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MINISTRY OF FOOD AND AGRICULTURE

West African Food System Resilience Program Phase 2 (FSRP2)

(P178132)

Environmental and Social Management Framework (ESMF) - Ghana

February 2022

TABLE OF CONTENTS

LIST OF ACRONYMS I

EXECUTIVE SUMMARY III

1.0 INTRODUCTION 1

1.1 Background 1
1.2 Objectives of the Assignment 1
1.3 Purpose of the ESMF 1
1.4 Rationale of the ESMF 2
1.5 Scope of the ESMF 2
1.6 Approach and Methodology for ESMF Preparation 3
1.6.1 Literature/Document Review 3
1.6.2 Field Visits/Stakeholders Consultations 3

2.0 DESCRIPTION OF THE PROGRAMME 5

2.1 Background 5
2.2 Programme Development Objectives 5
2.3 Project Components 6
2.3.1 Component 1: Digital Advisory Services for Agriculture and Food Crisis Prevention and Management 7
2.3.2 Component 2: Sustainability and Adaptive Capacity of the Food System's Productive Base 9
2.3.3 Component 3: Market Integration and Trade 10
2.3.4 Component 4: Contingency Emergency Response Component 11
2.3.5 Component 5: Project Management 11

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK 12

3.1 National Environmental Policy and Related Requirements 12
3.1.1 National Environmental Policy, 2013 12
3.1.2 National Environmental Action Plan, 1991 12
3.1.3 Environmental Protection Agency Act, 1994 (Act 490) 12
3.1.4 Environmental Assessment Regulations 1999 (LI 1652) 12
3.1.5 Fees and Charges (Amendment) Instrument, 2019 (LI 2386) 13
3.1.6 National Climate Change Policy, 2013 13
3.2 Waste Management Policies, Legislations and Regulations 13
3.2.1 Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917) 13
3.2.2 Hazardous, Electronic and Other Waste, Control and Management Regulations, 2016 (LI2250) 13
3.2.3 National Sanitation Policy, 1999 13
3.3. Agriculture, Food and Trade Related Policies 14
3.3.1 Food and Agriculture Sector Development Policy (FASDEP II), 2007 14
3.3.2 Ghana Shared Growth and Development Agenda, 2010 14
3.3.3 Ghana's Seed Policy, 2013 14
3.3.4 Medium Term Agriculture Sector Investment Plan (METASIP), 2010 14
3.3.5 Plants and Fertilizer Act, 2010 (Act 803) 14
3.3.6 Ghana Investment Promotion Centre Act, 1994 (Act 478) 14
3.4 Water Related Policies, Legislations and Regulations 15
3.4.1 National Water Policy, 2007 15
3.4.2 Water Resources Commission Act, 1996 15
3.4.3 National Irrigation Policy, 2010 15
3.4.4 Riparian Buffer Zone Policy, 2014 15
3.4.5 Water Use Regulations 2001, LI 1692 15

3.5 Fisheries and Aquaculture Sector Requirements 15
3.5.1 Ghana Fisheries and Aquaculture Policy 15
3.5.2 Ghana Fisheries and Aquaculture Development Plan 16
3.5.3 Fisheries Commission Act, 2002 (Act 625) 16
3.5.4 Fisheries (Amendment) Act, 2014 (Act 880) 16
3.5.5 Fisheries Regulations, 2010 (LI 1968) 16
3.5.6 Fisheries (Amendment) Regulations, 2015 (LI 2217) 16
3.6 Wildlife, Forestry and Cultural Heritage Protection 16
3.6.1 National Museums Act, 387 (1969) 16
3.6.2 Forest and Wildlife Policy, 2012 16
3.6.3 Forestry Commission Act, 1999 (Act 571) 17
3.7 National Planning and Development Requirements 17
3.7.1 National Land Policy, 2007 17
3.7.2 Lands Commission Act, 2008 Act 767 17
3.7.3 Land Use and Spatial Planning Act, 2016 (Act 925) 17
3.7.4 Local Governance Act, 2016 (Act 936) 17
3.7.5 National Building Regulations, 1996 (LI 1630) 18
3.7.6 State Lands 1962, Act 125 and Amendments 18
3.7.7 The Lands (Statutory Wayleaves), Act (1963) 18
3.8 National Labour, Gender and Human Rights Requirements 18
3.8.1 National Gender Policy, 2015 18
3.8.2 Labour Act, 2003 (Act 651) 18
3.8.3 National Employment Policy, 2012 18
3.8.4 Children's Act 1998 (Act 560) 18
3.8.5 Workmen's Compensation Law, 1987 (PNDCL 187) 19
3.8.6 Persons with Disability Act, 2006 (Act 715) 19
3.8.7 Data Protection Act, 2012 (Act 843) 19
3.9 National Health and Safety Requirements 19
3.9.1 National Workplace HIV/AIDS Policy 19
3.9.2 National HIV/AIDS and STI Policy, 2013 19
3.9.3 National Health Policy, 2008 19
3.9.4 Factories, Offices and Shops Act, 1970 (Act 328) 19
3.9.5 Public Health Act, 2012 (Act 851) 20
3.9.6 Imposition Restriction Act, 2020 (Act 490) 20
3.9.7 Ghana National Fire Service Act, 1997 (Act 537) 20
3.9.8 Fire Precaution (Premises) Regulations, 2003 (LI 1724) 20
3.9.9 Control and Prevention of Bushfires Act, 1990 (PNDCL 229) 20
3.10 National Environmental Quality Standards 20
3.10.1 Ghana Standard on Health Protection - Requirements for Ambient Noise Controls (GS 20
3.10.2 Ghana Standard on Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236:2019) 21
3.10.3 Ghana Standards Environment Protection-Requirements for Effluent Discharge (GS 1212:2019) 21
3.11 International Requirements, Safeguard Policies, Conventions and Agreements 22
3.11.1 World Bank Group Environmental and Social Framework 22
3.11.2 World Bank Group Safeguard Policies 23
3.11.3 World Bank Group General Environmental, Health and Safety Guidelines 24
3.12 World Bank Environmental and Social Framework vs Ghanaian Environmental Assessment Policies 26
3.13 Regional Policies and Frameworks 29
3.13.1 Cadre Harmonisé Framework 29
3.13.2 Volta River Basin Convention 29
3.13.3 Water Charter for the Volta River Basin 30

3.14 International Conventions 30
3.15 Institutional Framework 35
3.15.1 Ministry of Food and Agriculture 35
3.15.2 Ministry of Environment, Science, Technology and Innovation 35
3.15.3 Environmental Protection Agency (EPA) 35
3.15.4 Council for Scientific and Industrial Research 35
3.15.5 Ministry of Local Government and Rural Development 36
3.15.6 Metropolitan /Municipal/District Assemblies (MMDAs) 36
3.15.7 Land Commission 36
3.15.8 Department of Town and Country Planning 36
3.15.9 Ministry of Lands and Natural Resources 36
3.15.10 Office of the Administrator of Stool Lands 37

4.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS 38

4.1 Methodology for Data Collection 39
4.2 General Country Characteristics 40
4.2.1 Hydrogeology 41
4.2.2 Aquifers found in Ghana 44
4.2.3 Groundwater Quality 45
4.2.4 Borehole Yields 45
4.2.4 Groundwater Abstraction and Distribution 47
4.3 Lower Volta Basin Area 48
4.3.1 Surface Water Resources 48
4.3.2 Land Use, Ownership and Degradation 48
4.4 White Volta Basin Area 49
4.4.1 Surface Water Resources 49
4.4.2 Land Use, Ownership and Degradation 50
4.5 Agro-Ecological Zones in the Volta Basin of Ghana 50
4.5.1 The High Rainforest Zone (HRF) Zone 51
4.5.2 The Semi-Deciduous Forest (SDF) Zone 52
4.5.3 The Forest-Savanna Transitional (FST) Zone 52
4.5.4 The Guinea Savanna Zone 52
4.5.5 The Sudan Savanna Zone 53
4.5.6 The Coastal Savanna Zone 53
4.6 The SADA (now NDA) Regions 53
4.6.1 Climate and Meteorology 55
4.6.2 Geology and Topography 55
4.6.3 Savanna High Plains 55
4.6.4 Voltaian Sandstone Basin 55
4.6.5 Soils 56
4.6.6 Surface and Groundwater Hydrology 57
4.6.7 Biological Environment 58
4.6.8 Socio-Cultural Environment 60
4.6.9 Land Tenure 61
4.6.10 Gender and Vulnerable Groups Issues 61
4.7.1 The Bush Fallow System 65
4.7.2 The HUZA Farming System 65
4.7.3 The Permanent Systems 66
4.7.4 The Mixed Farming System 66
4.8 Cropping Systems in the Volta Basin of Ghana 66
4.8.1 Sudan Savanna Zone 66

4.8.2 Guinean Savanna Zone ... *66*
4.8.3 Forest Savanna Transitional Zone ... *67*
4.8.4 Deciduous Forest Zone ... *67*
4.9 Crop Husbandry Processes and Activities ... 67
4.9.1 Sudan Savanna Zone ... *67*
4.9.2 Guinea Savanna Zone ... *67*
4.9.3 Forest Savanna Transitional Zone ... *68*
4.9.4 Deciduous Forest Zone ... *68*
4.10 Livestock Production ... 69
4.10.1 Sudan Savanna and Guinea Savanna Zones ... *69*
4.10.2 Forest Transitional Savanna Zone ... *69*
4.10.3 Deciduous Zone ... *69*

5.0 STAKEHOLDER ENGAGEMENT AND CONSULTATIONS ... 70

5.1 Purpose of Stakeholder Engagement ... 70

6.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS ... 83

6.1 Methodology for Assessing and Ranking Impacts ... 83
6.2 Beneficial Impacts ... 84
6.2.1 Improved Regional Economy ... *84*
6.2.2 Improved National Economy ... *85*
6.2.3 Improved Food Security ... *85*
6.2.4 Improved Land and Environmental Management ... *85*
6.2.5 Employment Opportunities and Improved Income Profiles ... *85*
6.2.6 Inundation and Flood Control ... *86*
6.3 Adverse Impacts / Risks ... 86
6.3.1 Land Take Impacts ... *86*
6.3.2 Socio-cultural Impact ... *87*
6.3.3 Impacts of Transportation of Food Produce to Deficit regions ... *88*
6.3.4 Risk of Use of Substandard Agricultural Inputs ... *88*
6.3.5 Climate Change Impacts due to Conversion of forest/woodland to Agricultural lands ... *88*
6.3.6 Biodiversity Impact ... *89*
6.3.7 Waste Disposal Impacts ... *89*
6.3.8 Impacts on Water Resources ... *90*
6.3.9 Potential Soil Degradation ... *91*
6.3.10 Fire Risks ... *92*
6.3.11 Health and Safety Risks ... *93*
6.3.12 HIV/AIDS and other STDs Transmission Risks ... *95*
6.3.13 Risk of Contracting and Spreading of Coronavirus Disease ... *95*
6.3.14 Labour and Gender Issues ... *96*

7.0 MITIGATION AND ENHANCEMENT MEASURES ... 98

7.1 Resettlement and Livelihood Restoration Measures; ... 98
7.2 Safeguarding Socio-Cultural Values ... 99
7.3 Traffic and Road Safety Measures ... 99
7.4 Education on Approved Agricultural Inputs ... 100
7.5 Climate Change Adaptation Measures ... 100
7.6 Biodiversity Loss Minimisation Measures ... 100
7.7 Waste Segregation and Disposal Measures ... 100
7.7.1 Topsoil and Excavated Wastes ... *101*
7.7.2 Waste Segregation ... *101*

7.7.3 Liquid Waste *102*
7.7.4 Oily Wastes *102*
7.8 Water Resources Protection Measures 102
7.9 Soil Restoration Principles 102
7.10 Fire Prevention and Control Measures 103
7.11 Health and Safety Measures 103
7.11.1 Noise and Vibration Reduction Measures *103*
7.11.2 Dust and other Emission Reduction Measures *104*
7.11.3 Health and Safety *104*
7.12 Measures to minimise spread of HIV/AIDS and other STIs 105
7.13 Covid-19 Containment and Prevention Measures 105
7.14 Labour Improvement and Gender Protection Principles 106
7.14.1 Labour improvement *106*
7.14.2 Gender Safeguards *107*

8.0 ESMF IMPLEMENTATION PLAN 110

8.1 Institutional Roles and Responsibility 110
8.2 Capacity Building 111
8.3 Sub-project Screening and Approval 113
8.3.1 ESIA Procedure to be followed for Sub-projects *113*
8.3.2 Technical Specifications and Standards *118*
8.3.3 Environmental Standards *118*
8.4 Environmental and Social Monitoring and Reporting 119
8.4.1 Compliance Monitoring *119*
8.4.2 Impacts Monitoring *119*
8.4.3 Cumulative Impact Monitoring *120*
8.5 ESMF Implementation Budget 120

LIST OF REFERENCES 121

APPENDIX 1A Environmental and Social Screening Checklist 122

APPENDIX 1B EPA FORM EA1 124

APPENDIX 2 Generic Environmental and Social Management Plan 128

APPENDIX 3 Stakeholder Engagement Outcomes 168

APPENDIX 4 Citizen Engagement Plan 192

APPENDIX 5 Labour Management Procedures 200

LIST OF TABLES

Table 3. 1 Requirements for Ambient Noise Control *21*
Table 3. 2 Requirements for Ambient Air Quality – Maximum Limit for 24 Hours *21*
Table 3. 3 Requirements for Effluent Discharge *21*
Table 3. 4 Summary of Environmental and Social Standards of the ESF *22*
Table 3. 5 Safeguards Policies Relevant to this Programme *24*
Table 3. 6 Measures to bridge Gap between WB and Ghana EA Safeguards Policies *26*
Table 3. 7 International Conventions relevant to FSRP2 ..... *30*
Table 4. 1 Regional Distribution of Targeted Program Areas *38*
Table 4. 2 Summary of Borehole Yields of Hydrologic Provinces and Sub Provinces *45*
Table 4. 3 Surface Water flows of the Lower Volta of Ghana *48*
Table 4. 4 Sub-basins of the Main Volta River in Ghana *48*
Table 5. 1 Categorisation of Stakeholders *70*

Table 5. 2 Stakeholder Identification Matrix 73
Table 5. 3 Stakeholder Engagement Schedule 76
Table 5. 4 Major Highlights from Engagements 77
Table 7. 1 Summary of Impacts 108
Table 8. 1 Summary of Environmental and Social Screening Processes and Responsibility 116
Table 8. 2 ESMF Implementation Budget 120

LIST OF FIGURES

Figure 2. 1 Activity-Based Components of FSRP2 7
Figure 4. 1 Regional Distribution of Targeted Programme Areas 39
Figure 4. 2 Hydrogeological provinces of Ghana (Geological Survey of Ghana 1969) 42
Figure 4. 3 Hydrogeological sub-provinces of the Basement Complex (Ghana Geological Survey 1969) 43
Figure 4. 4 Distribution of borehole yield in Ghana (Water Resources Research Institute 1994) 46
Figure 4. 5 Regional Distributions of Borehole and Annual Abstraction Figures 47
Figure 4. 6 Land Use Map of the Lower Volta Basin (2003, 2005) 49
Figure 4. 7 Map showing the agro-ecological zones of Ghana and Burkina Faso 51
Figure 4. 8 NDA's Agricultural Network 54
Figure 4. 9 Map of Ghana showing major National Parks and Cultural sites 57
Figure 5. 1 Consultations with Male Farmers from Asutsuare 80
Figure 5. 2 Consultations with Female Rice Farmers from Asutsuare 81
Figure 5. 3 Consultations with Members of the Agogo Plantain Market 81
Figure 5. 4 Consultations with the Animal Production Department of the CSIR and Upper East NADMO 81
Figure 5. 5 Consultations with the Water Resources Commission and the Ejura Sheep Breeding Station 82

LIST OF ACRONYMS

AGRHYMET	Agriculture, Hydrology and Meteorology	**IESS**	Institute of Environment and Sanitation Studies
APD	Animal Production Directorate	**IRI**	Industrial Research Institute
ARAP	Abbreviated Resettlement Action Plan	**LAP**	Land Administration Project
ARI	Animal Research Institute	**LVD**	Land Valuation Division
DDF	District Development Fund	**MBDA**	Middle-Belt Development Authority
CERC	Contingency Emergency Response Component	**MEP**	Monitoring and Evaluation Plan
CERSGIS	Centre for Remote Sensing and Geographic Information Services	**MET**	Monitoring and Evaluation team
CDA	Coastal Development Authority	**MMDAs**	Metropolitan, Municipal and District Assembly
CORAF	West and Central African Council for Agricultural Research and Development	**MoFA**	Ministry of Food and Agriculture
CRI	Crop Research Institute	**MPA**	Multi–Phase Programmatic Approach
CSIR	Council for Scientific and Industrial research	**MSA**	Meteorological Services Authority
DAES	Directorate of Agricultural Extension Services	**NAFCO**	National Food Buffer Stock Company
DFSA	College of Science and Technology, Department of Fisheries Science and Aquaculture	**NDA**	Northern Development Authority
EA	Environmental Assessment	**NGOs**	Non-governmental Organizations
EAA	Environmental Assessment and Audit	**PAPs**	Project Affected Persons
EAR	Environmental Audit Report	**PDO**	Program Development Objective
e-AP	e-Agricultural Programme	**PIU**	Project Implementing Authority
EA/TRC	Environmental Assessment Technical Review Committee	**PPD**	Plant Protection Division
EIA	Environmental Impact Assessment	**RAP**	Resettlement Action Plan
EPA	Environmental Protection Agency	**RCC**	Regional Coordinating Council
ESIA	Environmental and Social Impact Assessment	**RPF**	Resettlement Action Framework
ESF	Environmental and Social Framework	**SADA**	Savannah Accelerated Development Authority
ESS	Environmental and Social Standard	**SEA/SH**	Sexual Exploitation and Abuse and Sexual Harassment
ECOWAS	Economic Community of West African States	**SEP**	Stakeholder Engagement Plan
FAO	Food and Agriculture Organisation	**SLWM**	Sustainable Land and Water Management
FRSP	Food Residues Survey Programme	**SRI**	Soil Research Institute
GADS	Gender and Agricultural Development Strategy	**UENR**	University of Energy and Natural Resources
GEDAP	Ghana Energy Development and Access Project	**FSRP2**	West Africa Food Systems Resilience Program
GEF	Global Environment Facility	**WIAD**	Women in Agriculture Development

GIDA	Ghana Irrigation Development Authority	**WEEE**	Waste Electrical and Electronic Equipment
GoG	Government of Ghana	**WHO**	World health Organisation
GRC	Grievance Redress Committee	**WRC**	Water Resources Commission
GCAP	Ghana Commercial Agriculture Project	**VCs**	Value Chains
IIE	Independent Impact Evaluation		

EXECUTIVE SUMMARY

Introduction

The Government of Ghana (GoG) through the Ministry of Food and Agriculture (MoFA) in collaboration with ECOWAS and the World Bank intend to undertake Phase 2 of the West Africa Food Systems Resilience Programme (FSRP2) (P178132) to strengthen regional food system risk management, improve the sustainability of the productive base in targeted areas and to develop regional agricultural markets. The programme will contribute to enhance the capacity of vulnerable households, families, communities, and systems within the country to face uncertainty and the risk of shocks, to withstand and respond effectively to shocks, as well as to recover and adapt in a sustainable manner. Phase 2 countries are Ghana, Sierra Leone, and Chad.

This ESMF seeks to establish a process of environmental and social screening which will guide the Ministry of Food and Agriculture (MoFA) and its implementing agencies to identify, assess and mitigate the environmental and social impacts of the proposed interventions. The ESMF also determines the institutional arrangements and coordination to be followed during the program implementation, including those relating to capacity building to enhance the implementation of this ESMF.

Rationale of the ESMF

Ghana's Environmental Assessment (EA) Regulations, 1999 (LI 1652) provide the general framework and procedures for EA and environmental management of development actions. Most Development Partners (DPs) and funding institutions, including the World Bank also have their respective EA requirements. As part of funding arrangements for the FSRP2, the Borrower is expected to comply with the World Bank Environmental and Social Standards 1 to 10 as well as the World Bank Group General Environmental, Health and Safety Guidelines and the EHSGs for Annual Crop Production.

The ESMF sets the stage to ensure that the environmental and social risks and impacts (ESRIs) associated with the implementation of the FSRP2 activities are properly assessed, managed and monitored throughout the program cycle. The ESMF will apply to the entire program and will be used for the screening of all undertakings which will inform subsequent preparation of site-specific instruments. This will ensure that all potential risks and impacts in the various proposed activities are identified, assessed, evaluated and managed using the mitigation hierarchy.

Approach and Methodology for ESMF Preparation

The ESMF has been prepared in accordance with applicable World Bank Environmental and Social Framework (ESF), World Bank Group General Environmental, Health and Safety Guidelines and the EHSGs for Annual Crop Production and relevant World Bank safeguard policies and the Ghana environmental assessment guidelines which involve the following activities:

- Literature/Document review
- Field visits/consultations with relevant institutions and potential implementing partners
- Information collation, analysis and preparation of report

The following relevant documents were reviewed:

- Programme Concept Note (PCN)
- The Mini-Project Appraisal Document (Mini-PAD)
- Proposed project activities submitted by potential participating institution and organizations
- Ghana policies and regulations regarding environmental/social assessment

- World Bank Environmental and Social Framework and relevant World Banks Safeguard Policies that have not been replaced by the Environmental and Social Standards (ESSs) and the World Bank Group General Environmental, Health and Safety Guidelines and the EHSGs for Annual and Perennial Crop Production, Mammalian Production and possibly Aquaculture and Poultry Production as well as EHSGs for Nitrogenous Fertilizer Production, Pesticides Formulation, Manufacturing and Packaging, Phosphate Fertilizer Manufacturing
- Relevant key international conventions ratified by Ghana
- ESMFs prepared for the West Africa Agricultural Transformation Program – WAATP and Ghana Commercial Agriculture Project - GCAP)
- Good practice ESMF documents / guides from the World Bank

Programme Description
The following are the proposed Programme Development Objectives (PDO) level outcome indicators:

- Strengthened regional food crisis prevention and management systems used for decision making;
- Total number of project beneficiaries;
- Producers adopting supported agricultural technologies and services, including access to agro-meteorological information through digital channels (by gender);
- Area under sustainable and integrated land management practices; and
- Countries implementing regional trade policy in targeted input and output VCs.

The Programme consists of five (5) Components, three (3) direct activity-based components, a contingency emergency response component and a project management component. The 3 activity-based components are divided into sub-components as follows:

Component 1: Digital Advisory Services for Agriculture and Food Crisis Prevention and Management
The sub-component 1.1 aims at transforming the regional food security and agriculture information system to support risk management decision-making. This sub-component objective will be achieved by:

A. Improving regional and national capacity to deliver reliable information services on vulnerability, nutrition, and food security.
B. Reorganizing and improving regional and national pest and disease monitoring and management mechanisms.
C. Strengthening regional collaboration for food crisis prevention.

The sub-component 1.2 aims at developing new services, improving the quality and increasing access to and use of impact-based and location-specific weather, climate and hydrological (hydromet) information as well as their application to agriculture (AGROMET) tailored to the needs of the agriculture sector. This sub-component objective will be achieved by:

D. Improving production, dissemination and use of hydromet, climate, agromet and impact-based information by decision-makers, farmers, pastoralists and other actors in the food system.
E. Supporting the timely delivery and use of essential agro-hydro-meteorological information.
F. Strengthening the financial and institutional sustainability of regional and national institutions providing hydromet, climate, and agromet information

Component 2: Sustainability and Adaptive Capacity of the Food System's Productive Base
Sub-component 2.1 will scale up the introduction and use of digital agriculture (E-extension, electronic markets for agriculture technologies, inputs, and products), support the strengthening of the seed system, soil fertility management (development of soil maps, promotion of soil testing, monitoring of soil fertility and introduction of targeted fertilizer blending).

Sub-component 2.2 will sustainably improve rural households' food security and resilience to climate variability in targeted areas. Proposed interventions like land and watershed restoration, floodplains restoration, water mobilization and irrigation developments and delivery of farm or climate smart agriculture (CSA) level packages of technologies will be coordinated through spatial/participatory planning and management at the watershed level.

Component 3: Market Integration and Trade

Sub-component 3.1 will support the preparation and implementation of sound regional regulations and policies to strengthen the enabling environment for an expansion of regional agricultural output and input markets. Activities would also lead to the consolidating of the Regional Food Reserve Systems.

Sub-component 3.2 identify, validate, establish and develop three (3) value chains of priority commodities / crops to ensure their integration within country and regional value chains to promote trade along the region.

Component 4: Contingency Emergency Response Component.

Component 5: Project Management

Policy, Legal and Institutional Framework

The following policy, legal and institutional framework were reviewed:

- National Environmental Policy and Related Requirements
  - National Environmental Policy, 2013
  - National Environmental Action Plan, 1991
  - Environmental Protection Agency Act, 1994 (Act 490)
  - Environmental Assessment Regulations 1999 (LI 1652)
  - Fees and Charges (Amendment) Instrument, 2019 (LI 2386)
  - National Climate Change Policy, 2013
- Waste Management Policies
  - Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917)
  - Hazardous, Electronic and Other Waste, Control and Management Regulations, 2016 (LI2250)
  - National Sanitation Policy, 1999
- Agriculture, Food and Trade Related Requirements
  - Food and Agriculture Sector Development Policy (FASDEP II), 2007
  - Ghana Shared Growth and Development Agenda, 2010
  - Ghana's Seed Policy, 2013
  - Medium Term Agriculture Sector Investment Plan (METASIP), 2010
  - Ghana Investment Promotion Centre Act, 1994 (Act 478)
- Water Related Policies
  - National Water Policy, 2007
  - Water Resources Commission Act, 1996
  - National Irrigation Policy, 2010
  - Riparian Buffer Zone Policy, 2014
  - Water Use Regulations 2001, LI 1692
- Fisheries and Aquaculture Sector Requirements
  - Ghana Fisheries and Aquaculture Policy
  - Ghana Fisheries and Aquaculture Development Plan
  - Fisheries Commission Act, 2002 (Act 625)

- Fisheries (Amendment) Act, 2014 (Act 880)
- Fisheries Regulations, 2010 (LI 1968)
- Fisheries (Amendment) Regulations, 2015 (LI 2217)
- Plants and Fertilizer Act, 2010 (Act 803)

- Wildlife, Forestry and Cultural Heritage Protection
  - National Museums Act, 387 (1969)
  - Forest and Wildlife Policy, 2012
  - Forestry Commission Act, 1999 (Act 571)
- National Planning and Development Requirements
  - National Land Policy, 2007
  - Lands Commission Act, 2008 Act 767
  - Land Use and Spatial Planning Act, 2016 (Act 925)
  - Local Governance Act, 2016 (Act 936)
  - National Building Regulations, 1996 (LI 1630)
  - State Lands 1962, Act 125 and Amendments
  - The Lands (statutory wayleaves) Act, 1963
- National Labour, Gender and Human Rights Requirements
  - National Gender Policy, 2015
  - Labour Act, 2003 (Act 651)
  - National Employment Policy, 2012
  - Children's Act 1998 (Act 560)
  - Workmen's Compensation Law, 1987 (PNDCL 187)
  - Persons with Disability Act, 2006 (Act 715)
  - Data Protection Act, 2012 (Act 843)
- National Health and Safety Requirements
  - National Workplace HIV/AIDS Policy
  - National HIV/AIDS and STI Policy, 2013
  - National Health Policy, 2008
  - Factories, Offices and Shops Act, 1970 (Act 328)
  - Occupational Safety and Health Policy of Ghana (Draft, 2004)
  - Public Health Act, 2012, Act 851
  - Imposition Restriction 2020, Act 490
  - Ghana National Fire Service Act, 1997 (Act 537)
  - Fire Precaution (Premises) Regulations, 2003 (LI 1724)
  - Control and Prevention of Bushfires Act, 1990 (PNDCL 229)
- National Environmental Quality Standards
  - Ghana Standard on Health Protection - Requirements for Ambient Noise Controls (GS 1222:2018)
  - Ghana Standard on Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236:2019)
  - Ghana Standards Environment Protection-Requirements for Effluent Discharge (GS 1212:2019)
- International Requirements, Safeguard Policies, Conventions and Agreements
  - World Bank Group Environmental and Social Framework
  - World Bank Group Safeguard Policies
  - World Bank Group General Environmental, Health and Safety Guidelines
  - World Bank Group EHSGs on Annual Crop Production
  - World Bank Group EHS Guidelines for Perennial Crop Production
  - World Bank Group EHS Guidelines for Mammalian Livestock Production
  - WBG EHS Guidelines for Aquaculture
  - WBG EHS Guidelines for Poultry Production

- WBG EHS Guidelines for Nitrogenous Fertilizer Production
- WBG EHS Guidelines for Pesticides Formulation, Manufacturing and Packaging
- WBG EHS Guidelines for Phosphate Fertilizer Manufacturing

- Regional Policies and Frameworks
  - Cadre Harmonisé Framework
  - Volta River Basin Convention
  - Water Charter for the Volta River Basin
- International Conventions
- Institutional Framework
  - Ministry of Food and Agriculture
  - Ministry of Environment, Science, Technology and Innovation
  - Environmental Protection Agency (EPA)
  - Council for Scientific and Industrial Research
  - Ministry of Local Government and Rural Development
  - Metropolitan /Municipal/District Assemblies (MMDAs)
  - Land Commission
  - Department of Town and Country Planning
  - Ministry of Lands and Natural Resources
  - Office of the Administrator of Stool Lands

Environmental and Social Baseline Conditions

The baseline conditions present a description of the existing environment, comprising the bio-physical and socioeconomic conditions of the country and proposed project areas / regions. The targeted areas of interventions are mainly within communities in the Lower Volta Basin, the White Volta Basin (which traverses the SADA Regions), the Forest Transition and Guinea Savannah areas, and to some lesser extent, a few communities in the Eastern, Greater Accra and Central regions.

Various techniques were applied for gathering data on the project environment. These included document review, institutional consultations, focus group discussions and field surveys of the existing environment. An account of the existing physical and biological environment and socio-economic conditions (ethnic groups, culture, economic activities, etc.) was assembled. These formed a part of the baseline information and the information obtained used in the environmental analysis / assessment.

The description of baseline information relevant to the FSRP2 cover:

1. The project areas
2. Land use categories
3. Land acquisition and tenure system
4. Socio-economic issues
5. Cultural resources
6. Healthcare situation
7. Natural resources
8. Wildlife and biodiversity
9. Climate and air quality
10. Hydrology of the area
11. Physical environment

Lower Volta Basin Area

The Lower basin is located below the confluence of the Black Volta and the White Volta rivers, excluding the Oti river drainage area. The surface water resources in the basin consist of flows from outside the country

and flows from within the country. The Lower Volta Basin covers a total area of about 68,588 km^2 and most of that (50,432 km^2) is located in east-central Ghana. The basin includes also portions of the Northern, Brong Ahafo, Volta, Ashanti, Eastern Regions and parts of Togo.

Current land use is short bush fallow cultivation along the immediate banks of the river, and less intensive bush fallow cultivation elsewhere. Animal grazing is common while the lakeshores are extensively settled by fishing families.

The Afram plains and other areas in the south have been the focus of increasing settlement and agricultural development since the 1960s, having been generally thinly populated in the past as part of the empty "middle belt". The forest and transitional areas are intensively farmed with cocoa, coffee, plantain, cocoyam, cassava, oil palm, and maize on small bush fallow plots. A large modern commercial farm at Ejura specializes in maize production.

Developments below the Akosombo Dam, include irrigated rice, sugar, and vegetable cultivation in the areas immediately adjoining the Volta River. The construction of the Akosombo Dam has reduced the annual flooding in the Lower Volta areas. The areas around the coastal lagoons, such as the Songhor, are used for salt mining.

White Volta Basin Area

The White Volta sub-basin covers about 49,210 km^2 in Ghana, representing 46% of its total catchment area of 10741.67 km^2 distributed in Ghana, Burkina and Togo. Its main tributaries are Morago and Tamne. The White Volta covers mainly the north-central Ghana and some parts of the Upper and Northern Regions. It is located within the Interior Savanna Ecological Zone and is underlain by the Voltaian and granite geologic formations.

Annual rainfall in the sub-basin ranges between 1,000 in the north and 1,200 mm in the south; pan evaporation is about 2,550 mm per year and runoff from within the basin averages about 96.5 mm per year. Current surface water uses in the basin are estimated at about 0.11m^3/s for domestic water supply and about 2m^3/s at numerous small irrigation projects.

Development potentials have been identified in the White Volta Basin which include a total of 63 megawatts of installed hydroelectric generating capacity, 155,809 hectares of irrigation, flood control, domestic water supply, navigation, and recreation.

Estimates of land use and land cover showed that the land in the northeast and northern parts of the basin was in the compound and bush fallow cultivation cycle. Farm sizes are usually less than three acres. Grazing land including that obtainable under natural condition is generally poor. Annual bush burning further reduces the quality and quantity of fodder.

Extensive valley bottoms in many parts of the basin, particularly in the guinea savannah areas, have in recent years been cultivated for rice under rain-fed conditions. In the north and northeast, the best agricultural soils are derived from granites, sandstones, and greenstones. The intensive cultivation and grazing without proper management practices have led to widespread soil erosion and loss of fertility of the upland soils. Outcrops of rocks, iron pan soils, as well as the scarps are usually avoided by farmers and may be uninhabited or only sparsely inhabited. Fuelwood and other wild produce gathering is widespread.

Urban land use is small and most intensive in such centres as Bolgatanga, Bawku, Wa, Navrongo, Tamale, and Tumu. Due to the decentralisation of administration to the district level, urban type land use is becoming important in some of the district capitals, especially those along major trunk roads.

Agro-Ecological Zones in the Volta Basin of Ghana

The natural vegetation of Ghana is closely related to the ecological zones. Six agro- ecological zones, defined based on climate, reflected by the natural vegetation and influenced by the soils are recognized in Ghana These consist of the Sudan, Guinea and Coastal Savanna Zones, Forest-Savanna Transitional Zone, the Semi-deciduous Forest Zone and the High Rainforest. In all these zones, the natural vegetation has undergone a considerable change because of human activities. Also, considerable variations exist between successive rainy seasons in time of onset, duration and amounts of fall. Rainfall is also generally accompanied by high intensities and energy loads and is therefore erosive. Generally, Alluvia soils (Fluvisols) and eroded and shallow soils (Leptosols) are found in all the agroecological zones (FAO- RAF, 2000/1).

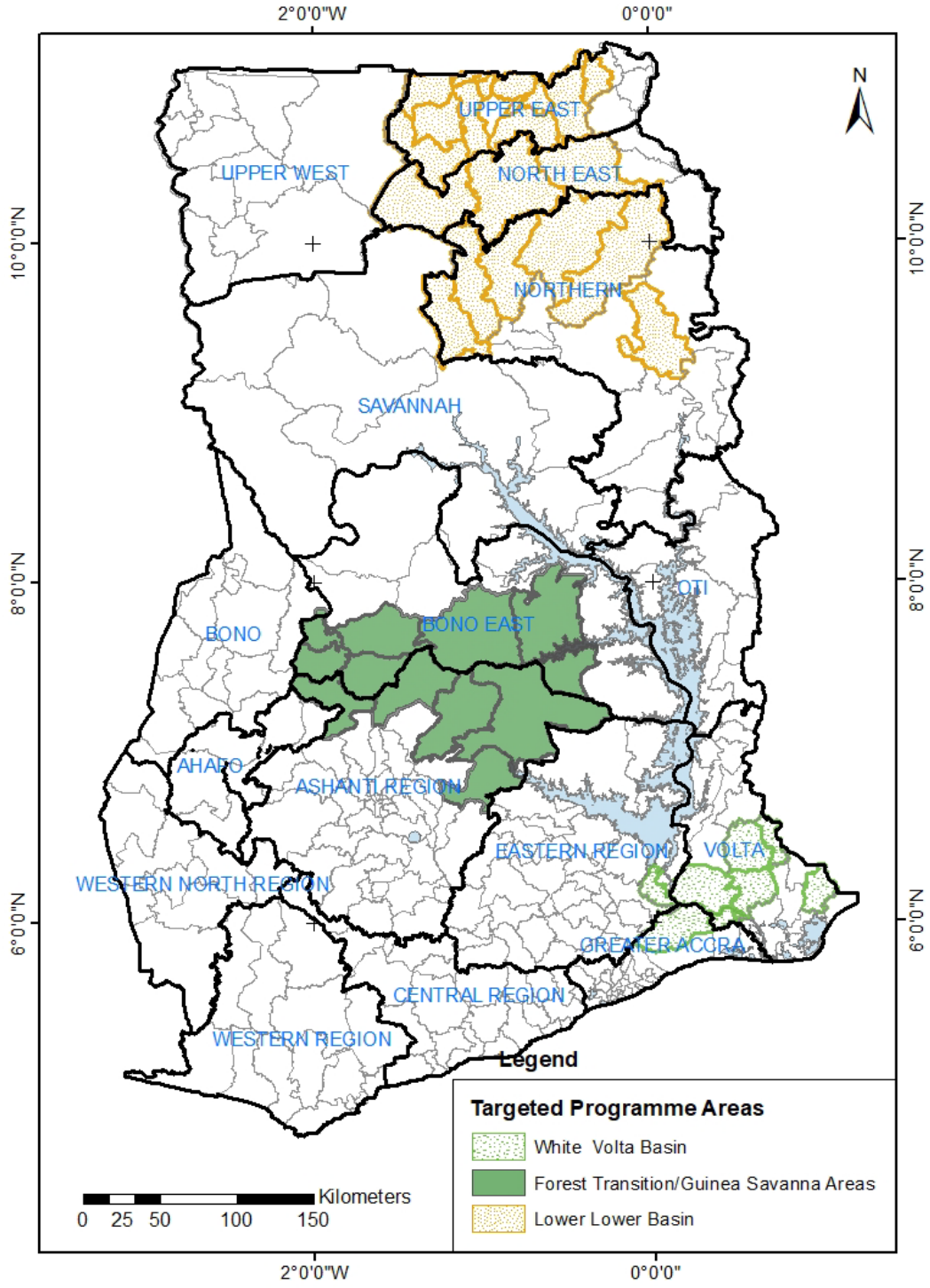
With the exception of the Tropical Rainforest Zone, the Volta Basin of Ghana (covering most of the FSRP2 areas) falls in all the agro-ecological zones of the country. The largest portion is in the Sudan Guinea Savanna zones (24.2%) followed by the Forest Savanna Transition zone (11.2%) and the Semi Deciduous Forest zone (5.4%). The Coastal Savanna occupies a small area of about 0.5%. It is within the Semi Deciduous Forest zone that most food crops and cocoa cultivation takes place. Most of the timber for both local needs and export comes from the zone. As a result of these activities the vegetation outside forest reserves consists mainly of forb regrowth, thicket, secondary forest and swamp thicket. Soils present in this zone are: Acrisols, Nitrisols and Gleysols (FAO-RAF, 2000/1).

Target Areas

The targeted areas of interventions are mainly within communities in the Lower Volta Basin, the White Volta Basin (which traverses the SADA or NDA regions), the Forest Transition and Guinea Savannah areas, and to some lesser extent, a few communities in the Eastern, Greater Accra and Central regions as captured in the Table and Map below.

Regional Distribution of Targeted Program Areas

Target Area of Intervention	Region	Districts
Target Area 1 – Lower Volta Basin (covering 6,950km^2 with 565,330 population)	Volta Region	Agotime Ziope, Adaklu Anyingbe, Central Tongu, North Tongu, Ketu North
	Eastern Region	Lower Manya Krobo
	Greater Accra Region	Shai-Osudoku
Target Area 2 – White Volta Basin (covering 12,000km^2 with 1.4million population)	Upper East Region North-East Region Savannah Region Northern Region	Not yet identified
Target Area 3 - Forest Transition and Guinea Savannah areas ((covering 27,810km^2 and 834,787 population)	Bono East Region	Techiman North, Techiman South, Atebubu Amantin, Nkoranza North, Nkoranza South, Sene West
	Ashanti Region	Ejura Sekyedumase, Sekyere Central, Sekyere Affram Plains, Asante Akyem North, Offinso North



Gender and Vulnerable Groups Issues

In Ghana, although women's roles and participation in economic activity have been defined and shaped along biological and cultural lines. Although females make up about 51% of Ghana's population as at 2010, illiteracy is more prevalent among women than men.

The predominant role of women in agriculture has enabled most women farmers to become increasingly responsible for the educational and other material needs of their wards, especially for female headed households. The problems women face in carrying out economic activities, include the following:

- Access to and control over land due to traditional/ cultural factors
- Access to credit due to lack of collateral, inadequate savings needed for equity payment required for loans, cumbersome bureaucratic procedures for accessing formal credit facilities
- Access to training due to ignorance on the awareness of training programs and low educational qualification
- Access to hired labour on their farms due to rural-urban migration
- Access to other inputs: fertilizer, extension services, information, technology, etc.
- Time constraints.

On access to and control of land it appears that most of the problems facing women in this area are associated with customary laws that are discriminatory to women as well as inefficiencies in land administration that tends to impact negatively women and other minority groups.

Stakeholder Engagement

The Consultation with relevant stakeholders were held mostly virtually in observance of COVID-19 protocols and also due to the fact that most institutions/organizations have scheduled days and times for work in the offices which made it difficult to hold consultations face-to-face.

The following key stakeholders were consulted:

- Environmental Protection Agency (EPA)
- Ghana Irrigation Development Authority (GIDA)
- CSIR-Crop Research Institute (CRI)
- CSIR–Food Research Institute (FRI)
- Women in Agriculture Development (WIAD)
- National Food Buffer Stock (NAFCO)
- Centre for Remote Sensing and Geographical Information System (CERSGIS)
- Northern Development Authority (NDA)
- Directorate of Crop Services (DCS) of MoFA
- Directorate of Agric Extension Services (DAES) of MoFA
- Animal Production Directorate (APD)
- Meteorological Service Authority (MSA)
- Institute of Environmental and Sanitation Studies (IESS)
- CSIR-College of Science and Technology
- Kpong Irrigation Scheme (KIS) Water Users Association
- Kpong Left Bank Project (KLBIP)
- Ghana Commercial Agriculture Project (GCAP)
- Water Resources Commission (WRC)
- Agogo Women Plantain Producers and Exporters Association (AWPPEA)
- National Disaster Management Organisation (NADMO)
- University of Energy and Natural Resources (UENR)

Assessment of Potential Environmental and Social Impacts and Risks

The various benefits of the project will include the following:

1. Improved Regional Economy
2. Improved National Economy

3. Improved Food Security
4. Improved Land and Environmental Management
5. Employment Opportunities and Improved Income Profiles
6. Inundation and Flood Control

The major potential risks and impacts in the implementation of the FSRP2 assessed included:

1. Land take impacts
2. Socio-cultural impact
3. Potential impacts of expanded transportation of food produce to deficit regions
4. Risk of imitation in the facilitation of agricultural inputs production
5. Climate change impact from conversion of forest/woodland to agriculture
6. Biodiversity impact
7. Waste disposal impacts
8. Impacts on water resources
9. Soil degradation
10. Fire risks
11. Health and safety risks
12. HIV/AIDS transmission risks
13. Risk of contracting and spreading of coronavirus disease
14. Labour and gender issues

Table 1 provides the sources and causes of impacts/risks and the corresponding mitigation and monitoring measures to the assessed impacts and risks.

Table 1 Risk and Impacts Description with Corresponding Mitigation and Monitoring Measures

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
Land Take		
• Development of ground based data collection systems and high-end digital tools • Irrigation and storage facilities developments; • Grazing reserves development • Land, watershed and flood plain restoration • Rehabilitation of existing Agriculture Centres	• As much as possible, subcomponents of the programme would avoid areas with potential displacement/involuntary resettlement issues; • Screening would be done at the onset of each sub-component to determine potential areas where displacement/involuntary resettlement may occur; • Resettlement Action Plan (RAP) would be prepared and implemented where there is a likelihood of displacement/involuntary resettlement; • Contractors would be required to use local labour as much as possible and where available; • Alternative grazing fields would be provided for pastoralists in case project activities impacts on grazing fields	• Review screening reports • Follow monitoring provisions prescribed in the RAP
Socio Cultural Impacts		
Breaking of cultural norms, taboos and practices leading to potential conflicts	• Engagement with traditional authorities through courtesy call and for establishing cordial relationships to fulfil relevant cultural obligations • Agree on socio-cultural protocols and provide orientation to migrant employees • Sensitization of workers on taboos, cultural norms, and values of the local communities • Discuss possible support to the traditional authority during festival celebrations.	• Review records of engagements with traditional authority and decisions taken • Review content of orientation given to migrant workers • Review records of breaches to cultural practices and norms • Inspect records of support extended to traditional authority during festival celebrations
Impacts of Expanded Transportation of Food Produce to Deficit Regions		
• Frequent breakdown of cargo vehicles in transit; • Speeding (cargo) vehicles and frequent accidents; • Inconsiderate driving on bad and pothole riddled roads with associated high	• Trucks and vehicles deployed will be equipped with safety accoutrement such as reflective triangle, fire extinguishers, etc.; • Trucks and vehicles deployed will be in good working condition, regularly serviced to avoid breakdowns in transit; • All trucks and other equipment will follow a maintenance regime and records kept;	• Inspect for the availability of safety accoutrements on trucks • Review maintenance records of trucks and vehicles used • Impromptu checks for the availability of labels with complaints and emergency phone numbers

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
vehicular accident rate and road fatalities.	• Trucks and vehicles will be labelled with complaints and emergency phone numbers for reporting irresponsible driving; • Impromptu tests on alcohol consumption levels of truck drivers; • Compliance with the 30km/h speed limit driving through towns and 20km/h in construction sites; • Only licensed (Class E) drivers will be qualified to drive trucks; and • Reflectors on haulage trucks will be mandatory for hired trucks to caution other road users.	• Review of records for breaches to alcohol prohibition and sanctions applied • Impromptu check on trucks and other vehicles for adherence • Review of employee records and impromptu checks or validity of license • Inspection of haulage truck for compliance
Risk of Use of Substandard Agricultural Inputs		
proliferation of sub-standard seeds, fertilizers, pesticides, veterinary products by covert industries	Extensive use of Agriculture Extension Agents to sensitize • Farmers to purchase and use only EPA approved agrochemicals from licensed agrochemical shops for use at the recommended application rates. • farmers to adopt integrated weed and pest management practices for weed and pest control	Impromptu checks on farms to check to test farmer's knowledge on agrochemicals use and integrated weed and pest management
Climate Change Impact		
enhance agriculture productivity and attract more investments and people	• Sustainable management of ecosystems using the Integrated Landscape Management (ILM) • Introduction of scientific methods of farming through sustained extension services, improved seeds among others will ensure the intensive use of land and reduce shifting cultivation	• Review record of scientific methods of farming including: • Variety and quantity of improved seeds supplied to farmers • Farmer • Improved land and water management, erosion control, etc.
Biodiversity Impact		
Development of sub-projects requiring large land take such as irrigation and graze land reserves development with accompanying infrastructure	• Unnecessary exposure and access to sensitive fauna and forest habitats would be avoided • Regular or monitoring would be carried out in the area identified or suspected to be sensitive habitat prior to start and during work. Screen for Critical and Natural Habitat (World Bank Environmental and Social Standard 6) • Hunting or keeping of wildlife as pet among project workers, as well as cutting of natural vegetation will be prohibited at project sites	Review of • Sub-project screening report, which includes the determination if Critical or Natural Habitat will be affected; • Monitoring reports on environmental performance during project implementation • Records of offenders and sanctions applied

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
Waste Disposal Impacts		
Handling and disposal of excavated spoil Indiscriminate disposal of wastes generated at the construction and operation phases Indiscriminate defecation and disposal of grey water Inappropriate handling and disposal of oily waste from equipment/machinery maintenance works	***Vegetative waste, topsoil and excavated spoil*** • Stockpile excavated spoil for use for backfilling and burrow pit reclamation. ***Segregated waste*** • Use colour coded bins to segregate all wastes • Outsource segregated waste transfer to contractors • E-waste to be auctioned to accredited e-waste dealers ***Liquid Waste*** • Provide mobile toilets at construction phase, separate for women and men. • Construct septic tank toilets in the operation phase. • Sanction workers who engage in bush defecation. • Direct grey water into sumps for primary screening and clarification prior to discharge ***Oily Waste*** • Perform activities involving oil and lubricants on bunded platforms, fitted with oil sump to hold waste oils. • Put fuel tanks in impermeable bunds of 110% of the volume of the largest tank. • Provide waste oil tanks at workshops and servicing areas to hold spent oils and returned to suppliers.	Inspect records of quantities of onsite filling material • Adherence to segregation practices • Waste transfers to accredited companies and to final disposal site. • Performance of waste contractors. • Quantities of e-waste auctioned to accredited dealers • Adequacy and hygienic state of mobile toilets daily • Surroundings for signs of defecation and sanctions applied. • Screened grey water quality prior to discharge. Parameters to review include COD, BOD, grease, oil, Turbidity and TSS • Monthly checks on integrity of oil sumps • Quarterly inspection of records of waste oils generated, collected from sumps and returned to suppliers
Impacts on Water Resources		
Construction phase • Development and rehabilitation of irrigation schemes and other structures; • Servicing of machinery and equipment on-site; and • Leakages of fuel in storage	• Contractors would be required to implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and cleanup of accidental spills • Contractors to prohibit the washing of machineries and vehicles and be required to do period water quality monitoring and the protection of the buffer zones of such water bodies	Review of the hazardous management plan Review of water quality monitoring report against the WBG General EHS Guidelines. Parameters of interest include BOD, COD,

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
Operations Phase: - • Water abstraction for irrigation; • Farmland/plots development;	• Acquisition of water use permit for water abstraction • Plot layout pattern would follow soil conservation measures and will include field drains along the least slope within the field • Develop and implement a Water Quality Monitoring System	heavy metals, grease, oil, Turbidity and TSS, etc. Review of surface water (lakes, rivers, streams etc.) quality against Ghana Water Resources Commission's (WRC's) Target Water Quality Range. Check for the validity of water use permit Monitor the quality of incoming irrigation water and the quality of the drainage water prior to discharge into a river. Focus on BOD, P an N levels and pesticide levels. A laboratory will be needed for this purpose.
Soil Degradation		
• Vegetation removal for development of infrastructure and farming • Sand and laterite extraction from borrow pit for construction works; • Improper agriculture practices including mono cropping and excessive use of agrochemicals; and • Inappropriate disposal of waste oil.	• Land clearing to be minimized in areas as much as possible to avoid unnecessary exposure of bare ground • Cleared areas would be revegetated as early as possible • Farmers will be sensitised to adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and hardpan formation • Crop residue comprising process residue (straw, husks, skins, trimmings, among others) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content. • Farmers will utilise cover crops at erosion-prone areas in sections • Use of Regenerative Agriculture Techniques for Crop Farming and Grazing Practices, which are more climate change resilience.	• Impromptu check for supervision during land preparation • Review record and content of sensitization of farmers • Impromptu checks on farms during land preparation for the use of crop residue • Impromptu checks on farms for the extent of use of cover crops

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
Fire Risks		
Smoking by workers, faulty electrical gadgets and the use of sub-standard electrical cables. Intentional burning of bush and crop residues , which is a general practice.	• Post caution signs like 'No Smoking', 'Switch Engines' and 'Mobile Phones Off', 'Emergency Hotlines', etc. conspicuously at the fuel storage and fuelling areas; • Provide firefighting equipment such as fire beaters, extinguishers, foam concentrates, hose reels, dry chemical powder and CO_2 fire extinguishers at fuel storage and generator set areas; • Restrict smoking to designated areas; • Conduct weekly toolbox meetings on fire safety; • Provide fire emergency exits and assembly points; and • Prompt cleaning of accidental spills. • Install smoke detectors and heat alarms at various offices and facilities; and • Conduct annual firefighting drills and search-and-rescue operations to check the efficiency of emergency response and preparedness plan. • Educate farmers and herders on the negative impacts of burning of bush and crop residues.	Monitor/review/inspect - • Visibility of signage • Availability and accessibility of firefighting equipment • Adherence to smoking zones • Training programme and number held • Support to GNFS and number of volunteers trained • Emergency exits and assembly points • Emergency plan annually • Validity of fire certificate • Functioning of smoke detectors • Annual fire drills
Health and Safety Risks		
• Health risk from agro-chemical handling, storage and disposal; and • Risk of accidents and knockdowns from the movement of trucks/vehicles and other machinery. • Accidents Trips, slips, falls • Risk of manual handling and work-related musculoskeletal disorders etc • Dust and emissions from land preparation,	• Use only qualified contractors with proven E&S and Health and Safety management records for civil works • Contractor will be required to develop a Contractor ESMP and a Contractor Health and Safety Plan to guide E&S and H&S implementation during construction • Contractor to be required to provide staff with PPEs and enforce their use • First Aid Kits in every project car will be provided to cater for injured workers before they are sent to the nearest Hospital, depending on the level of injury. The Contractor establishes a small clinic at the work camp with a qualified nurse and an ambulance; • Qualified first aid personnel will be employed at project and construction site to administer first aid;	• Review the profile of contractors • Review construction ESMP • Inspect availability and use of hard hats, high visible clothing and other PPE. • Check for the availability of First Aid services and trained personnel to provide such services and check for an ambulance. • Inspect incident register • Review of maintenance records of machinery

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
equipment and machinery use and cement, paint and solvents exposure; • Noise and vibration from heavy-duty equipment and machinery use; • Risk of drowning from open canals	• All accidents/injury, snake bites and public concerns will be reported and recorded. A Root Cause Report will be prepared, as well as an Action Plan to avoid similar accidents in the future • Vehicles, machinery and equipment will be required to follow scheduled servicing regime and certified; • Mounting of signage prohibiting bathing and swimming in canals	• Review air and noise quality against WBG General EHS guidelines and Ghana Standards. The most stringent regulations applies. • Check for visibility of signages
HIV/AIDS/STIs Transmission Risks		
• High mobility, resulting in long periods spent away from home and family, or contact with highly mobile workers; • Isolation and working in confined environments with limited contacts; • Male-dominated profession and a predominantly masculine environment, with the cultivation of a 'macho culture' including openness to occasional sexual relations; • Stress due to working and living conditions; and • Misinformation or lack of information about HIV/AIDS.	• HIV/AIDS and other STIs prevention clauses will be incorporated into workers' contracts; • HIV/AIDS and other STIs prevention and treatment guidelines for workers will be prepared and supported; • Relations with infected HIV/AIDS workers will be governed by the basic human rights as enshrined in the Constitution and the National Workplace HIV/AIDS Policy; • Refusal of employment or dismissal will not be based on HIV status, nevertheless testing for HIV will be encouraged to know and manage one's status; • No discrimination or stigmatization against workers based on real or perceived HIV status; • Information on HIV status of workers will be handled with due care and confidentiality; and • Information provision, peer counselling, condom use promotion and distribution, as well as facilitation of voluntary testing, counselling and support for behavioural change to reduce spread. • Awareness creation on HIV/AIDS among nearby communities	• Review implementation of HIV/AIDS/STI Workplace Policy • Review HIV policy on prevention clauses • Review records of employee contracts • Monitor workers settling in nearby communities • Review records of distributed leaflets, workshop attendance and condom supply • Review number of educational campaigns and records of attendance • Checks availability/supply of condoms to workers • Review records of awareness campaign for workers
Risk of Contracting and Spreading of Coronavirus Disease and other Communicable Diseases		
• Lack of knowledge and nonchalant attitude of people;	• Entry logbook for workers and visitors; • Space for personnel entry record taking; • Infrared thermometer for temperature recording; • Water storage tank for constant supply of drinking water and water for hand washing;	• Compliance level with COVID-19 safety protocols (number complying) • Review records of infections

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
• Unhygienic personal habits and practices promoting infection; • Failure of business/industry to allocate budget and to invest in the COVID-19 protocols and other prevention measures; and • Affected workers concealing infection due to possible stigmatization.	• Nose masks supplies; • Workplace physical distancing arrangement; • Veronica bucket, liquid soap, and tissue paper supplies and hand washing area; • Hand sanitizer stand and area; • Poster/signage on COVID-19 protocols - • Disposal of used tissues and hand washed water; • Dust bins and wastewater containers; and • Designated security personnel responsible for COVID-19 protocol.	• Review records of COVID-19 response equipment and logistics in place • Records of workers cautioned or dismissed • Records of number of beneficiaries
Labour and SEA/SH Risks		
• Risk of child abuse; • Risk of sexual abuse by workers; • Women being side-tracked from the compensation and decision making processes; • Disturbance of women's subsistence activities; • Marginalisation of women during the employment; and • Marginalisation of vulnerable groups.	• Prohibition of forced labour or child labour • Provision of safe working environment; • Prohibition of excessive compulsory overtime duties • The client will develop a SEA/SH Risk Mitigation and Response Action Plan and will ensure that GBV risks are adequately reflected in all safeguards' instruments (i.e., Project ESMP and Contractor's C-ESMP) and Code of Conduct. • The SEA/SH Risk Mitigation and Response Action Plan will also include the availability of an effective grievance mechanism (GM) with multiple channels to initiate a complaint. It should have specific procedures for GBV including confidential reporting with safe and ethical documenting of GBV cases consistent with Ghana Gender Policy • Clearly define GBV requirements and expectations in the bidding documents • Awareness programmes would be organised among workers and local community members on the gender-based violence and related consequences on culpability • Involvement of women and the vulnerable in all project related issues • Access to improved variety of seeds and seedlings as well as fertilizers and other chemicals needed to improve agricultural	• Review of employee contracts. These contracts and Code of Conduct would be explained and signed by the worker and a copy of these signed contracts and Code of Conduct would be provided to the worker. A copy of these signed contracts and Code of Conducts would be at all times present at the office at the construction site. It should also be checked that workers get paid the amount, which is stated in their contracts. • Review complaints register and how issues were resolved and if their long-term outstanding complaints, which have not yet been solved. • Inspect sensitization programmes organized and the content of sensitisation and materials used and ensure that GBV related information are included

Sources of Risks / Impact	Mitigation and Enhancement Measures	Monitoring Activities
	methods, would be enhanced by making them affordable to women farmers; • Women farmers would be educated on new variety of crops that are being introduced as well as on other new and improved methods of farming through extension services; • More women extension services workers would be allocated to districts and communities where women farmers predominate as this will enhance their interaction, especially in areas where married women are traditionally barred from being friendly with other men;	• Review Request for proposals for all civil works and contracts to ensure that GBV requirements and expectations are included. • Review Implementation Reports to ensure that workers Code of Conduct are being adhered to. • Review records of stakeholder engagements held and those for women and the vulnerable • Review records of women engaged in Agriculture as a result of programme implementation and compare with baseline period • Review records of women engaged/trained as extension services workers.

ESMF Implementation

The successful implementation of the environmental and social safeguards will depend on the commitment of MoFA and various stakeholder including the EPA, GIDA, WRC and other key stakeholders playing their expected roles. This section addresses the following key areas of the ESMF implementation:

- Institutional roles and responsibility;
- Capacity building;
- Environmental and social monitoring and reporting;
- Sub-project screening and approval; and
- ESMF estimated budget.

Environmental and Social Reporting

Monitoring would be a key component of the ESMF during project implementation. Monitoring would be undertaken at the sub-project implementation phase to verify the effectiveness of impact management, including the extent to which mitigation measures are successfully implemented. Monitoring would involve three areas namely:

- Compliance monitoring;
- Impact monitoring; and
- Cumulative impact monitoring.

The PIU would be responsible for compliance monitoring, hence would be required to recruit full time experienced and qualified Environmental Specialist (preferable certified ISO 45001:2018 or equivalent), as well as an experienced and qualified Social Specialist for monitoring of Environmental and Social Safeguards implemented by the contractor.

Daily compliance monitoring should be the responsibility of the Supervising Engineer. For this purpose, the Supervising Engineer recruit an experienced and qualified Environmental Specialist (should be certified ISO 45001:2018 or equivalent) and qualified Social. These 2 specialists should be full-time at the construction sites during working hours.

The Contractor will be responsible for the preparation and implementation of the Contractor ESMP and the Contractor Health and Safety Plan, which would include Community Health and Safety. The Contractor will be required to recruit experienced and qualified Environmental Specialist (certified ISO 45001:2018 or equivalent), as well as an experienced and qualified Social Specialist. These specialists will be responsible for the implementation of environmental and social safeguards outlined in the Contractor ESMP.

ESMF Estimated Budget

The estimated budget for the ESMF implementation covers the cost of training for PIU, GIDA, WRC, LVD, AEAs of MoFA and WUAs in order to effectively execute their roles outlined in the ESMF. The estimated cost of training, recruitment of Safeguards Officers for PIU and Environmental Assessment for individual subproject is **USD 936,000.**

1.0 INTRODUCTION

1.1 Background

The Government of Ghana (GoG) through the Ministry of Food and Agriculture (MoFA) in collaboration with ECOWAS and the World Bank intend to participate in the West Africa Food Systems Resilience Programme (FSRP2) which aims to strengthen regional food system risk management, improve the sustainability of the productive base in targeted areas and to develop regional agricultural markets. It will contribute to enhance the capacity of vulnerable households, families, communities, and systems within the country to face uncertainty and the risk of shocks, to withstand and respond effectively to shocks, as well as to recover and adapt in a sustainable manner. The programme will be implemented in at least seven African countries (for Phase 1 and 2 and three regional institutions). Details of the programme are provided in chapter two of this report.

1.2 Objectives of the Assignment

The objective of this assignment is to prepare the Environmental and Social Management Framework (ESMF) which will provide guidelines and procedures for screening, assessing, analyzing and evaluating the environmental and social risks and impacts of project activities and to contribute to the Strategic Environmental Assessment of the FSRP2 for the sub-region. More specifically, it reviews the national context and establishes technical instruments for assessing, analysing and evaluating environmental and social impacts of proposed activities. Subsequently, the study defines/suggests appropriate mitigation measures by either avoiding, eliminating, or reducing adverse environmental and social impacts, mitigating residual effects and compensating or offsetting where necessary.

The specific objectives of the study are to:

- Identify all relevant potential environmental and social risks and impacts that may arise because of the project and the sub-projects that it will support.
- Specify appropriate roles and responsibilities of involved stakeholders in the implementation of the ESMF.
- Develop sub-project review procedures as well as forms, guidance, and checklists to apply technical input for the sub-projects.
- Develop a screening procedure to identify the environmental and social issues associated with the sub-projects and determine which safeguard instruments will need to be prepared: A full ESIA/ESMP, only an ESMP, or a RAP.
- Review and make an assessment of the capacity of the project implementation entities, specially the Project Coordination Unit, to screen sub-projects and monitor the implementation of the relevant environmental and social (E&S) instruments and make proposals for capacity enhancement as appropriate.
- Provide estimates for the budget required for project preparation and potential implementation of E&S instruments during the implementation phase of the project.
- Develop a public consultation and stakeholder engagement strategy.
- Define appropriate environmental and social standards performance indicators.
- Provide practical information resources for implementing the ESMF.

1.3 Purpose of the ESMF

This ESMF seeks to establish a process of environmental and social screening which will guide the Ministry of Food and Agriculture (MoFA) and its implementing agencies to identify, assess and mitigate the environmental and social impacts of the proposed interventions. The ESMF also determines the institutional arrangements and coordination to be followed during the program implementation, including those relating

to capacity building to enhance the implementation of this ESMF and the preparation and implementation of the safeguard instruments for the sub-projects.

1.4 Rationale of the ESMF

The Environmental Assessment (EA) Regulations of Ghana, 1999 (LI 1652) provide the general framework and procedures for EA and environmental management of development actions. Most Development Partners (DPs) and funding institutions, including the World Bank also have their respective EA requirements.

As part of funding arrangements for the FSRP2, the Borrower is expected to comply with the World Bank Environmental and Social Standards (ESSs). The FSRP2 is prepared under the World Bank Environmental and Social Framework (ESF) which requires the Borrower to comply with ten (10) Environmental and Social Standards (ESSs). At this stage of project preparation, the exact locations/sites of project implementation and the specifics of sub-project activities and locations are not yet confirmed. In compliance with the requirements of the ESF, specifically the ESS1 and ESS5, the FSRP2 is expected to prepare an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) to guide the management of potential environmental and social risks and impacts associated with the program. The ESMF is relevant because it provides guidelines on processes and procedures to follow during project implementation to ensure compliance with the ESF and its ESSs. The eight (8) relevant ESSs of the ESF are:

- **ESS1:** Assessment and Management of Environmental and Social Risks and Impacts
- **ESS2:** Labor and Working Conditions
- **ESS3:** Resource Efficiency and Pollution Prevention and Management
- **ESS4**: Community Health and Safety
- **ESS5**: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- **ESS6**: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **ESS8**: Cultural Heritage
- **ESS10:** Stakeholder Engagement and Information Disclosure

Whereas the ESS5 and ESS10 will be addressed comprehensively in a separate Resettlement Policy Framework (RPF) and the Stakeholder Engagement Plan (SEP) respectively, the other ESSs must be addressed in the ESMF. The ESMF sets the stage to ensure that the environmental and social risks and impacts (ESRIs) associated with the implementation of the FSRP2 activities are properly assessed, managed, and monitored throughout the program cycle.

The ESMF will be applied to the entire program and its screening tool will be used for the screening of all undertakings which will inform subsequent preparation of site-specific instruments e.g. the Environmental and Social Impact Assessment (ESIA) reports, Biodiversity Management Plans (BMPs), Environmental and Social Management Plans (ESMPs) and E&S Audit etc. This will ensure that all potential ESRIs in the various proposed activities are identified, assessed, evaluated and managed using the mitigation hierarchy. The ESMF will provide guidelines for screening of all project activities.

1.5 Scope of the ESMF

The scope of the ESMF entails the following:

- Executive Summary
- Introduction
  - Background
  - Purpose and objectives of ESMF
- Approach and Methodology for ESMF Preparation
- Project Description

- Policy, Legal and Institutional Framework
- Environmental and Social Baselines Data
- Results of Stakeholders Engagement and Consultation
- Stakeholder Engagement
- Potential Environmental and Social Risks and Impacts of Project
- Environmental and Social Mitigation Measures (This will include procedures and actions)
- ESMF Implementation Arrangements, Responsibilities and Capacity Building
- Annexes
  - Abbreviations and Acronyms
  - Screening Form for Potential Environment and Social Issues
  - Labour Management Procedures
  - GBV/SEA Framework
  - COVID 19 Control Protocol
  - Generic/sample ESMPs
  - Sample TOR for preparation of site-specific ESIA/ESMP
  - Formats for preparing the subprojects E&S documents
  - Summary of stakeholder consultations
  - Grievance Mechanism and Monitoring and Evaluation

1.6 Approach and Methodology for ESMF Preparation

This ESMF has been prepared in accordance with applicable World Bank Environmental and Social Framework (ESF), World Bank Group General Environmental, Health and Safety Guidelines, EHSGs for Annual and Perennial Crop Production, ESHGs for Mammalian Livestock and Poultry Production and relevant World Bank safeguard policies and the Ghana environmental assessment guidelines which involve the following activities:

- Literature/Document review;
- Field visits/consultations with relevant institutions and potential implementing partners; and
- Information collation, analysis and preparation of report.

1.6.1 Literature/Document Review

The following relevant documents were reviewed:

- Programme Concept Note (PCN);
- The Mini-Project Appraisal Document (Mini-PAD);
- Proposed project activities submitted by potential participating institutions and organizations;
- Ghana policies and regulations regarding environmental/social assessment;
- World Bank Environmental and Social Framework, applicable World Bank Group Environmental, Health and Safety Guidelines and relevant World Banks Safeguard Policies that have not been replaced by the Environmental and Social Standards (ESSs);
- Relevant key international conventions ratified by Ghana;
- ESMFs prepared for some recent World Bank funded projects in Ghana (including the West Africa Agricultural Productivity Program - WAAPP, Ghana Commercial Agriculture Project - GCAP)
- Good practice ESMF documents/guides from the World Bank.

1.6.2 Field Visits/Stakeholders Consultations

The Consultant visited the Kpong irrigation Scheme (KIS) and the Kpong Left Bank Project between 17th March and 19th March, 2021 to observe the baseline conditions and the rehabilitation of the irrigation projects under GCAP to inform the potential environmental and social risks and impacts that could arise during the rehabilitation of the proposed irrigation schemes under the FSRP2 program. Further consultations were held

with other stakeholders from 7 to 11th June, 2021. The selection of sites was informed after consultation with GCAP due to the proximity of the sites. The Consultation with relevant stakeholders were held mostly virtually or via phone calls in observance of COVID-19 protocols and also due to the fact that most institutions/organizations have scheduled days and times for work in the offices which made it difficult to hold consultations face-to-face. The following key stakeholders were consulted:

- Environmental Protection Agency (EPA);
- Ghana Irrigation Development Authority (GIDA);
- CSIR-Crop Research Institute (CRI);
- CSIR–Food Research Institute (FRI)
- Women in Agriculture Development (WIAD);
- National Food Buffer Stock (NAFCO);
- Centre for Remote Sensing and Geographical Information System (CERSGIS);
- Northern Development Authority (NDA);
- Directorate of Crop Services (DCS);
- MoFA – Directorate of Agric Extension (DAES);
- MoFA – Animal Production Directorate (APD);
- Meteorological Service Authority (MSA);
- Institute of Environmental and Sanitation Studies (IESS);
- CSIR-College of Science and Technology;
- Kpong Irrigation Scheme (KIS) Water Users Association (WUA)
- Kpong Left Bank Project (KLBIP); and
- Ghana Commercial Agriculture Project (GCAP);
- Water Resources Commission (WRC);
- Agogo Women Plantain Producers and Exporters Association (AWPPEA);
- National Disaster management Organisation (NADMO); and
- University of Energy and Natural Resources (UENR)

Details of the stakeholder consultations are provided in the chapter 5.

2.0 DESCRIPTION OF THE PROGRAMME

2.1 Background

The Economic Community of West African States (ECOWAS) is home to more than 360 million inhabitants with about 55% living in rural areas. Most derive their food and livelihood from agriculture, which contributes approximately 29% of gross domestic product (GDP) and constitutes 28% of total exports of ECOWAS by value. More than 30% of the population live in poverty (below US$1.90 PPP per day) and around 60% of the poor derive their livelihoods in part or entirely from agriculture. Throughout the West African sub-region, factors such as climate change, extreme poverty, rapid population growth and insecurity are driving high levels of vulnerability of communities. The sub-region is also a climate change migrant hotspot globally, projected to reach between 17.9 million and 54.4 million people by 2050.

As of April 2020, 11.4 million people in West Africa were severely food insecure and the number was projected to rise to 17 million by August 2020, not taking into account likely major disruptions by COVID-19 and a possible spill over of the locust outbreak in Eastern Africa. COVID-19 driven trade restrictions are threatening to trigger price spikes in the largely food import dependent region and mobility restrictions have had immediate effects on food supply and demand, with strong expected impacts on food security and nutrition outcomes. ECOWAS and member states are deploying responses and focusing efforts to preserve and increase domestic production to secure the next harvest of key staples, anticipating further restrictions in international trade should the pandemic worsen.

Agriculture is an engine of growth and poverty alleviation in Africa. Africa has experienced faster agricultural growth (+4.6% over 2000-2017) than the global average over the same period (+2.9%). There is further headroom as African agriculture could be 2-3 times more productive if it intensified further with demand for food being projected to grow by 4.6% per annum. This growth presents significant economic opportunities but also raises pressure on production to deliver sufficient food with shrinking per capita endowments of natural resources.

There is therefore the need to develop food systems that will help nations meet the growing demand for food while adequately mitigating, diversifying and transferring production risks faced by the already shrinking natural resources in the face of climate change experienced in the region. It is against this background that the West African Food Systems Resilience Program (FSRP2) was developed. Implementation of FSRP2 is particularly important for Ghana's food and nutrition security due to the uncertain nature and severity of COVID-19 impacts across the agricultural Value Chains (VCs).

The Government of Ghana (GoG) through the Ministry of Food and Agriculture (MoFA) in collaboration with ECOWAS and the World Bank will participate in the FSRP2 under the World Bank Multi-Phase Programmatic Approach (MPA) Instrument. The Program includes three regional institutions: Economic Commission of West African States (ECOWAS), the Permanent Interstate Committee for Drought Control in the Sahel (CILSS), and the West *and Central* African Council for Agricultural Research and Development (CORAF). Phase 1 FSRP2 countries include Burkina Faso, Mali, Niger, and Togo. Phase 2 countries are Chad, Ghana, and Sierra Leone. The Program is expected to end December 2030. Ghana will implement the program for 5 years with a financing envelope of US$100 Million (expected end date December 2026).

2.2 Programme Development Objectives

The main Programme Development Objective (PDO) of the FSRP2 is to strengthen the regional food system risk management, improve the sustainability of the productive base in targeted areas and to develop regional agricultural markets. It will contribute to enhance the capacity of vulnerable households, families, communities and systems within the country to face uncertainty and the risk of shocks, to withstand and

respond effectively to shocks, as well as to recover and adapt in a sustainable manner. The agricultural priority focus of Ghana in this programme aligns with regional priorities outlined in the regional agricultural policy for West Africa (ECOWAP) with greater integration in markets in the sub-region. The specific PDOs are:

- To establish risk management architecture to provide early warning support to value chain actors at national and regional level;
- To scale up dissemination, adoption and capacity building programmes focused on regional and national priority commodities;
- To develop, expand and maintain areas under Sustainable Land and Water Management (SLWM);
- To strengthen partnership among actors in priority value chains; and
- To facilitate and promote regional trade in inputs and output of targeted value chains.

The primary beneficiaries are the producers, aggregators, traders and all actors of the selected value chain. Other beneficiaries include key participants in establishing, managing and disseminating risk management data and information as well as researchers, extensionists (public and private extension service and advisory agencies), research institutions and universities, private sector, trade associations, financial institutions, government agencies and NGOs involved in value chain management.

The following are the proposed PDO level outcome indicators:

- Strengthened regional food crisis prevention and management systems used for decision making;
- Total number of project beneficiaries;
- Producers adopting supported agricultural technologies and services, including access to agro-meteorological information through digital channels (by gender);
- Area under sustainable and integrated land management practices; and
- Countries implementing regional trade policy in targeted input and output VCs.

2.3 Project Components

The Programme consist of five (5) Components, three (3) direct activity-based components, a contingency emergency response component and a project management component. The 3 activity-based components are divided into sub-components as shown in figure 2.1 below:

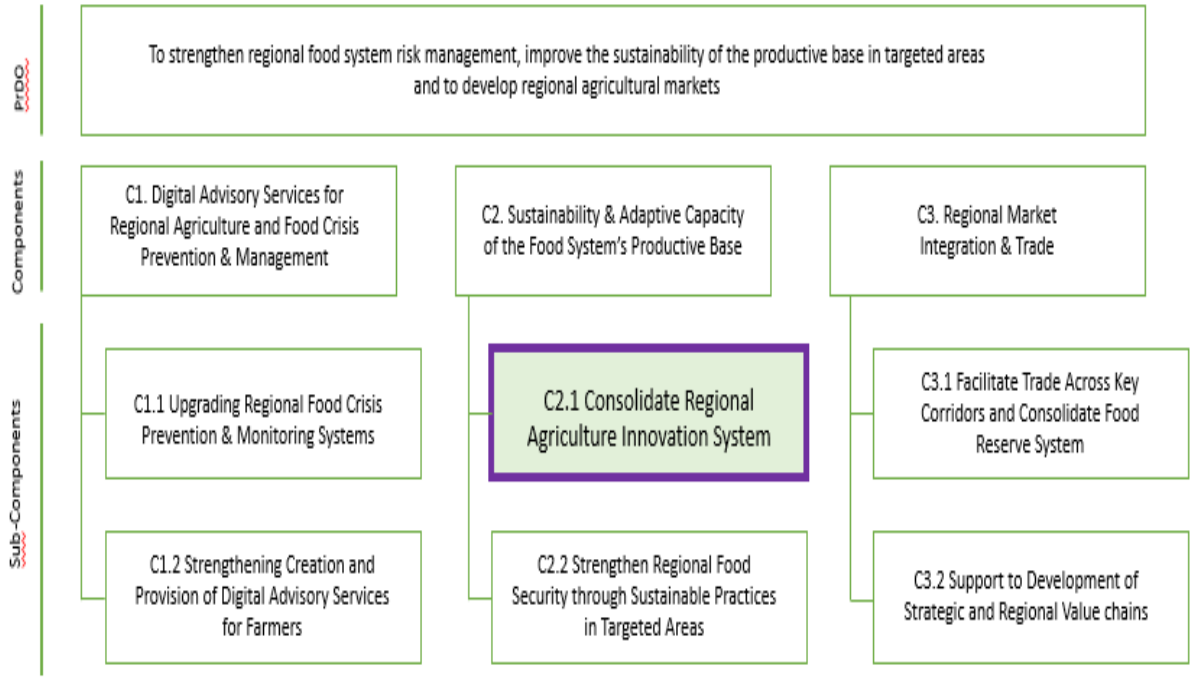


Figure 2. 1 Activity-Based Components of FSRP2

2.3.1 Component 1: Digital Advisory Services for Agriculture and Food Crisis Prevention and Management

The objective of this component is to leverage digital advisory services at both the regional and national levels to strengthen Ghana's food security systems and avert the risk of food crisis. This will be achieved by using high-end ICT tools and emerging software making it possible to predict the negative and positive externalities that affect agriculture. These early warning signals will be disseminated to stakeholders across the agricultural value chains to make informed decisions.

The sub-component 1.1 aims to transform the regional food security and agriculture information system to support risk management decision-making. This sub-component objective will be achieved by:

A. Improving regional and national capacity to deliver reliable information services on vulnerability, nutrition, and food security.

Activities

- *Build capacity of relevant institutions in response to the "Cadre Harmonisé" framework.*
- *Support relevant national institutions to digitize data collection*
- *Provide tablets for timely data collection and reporting*

B. Reorganizing and improving regional and national pest and disease monitoring and management mechanisms.

Activities

- *Upgrade the existing e-extension system in order to strengthen monitoring and reporting of national pest and disease*
- *Capacity building for agriculture extension agents at district and national levels on the use of the e-extension system to monitor and report pest and disease*
- ***S**upport the transmission of pest and disease information to the regional system*

C. Strengthening regional collaboration for food crisis prevention.

Activities

- *Equip the National Information Technology Agency (NITA) with computing resources and network infrastructure to provide high-availability online presence between ground-based data collection systems, the national digital advisory system and the AGRHYMET platform*
- *Support AGRHYMET developed, harmonized and disseminated relevant information in a timely, reliable and accurate manner*
- *Support relevant institutions to participate in regional food security forum (PREGEC) and the annual agro-hydro-meteorological fora (PRESAGG and PRESASS) led by AGRHYMET*
- *Support relevant staff from relevant institutions to pursue Master's programme on climate change and sustainable development at AGRHYMET*

The sub-component 1:2 aims at developing new services, improving the quality and increasing access to and use of impact-based and location-specific weather, climate and hydrological (hydromet) information as well as their application to agriculture (AGROMET) tailored to the needs of the agriculture sector. This sub-component objective will be achieved by:

G. Improving production, dissemination and use of hydromet, climate, agromet and impact-based information by decision-makers, farmers, pastoralists and other actors in the food system.

Activities

- *Launch high-resolution imaging satellite to improve accuracy and timeliness of ground-based data collection systems;*
- *Provide 4 high-end servers for high-speed processing of high-resolution imaging from the satellite;*
- *Install 3000 weather stations across the country for ground-truthing hydromet and climate satellite data;*
- *Install 250 moisture meters, weighing scales and environmus to monitor and manage national food reserves in various warehouses;*
- *Provide 2000 tablets for field officers to enhance collection of operational data (harvest data, food reserve inventory data and market price data);*
- *Provide 200,000 last-mile radio alert devices for vulnerable women farmers;*
- *Provide 50 units of high-end laptops and desktop computers for desk officers in relevant institutions;*
- *Establish a livestock management system; and*
- *Provide AI software and other relevant software for processing big data*.

H. Supporting the timely delivery and use of essential agro-hydro-meteorological information.

Activities

- *Improve ground-based data collection systems into one digital ecosystem/platform*

- *Develop smartphone apps (IOS, Android, Windows), web apps and desktop apps, last-mile radio alert system (sms and ussd push alert system, voice call alert system, and APIs for system for an estimated 1million farmers and other 500,000 actors in the value chain*
- *Provide high-availability and scalable cloud computing environment for hosting the ecosystem web application for online presence and dissemination to beneficiaries by engaging a service provider*
- *Carry out nationwide sensitization to farmers on the usefulness of early warning alerts and protocols for accessing/receiving such alerts*

I. Strengthening the financial and institutional sustainability of regional and national institutions providing hydromet, climate, and agromet information

Activities

- *Establish a national digital advisory system*
- *Institutional Capacity Building for ensuring the Sustainability of the System*

The preliminary assessment of Component 1 shows that the following ESSs will be triggered: ESS1 (general sub-project E&S assessment); ESS2 (construction of stations); ESS3 (waste electronic and electrical equipment); ESS4 (safety risks to communities in which stations are constructed), ESS5 (Conditional: if substantial land is required for building of stations) and ESS 10 (relevant for all the stakeholders identified under the component).

2.3.2 Component 2: Sustainability and Adaptive Capacity of the Food System's Productive Base

This component will target the resilience of agro-sylvo-pastoral production systems allowing small and medium producers, especially women and youth, to sustainably meet their nutritional needs and raise incomes from the sale of surpluses in local and regional markets.

Sub-component 2.1 will scale up the introduction and use of digital agriculture (E-extension, electronic markets for agriculture technologies, inputs and products), support the strengthening of the seed system, soil fertility management (development of soil maps, promotion of soil testing, monitoring of soil fertility and introduction of targeted fertilizer blending).

Activities

- *Support the running of the National Centre of Excellence (NCoE) established under WAAPP*
- *Foster establishment of new NCoS on mechanization, bio-risks management, land and water management*
- *Joint (NARI, CG centers, other IARIs) regional research planning & evaluation, project development and implementation meetings*
- *Establish a Gender-sensitive Agriculture/Agribusiness Innovation*
- *Management of Competitive/Commissioned grant scheme (FONTAGRO model)*
- *Modernize and improve extension systems, including through private sector models*
- *Delivery of CSA, Nutrition and Gender sensitive, land and water management technology*

Sub-component 2.2 will sustainably improve rural households' food security and resilience to climate variability in targeted areas. Proposed interventions like land and watershed restoration, floodplains restoration, water mobilization and irrigation developments and delivery of farm or climate smart agriculture

(CSA) level packages of technologies will be coordinated through spatial/participatory planning and management at the watershed level.

Activities

- *Establishment of an e-agriculture platform*
- *Establishment of a cattle grazing reserve to support cattle during the dry season*
- *Establishment of cattle centres located at the entry/exit points of the grazing reserves;*
- *Promotion of efficient crop - livestock rotation system within designated area(s) to maximise resources*
- *Over sowing with grasses / leguminous seeds to generate more fodder, and provision of baling equipment for baling/ processing of crop residues such as rice straw from nearby irrigation sites*
- *Fencing, construction of trenches/cattle catchers at selected sections of the perimeter of grazing reserve*
- *Support soil fertility tests/analysis using local bio-resource (oyster shell deposits and invasive aquatic weeds*
- *Rehabilitation of portions of KIS and selected small dams*
- *Production of rice fodder for cattle feeding at Irrigation schemes (KIS, KLBIP and Wheta)*
- *Reclamation and development of land at Wheta Irrigation Schemes*
- *Promotion of downstream economic activities of Women Groups*
- *Promotion of aquaculture activities*
- *Fund Persons undertaking Climate Smart Agricultural* (*CSA) technique activities*
- *Empower stakeholders along the White/Red Volta Basin with predictive information and advisory services to manage flash flood*
- *Enhance cross border trade as a food security measure*
- *Introduction of improved breed stock of guinea fowl and small ruminants for women*
- *Establishment of Woodlots and Plantation to be managed by Youth*
- *Establishment of Private Sector Lead Agric Mechanisation Centre*
- *Establishment of 1000 on-farm/community demonstration fields*

The preliminary assessment of the component 2 shows that almost all the ESSs will be relevant except ESS7 and ESS 9 considering the wide range of activities and locations in which these activities could potentially be implemented.

2.3.3 Component 3: Market Integration and Trade

This component will seek to expand food trade in West Africa to enable an effective distribution of surplus produce to deficit regions and facilitate production and commercialization of agricultural inputs and technologies within and across national borders.

Sub-component 3.1 will support the preparation and implementation of sound regional regulations and policies to strengthen the enabling environment for an expansion of regional agricultural output and input markets. Activities would also lead to the consolidating of the Regional Food Reserve Systems.

Activities

- *Support Agricultural Regional Trade Policy harmonization by facilitating dialogue between relevant institutions*
- *Support ECOWAS Multi-Stakeholder Policy Dialogue and Consultation*
- *Develop an ECOWAS Agriculture Trade and Market Scorecard Mechanism*

- *Strengthen the West Africa Rice Observatory*
- *Improve Regional Food Reserve System Performance*
- *Support the operations of National Food Buffer Stock Company (NAFCO)*

Sub-component 3.2 identify, validate, establish and develop three (3) value chains of priority commodities / crops to ensure their integration within country and regional value chains to promote trade along the region.

Activities

- *Strengthen Value Chain Organization and Financing*
- *Development of 2000ha inland valleys for rice production*
- *Promote Agricultural Competitiveness and Market Infrastructure and*
- *Strengthen Multi-Stakeholder Coordination and Promote Enabling Environment to Private Sector*

Similar to component 2, the preliminary assessment of the component 3 shows that almost all the ESSs will be relevant except ESS7 and ESS9 mainly due to the activities which will be undertaken to achieve the objectives of the three value chains to be promoted.

2.3.4 Component 4: Contingency Emergency Response Component

This component will allow for a reallocation of credit proceeds from other components to provide immediate emergency recovery support following an eligible crisis or emergency. For instance, pests and diseases infestation such as Fall Armyworm (FAW), locusts, swine fever and bird flu; severe climatic change and extreme weather variability resulting in extreme drought or floods; widespread and severe bush and wild land fires and protracted community conflicts that could cause devastating consequences to agricultural productivity in the country. Also, as Covid-19 becomes the new normal, until such a time when sustainable remedy is found, conscious effort and systems must be put in place under Crisis and Emergency Risk Communication (CERC) to conduct vulnerability assessment in collaboration with the World Bank, CoRAF and FAO and re-establish early warning systems to provide regular update on the food situation.

2.3.5 Component 5: Project Management

The objective of component 5 is to ensure effective and efficient project coordination, learning, monitoring and evaluation. Project management will be coordinated by ECOWAS, which would delegate technical work to the relevant mandated organizations (principally AGRHYMET and CORAF) which will work with the various country Project Coordinating Unit (PCUs) which in Ghana case will be a Project Implementation Unit (PIU). The PCUs will facilitate the disbursement of funds to various implementing agencies; facilitate the recruitment of consultants in consultation with MoFA/World Bank/CoRAF; sign contracts with relevant institutions; and undertake financial and procurement monitoring and backstopping activities of Implementing Agencies.

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section identifies policies, regulations, conventions, standards, guidelines and institutional requirements (national and international) and briefly reviews their relevance to the FSRP2. A comparison between the WB ESSs and national policies and regulations has been done and specific measures to bridge these gaps have been outlined in (Table 3.6).

3.1 National Environmental Policy and Related Requirements

3.1.1 National Environmental Policy, 2013

The Environmental Policy of Ghana builds on the previous one, which hinged on 'prevention' as the effective tool for environmental protection, by requiring prior environmental assessments of all developments. The vision of the policy which is based on an integrated and holistic management system for the environment, seeks to unite Ghanaians in working towards a society where all residents have access to sufficient and wholesome food, clean air and water, decent housing and other necessities of life; and that further enable them to live in a fulfilling spiritual, cultural and physical harmony with their natural surroundings. This new paradigm of sustainable development intends to ensure:

- Citizens' quality of life and their living and working environments;
- Equal access to land and other natural resources; and
- Public participation and environmental governance.

3.1.2 National Environmental Action Plan, 1991

The policy aims at ensuring a sound management of resources and the environment, and to avoid any exploitation of these resources in a manner that might cause irreparable damage to the environment. Specifically, it provides for maintenance of ecosystems and ecological processes essential for the functioning of the biosphere, sound management of natural resources and the environment, and protection of humans, animals and plants and their habitats. Implementation of targeted interventions under FSRP2 will therefore ensure that the environment is not over exploited and ecosystems are not destroyed.

3.1.3 Environmental Protection Agency Act, 1994 (Act 490)

The Environmental Protection Agency Act, 1994 (Act 490) grants the EPA the mandate to ensure compliance with the Ghana Environmental Assessment (EA) requirements and procedures. Additionally, the Agency is required to control and monitor the generation, treatment, storage, transportation and disposal of waste, and the use and advice on regulation and management of hazardous substances.

The Agency is also vested with the power to determine an 'adverse effect on the environment' or an activity posing 'a serious threat to the environment or public health', and to regulate and serve an enforcement notice for any offending or non-complying activity. The Agency is also required to monitor and verify compliance with permit conditions of approved developments. The operations of any FSRP2 intervention will therefore comply with the EPA standards and must at all times subject itself to the Agency for any inspection.

3.1.4 Environmental Assessment Regulations 1999 (LI 1652)

The Environmental Assessment Regulations, 1999 (LI 1652) prohibit commencing an "undertaking" without prior registration and environmental permit. Undertakings/activities are grouped into Schedules to facilitate screening and registration through the EA system. The schedules include undertakings requiring registration and environmental permit (Schedule 1), EIA mandatory undertakings (Schedule 2), and Schedule 5-relevant undertakings (i.e. proposals located in or near Environmentally Sensitive Areas) in Ghana. The regulations require submission of Annual Environmental Reports (AER) and Environmental Management Plans (EMP) for

the implementation phase of approved undertakings. FSRP2 activities will be screened and the appropriate level of Environmental and Social Assessment conducted in accordance with this regulation.

3.1.5 Fees and Charges (Amendment) Instrument, 2019 (LI 2386)

The Fees and Charges (Amendment) Instrument, 2019 (LI 2386) sets out the fee regime for processing and environmental permits, associated with the Environmental Assessment Regulations. Fee invoices are duly issued by EPA and paid for prior to issuance of an environmental permit. Fees for permits will be paid in accordance with this instrument.

3.1.6 National Climate Change Policy, 2013

The National Climate Change Policy (NCCP) is Ghana's integrated response to climate change, aimed at a climate-resilient and climate-compatible economy, and also sustainable development through equitable low-carbon economy. The programme areas aim to improve food security, increase resilience of infrastructure and communities, improve environmental management practices and ecosystems for greater biodiversity and carbon sequestration, optimize key socio-economic factors, and achieve efficient systems for improved economic growth. Agriculture and food security is one of the thematic areas under this policy, FSRP2 will implement its activities in a manner that seeks to address some of the key challenges identified in the policy.

3.2 Waste Management Policies, Legislations and Regulations

3.2.1 Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917)

The Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917) provides for the control, management and disposal of hazardous, electrical and electronic waste and related purposes. The Act also states that a person involved in the management of hazardous wastes or other wastes shall:

- take the steps that are necessary to prevent pollution from hazardous wastes and other wastes arising from the management; and
- where pollution occurs, minimize the consequences of the pollution on human health and the environment.

3.2.2 Hazardous, Electronic and Other Waste, Control and Management Regulations, 2016 (LI2250)

The Hazardous, Electronic and Other Wastes (Classification), Control and Management Regulations, 2016 is derived from the parent Act 917, and applies principally to waste generators, transporters and managers, but not to domestic waste. The purpose includes:

- Classification, control and management of wastes;
- General duties of waste generators, waste transporters and managers; and
- Requirements for the disposal of wastes.

Activities under the Components (1&2) of the FSRP2 will adhere strictly to the requirements under these policies.

3.2.3 National Sanitation Policy, 1999

The National Sanitation Policy 1999 aims at developing and maintaining a clean, safe and pleasant physical environment in all human settlements, to promote the social, economic and physical well-being of all sections of the population. The principal components of the policy include:

- Collection and disposal of waste e.g. solid and liquid, excreta, hazardous waste;
- Storm-water drainage; and

- Control of pests and vectors of disease.

FSRP2 construction and manufacturing related activities will comply with the regulation.

3.3. Agriculture, Food and Trade Related Policies

3.3.1 Food and Agriculture Sector Development Policy (FASDEP II), 2007

The revised policy (FASDEP II) emphasises the sustainable utilization of all resources and commercialization of activities in the sector with market-driven growth in mind. It however targets fewer commodities for food security and income diversification, especially of resource poor farmers. Enhancement of productivity of the commodity value chain, through the application of science and technology, with environmental sustainability is emphasized.

3.3.2 Ghana Shared Growth and Development Agenda, 2010

The Ghana Shared Growth and Development Agenda provides for the Vision for the Agricultural, Environment and Natural Resource Sectors in Chapter four of the document. The main focus of the agricultural sector is to accelerate the modernization of agriculture and ensure its linkage with industry through the application of science, technology and innovation. The modernized agriculture sector is expected to underpin the transformation of the economy through job creation, increased export earnings, food security, and supply of raw materials for value addition and rural development as well as significant reduction in the incidence of poverty.

3.3.3 Ghana's Seed Policy, 2013

Ghana has developed a comprehensive national seed policy. The main objective of the National Seed Policy is to support the development and establishment of a well-coordinated, comprehensive and sustainable private sector-driven seed industry through systematic and strategic approaches which would continuously create and supply new improved varieties for use by farmers and, further, support successful seed production, certification, marketing and seed security systems which will form the basis for food security and support the overall development of the agricultural sector. Component 2 and 3 of the Programme will seek to improve seeds through a public-private partnership arrangement.

3.3.4 Medium Term Agriculture Sector Investment Plan (METASIP), 2010

The METASIP is the investment plan to implement the medium term (2011-2015) programmes of the Agriculture Policy. The METASIP is consistent with the ECOWAS Agriculture Policy and New Partnership for African Development (NEPAD)'s Comprehensive Africa Agriculture Development Programme (ECOWAP / CAADP) which provide an integrated framework to support agricultural growth, rural development and food security in the African region.

3.3.5 Plants and Fertilizer Act, 2010 (Act 803)

The Act provides for the efficient conduct of plant protection to prevent the introduction and spread of pests and diseases; to regulate imports and exports of plants and planting materials; the regulation and monitoring of the exports, imports and commercial transaction in seeds and related matters; and control and regulation of fertilizer trade.

3.3.6 Ghana Investment Promotion Centre Act, 1994 (Act 478)

The Ghana Investment Promotion Centre Act, 1994 (Act 478) requires that every investor wishing to invest in the country must in its appraisal of proposed investment projects or enterprises, "…have regard to any effect the enterprise is likely to have on the environment and measures proposed for the prevention and control of any harmful effects to the environment...". Where FSRP2 activities opens the opportunity for Investors to participate in the programme, investors must operate with regard for the environment.

3.4 Water Related Policies, Legislations and Regulations

3.4.1 National Water Policy, 2007

Launched in 2008, the policy aims at an overall goal of sustainable development, management and use of Ghana's water resources to improve health and livelihoods, reduce vulnerability while assuring good governance for present and future generations. The policy addresses relevant issues under water resources management, urban water supply and community water and sanitation. The policy objectives seek to:

- Minimize the pollution of water sources from poor environmental sanitation services;
- Support District Assemblies to meet statutory obligations of providing services; and
- Ensure sustainability through effective community ownership and management facilities, active participation of women, public sector facilitation and private sector involvement.

3.4.2 Water Resources Commission Act, 1996

The Water Resources Commission Act, 1996 establishes the Commission, to regulate and manage the utilization of water resources in Ghana, and for the co-ordination of any policy in relation to them. The Commission also plans towards the utilization, conservation, development and improvement of water resources, initiate, control and co-ordinate activities connected with the development and utilization of water resources. FSRP2 activities related to water use will comply with schedules stipulated in this Act.

3.4.3 National Irrigation Policy, 2010

This policy addresses the problems, constraints and opportunities, which cut across the whole irrigation sub-sector; and specifically, for informal, formal and commercial irrigation towards ensuring putting an area of 50,000ha under irrigation in the medium term. Thus, the policy is designed to open up the investment space for intensified and diversified irrigated crop production in Ghana where there is clear comparative and competitive advantage. FSRP2 will contribute to the achieving of this policy goals.

3.4.4 Riparian Buffer Zone Policy, 2014

This outlines a national policy on buffer zones in managing river basins in an integrated manner and harmonizing the existing standards on buffer zones in Ghana. It aims at ensuring all designated buffer zones along rivers, streams, lakes, reservoirs, and other water bodies are sustainably managed, as well as conserve, protect, restore and maintain the ecology of such areas. It also seeks to establish vegetation in riparian buffer zones to improve water quality by controlling activities along the riverbanks and generally in catchments of surface water bodies. No activities of FSRP2 will be permitted within the buffer zones of water bodies in the country.

3.4.5 Water Use Regulations 2001, LI 1692

The Water Use Regulations 2001 (LI 1692) enjoins all persons to obtain Water Use Permits from the Water Resources Commission for commercial water use. The Commission is also mandated to request for evidence that an environmental impact assessment or an environmental management plan has been approved by the EPA before issuance of the Water Use Permit. In accordance with this regulation, all FSRP2 activities requiring the use of significant water will seek direction from the WRC.

3.5 Fisheries and Aquaculture Sector Requirements

3.5.1 Ghana Fisheries and Aquaculture Policy

This Policy provides the framework for fisheries contribution to the Ghana Poverty Reduction Strategy (GPRS) II objectives. The policy is structured around four major areas:

- Management of fisheries, conservation of aquatic resources and protection of their natural environment;
- Promotion of value addition in the fisheries sector and the improvement of livelihood in fisheries communities; and
- Development of aquaculture.

FSRP2's activities in relation to aquaculture will contribute to the realisation of this policy.

3.5.2 Ghana Fisheries and Aquaculture Development Plan

The Plan sets seven targets and the program to be implemented to meet these targets. The implementation of this plan is targeted at:

- Increasing revenue and profitability in capture fisheries by at least US$50 million per annum after five years (targets 2 and 3);
- Increasing aquaculture production from 9000 -100,000 tonnes per annum (target 4); and
- Ensuring the fisheries sector makes a fiscal contribution to national revenue (target 7).

3.5.3 Fisheries Commission Act, 2002 (Act 625)

The Fisheries Act, 2002 (Act 625) establishes the Fisheries Commission and consolidates with amendments the law on fisheries, providing for the regulation and management of fisheries, the development of the fishing industry and the sustainable exploitation of fishery resources, etc. It also provides for the establishment of a Fisheries Development Fund and its use and regulates the management and conservation of fishery resources of Ghana, including aquaculture and small-scale fishing.

3.5.4 Fisheries (Amendment) Act, 2014 (Act 880)

The Fisheries (Amendment) Act, 2014 (Act 880) amends the Fisheries Act, 2002 (Act 625) to empower the Minister to among others publish, by Notice in the Gazette, the list of international fisheries conservation and management measures, which are binding on the Republic (Section 45A).

3.5.5 Fisheries Regulations, 2010 (LI 1968)

The Fisheries Regulations, 2010 (LI 1968) implement the provisions of the Fisheries Act, 2002, and a wide variety of matters regarding fisheries management and conservation, aquaculture and trade in fish products.

3.5.6 Fisheries (Amendment) Regulations, 2015 (LI 2217)

The Fisheries (Amendment) Regulations, 2015 (LI 2217) amends the Fisheries Regulations, 2010 by making provisions to deter and eliminate Illegal, Unreported, and Unregulated (IUU) Fishing (new regulations 24A to 24DD and regulations 49A to 49D).

3.6 Wildlife, Forestry and Cultural Heritage Protection

3.6.1 National Museums Act, 387 (1969)

The National Museum Act 387 of 1969 establishes and governs the operations of the Ghana Museums and Monument Board (GMMB) to acquire, protect, conserve and document the Nation's movable and immovable material cultural heritage for posterity, for the purposes of research and education of the public. Sections 8, 9 and 10 of the Act deals with excavation permits, removal of antiquity and duty to notify discovery.

3.6.2 Forest and Wildlife Policy, 2012

The policy aims at the conservation and sustainable development of forest and wildlife resources for the maintenance of environmental stability and continuous flow of benefits for the socio-cultural and economic goods and services derived by the present and for future generations, whilst fulfilling Ghana's commitments

under international agreements and conventions. Two relevant objectives of the policy are to manage and enhance the ecological integrity of the forest, savannah, wetlands and other ecosystems for the preservation of vital soil and water resources, conservation of biological diversity, and carbon stocks and to promote the rehabilitation and restoration of degraded landscapes to enhance environmental quality and sustain the supply of raw materials.

3.6.3 Forestry Commission Act, 1999 (Act 571)

The Forestry Commission Act, 1999 (Act 571) establishes the Commission to be responsible for the regulation of the utilization of forest and wildlife resources, the conservation and management of those resources and the co-ordination of policies related to them. A relevant function is to create, protect and manage the permanent forest estates and protected areas in the various ecological zones to conserve Ghana's biophysical heritage.

3.7 National Planning and Development Requirements

3.7.1 National Land Policy, 2007

The National Land Policy, 1999 sets out a broad framework and policy guidelines for land administration and utilization. The objectives of the policy are to ensure socio-economic activities are in conformity with the principles of sustainable land use, and equity and security of tenure to both indigenous and foreign investors. Others are to protect the rights of landowners and their descendants from becoming landless or tenants on their own lands; and provide mechanism for minimization and resolution of land dispute.

3.7.2 Lands Commission Act, 2008 Act 767

The Land Commission is charged with the management and administration of state and vested lands, with general functions as spelt out in Article 256 of the 1992 constitution and the Lands Commission Act,1994 (Act 483). The proprietary plan covering the site acquired for the project is plotted by the Commission in the government records. It is also responsible to ensure the acquisition is processed for the approval by the Minister responsible for lands, before an executive instrument is issued and gazetted.

3.7.3 Land Use and Spatial Planning Act, 2016 (Act 925)

The Land Use and Spatial Planning Act, 2016 (Act 925) establishes the Land Use and Spatial Planning Authority with the functions to:

- Develop the capacities of the District Assemblies and other institutions for effective performance of their spatial planning and human settlement management functions;
- Ensure the control of physical development in uncontrolled or less controlled but sensitive areas such as forest reserves, nature reserves, wildlife sanctuaries, green belts, coastal wetlands, water bodies and catchment areas, open spaces and public parks; and
- Ensure the exploitative use of natural resources for agriculture, mining, industry and other related activities do not adversely impact on human settlements.

3.7.4 Local Governance Act, 2016 (Act 936)

The Local Governance Act, 2016 (Act 936) gives the Ministry of Local Government and Rural Development responsibility over the sixteen administrative regions of Ghana. These regions are sub-divided into 254 Metropolitan, Municipal and District Assemblies (MMDAs). The Act mandates the MMDAs to take charge of the overall development of their respective areas. This makes them representatives of the Central Government at the local level. The MMDAs by the Act are the planning authorities responsible for physical/spatial planning, for approval of all planning schemes in the districts, and development control through the grant of permit for development.

3.7.5 National Building Regulations, 1996 (LI 1630)

The National Building Regulations, 1996 (LI 1630) regulates the haphazard and amorphous building of structures which affects the landscape of the country. The LI 1630 makes it an offence for any individual to undertake any development without the acquisition of a Building Permit from the relevant District Assembly. This ensures that buildings are well planned and are in conformity with the Assembly's plan designs of an area.

3.7.6 State Lands 1962, Act 125 and Amendments

The State Lands Act 1962 (Act 125) has vested authority in the President of the Republic of Ghana to acquire land for the public interest via an executive instrument.

3.7.7 The Lands (Statutory Wayleaves), Act (1963)

The Act requires notification for the right of entry to occupiers before undertaking survey, construction, inspection and maintenance work. Section 6 of the Act states that any person who suffers any loss or damage of land as a result of construction, is entitled to compensation of an amount assessed by the Minister in respect of such loss or damage.

3.8 National Labour, Gender and Human Rights Requirements

3.8.1 National Gender Policy, 2015

The National Gender Policy overarching goal is to mainstream gender equality concerns into the national development processes by improving the social, legal, civic, political, economic and socio-cultural conditions of the people of Ghana particularly women, girls, children, the vulnerable and people with special needs; persons with disability and the marginalized. In this regard, FSRP2 will ensure that its activities are focused and provide equal opportunity for all.

3.8.2 Labour Act, 2003 (Act 651)

The purpose of the Labour Act, 2003 (Act 651) is to amend and consolidate existing laws relating to labour, employers, trade unions and industrial relations. The Act provides for the rights and duties of employers and workers; guarantees trade unions and freedom of associations and establishes the Labour Commission to mediate and act in respect of all labour issues. The provisions under Part XV (Occupational Health, Safety and Environment), where the Act explicitly prescribes the duty of an employer to ensure that every worker works under satisfactory, safe and healthy conditions, is relied on extensively to cater for workers at both construction and operation phase of the project.

3.8.3 National Employment Policy, 2012

The policy indicates that the key source of demand for labour emanates from the productive sectors of the economy, namely, agriculture, industry and service. One of the key strategies of the employment policy is to promote farm and non-farm rural employment through modernisation of agriculture, improving the productivity of farmers and contract farming arrangements, promoting effective linkages between farm and non-farm activities among others.

3.8.4 Children's Act 1998 (Act 560)

The Children's Act is an Act to reform and consolidate the law relating to children, to provide for the rights of the child, maintenance and adoption, regulate child labour and apprenticeship, for ancillary matters concerning children generally and to provide for related matters. Section 87 of this Act specifically stat that "No person shall subject a child to exploitative labour", therefore no activities of FSRP2 shall engage children below the working age.

3.8.5 Workmen's Compensation Law, 1987 (PNDCL 187)

The Workmen's Compensation Law 1987 (PNDCL 187) holds employers responsible for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. Where an employee sustains personal injury by accident arising out of, and in the course of employment, the employer is liable, subject to this Act, to pay compensation in accordance with this Act.

3.8.6 Persons with Disability Act, 2006 (Act 715)

The Persons with Disability Act, 2006 (Act 715) provides certain rights to protect persons with disability. The Act states that a person or an employer shall not:

- Discriminate against or subject a person with disability to degrading treatment;
- Call a person with disability derogatory names because of the disability of the person;
- Discriminate against a prospective employee or an employee on grounds of disability, unless the disability is in respect of the relevant employment; and
- Post or transfer a person with disability to a section or place of the establishment not suited for the person.

3.8.7 Data Protection Act, 2012 (Act 843)

The Data Protection Act, 2012 (Act 843) sets out the rules and principles governing the collection, use, disclosure and care for personal data or information by a data controller or processor. Data Protection Commission established by this Act is an independent statutory body to ensure and enforce compliance. While Activities of FSRP2 Component 1 will involve the collection of significant data in communities, the right of individuals will the respected as stipulated in this Act.

3.9 National Health and Safety Requirements

3.9.1 National Workplace HIV/AIDS Policy

The broad objectives of the policy among others, are to provide protection from discrimination in the workplace to people living with HIV and AIDS; prevent HIV and AIDS spread among workers; and provide care, support and counselling for those infected and affected.

3.9.2 National HIV/AIDS and STI Policy, 2013

The goal of the revised National HIV/AIDS and STI Policy, 2013 is to create a favourable environment for every aspect of HIV/AIDS and STI prevention, care and support. The main objectives of the policy are to set standard parameters for national response to HIV/AIDS to:

- Halt and reverse the incidence of new infections, aiming to achieve zero new infections;
- Reduce HIV-associated morbidity and mortality to ensure the continued survival of infected persons with the virus; and
- Ensure that the basic human rights of each person in Ghana especially persons infected and affected by HIV are respected, protected and upheld.

3.9.3 National Health Policy, 2008

The National Health Policy 2008 serves as the basis for the development of health sector priorities and planning. It aims at creating wealth through health, and among other things places emphasis on improvements in personal hygiene, immunization of mothers and children, the practice of safe sex and the prevention of injuries at both workplaces and on the road.

3.9.4 Factories, Offices and Shops Act, 1970 (Act 328)

The Factories, Offices and Shops Act, 1970 (Act 328) spells out the responsibilities of an employer in registering new and existing factories, renewal of certificate of registration and ensuring a safe and healthy

work environment of employees. It defines a factory to include any premises (whether in or not in a building) in which one or more persons are employed in manual labour in any process.

3.9.5 Public Health Act, 2012 (Act 851)

The Public Health Act, 2012 (Act 851) consolidates the law relating to public health to prevent diseases, promote, safeguard, maintain and protect the health of humans and animals and to provide for related matters. This Act makes provision with respect to the protection of public health in Ghana and lays down rules relative to environmental sanitation. It further, among other things, provides rules relative to food vending and food-borne diseases, prohibits noxious or offensive practices that may cause damage to the lands, crops or cattle.

3.9.6 Imposition Restriction Act, 2020 (Act 490)

The Imposition Restriction Act, 2020 (Act 490) provides for the imposition of restrictions that are reasonably required in the interest of public safety, public health on the movement or residence within Ghana of any person or persons generally, or any class of persons. This Act with the provisions of the Executive Instruments (EI 64 to date) signed by the President has been used to regulate the wearing of face masks by the general public when moving out of homes and also impose restriction on public gatherings and travels to help reduce the spread of COVID-19.

3.9.7 Ghana National Fire Service Act, 1997 (Act 537)

The Ghana National Fire Service Act, 1997 (Act 537) re-establishes the National Fire Service to provide for the management of undesired fires and for related matters. To achieve its objective of preventing and managing undesired fire; the Service organises public fire education programmes to create and sustain awareness of the hazards of fire, and the role of the individual in preventing fire. It also provides technical advice for building plans and structural layouts to facilitate escape from fire, rescue operations and fire management. The Act also mandates the issuance of fire certificates.

3.9.8 Fire Precaution (Premises) Regulations, 2003 (LI 1724)

The Ghana National Fire Service Act, 1997 (Act 537) requires that a fire certificate is obtained for premises used as a public place or place of work. This requirement is reinforced by the Fire Precaution (premises) Regulations, 2003 (LI 1724). It is incumbent on any project developer to ensure that adequate provision and measures are introduced to minimize or prevent fire outbreaks.

3.9.9 Control and Prevention of Bushfires Act, 1990 (PNDCL 229)

The Control and Prevention of Bushfires Act, 1990 (PNDCL 229) prohibits the starting of bushfires by any person for any purpose. A bushfire is described as an action of a person that results in the uncontrolled burning of a farm, forest or grassland. The Act provides for the establishment of a fire volunteer squad in every town, area or unit. The National Fire Service is responsible for the training of these fire volunteer squads.

3.10 National Environmental Quality Standards

3.10.1 Ghana Standard on Health Protection - Requirements for Ambient Noise Controls (GS 1222:2018)

The Ambient Noise Controls provide for maximum permissible levels of noise based on categorised zones as shown in Table 3.1. The standard also provides noise requirement for a construction site which includes:

- Erecting an acoustic barrier around construction site; and
- Ensuring that the maximum noise level near the construction site does not exceed 66dB(A) Leq (5min) in areas other than industrial areas.

The permissible noise levels for Ghana are compared with the WBG general EHS guidelines on noise management in Table 3.1 below. For this project, the most stringent of the two applies.

Table 3. 1 Requirements for Ambient Noise Control

Zone	Permissible Noise Level in dB(A)		World Bank	
	Day (6:00-22:00)	Night (22:00-6:00)	Day 07:00 – 22:00	Night 22:00 – 7:00
Residential Area	55	48	55	45
Educational and health facilities, offices and law courts	55	50	55	45
Mixed use	60	55	-	-
Area with some light industry	65	60	70	70
Commercial areas	75	65	70	70
Light industry areas	70	60	70	70
Heavy industry areas	70	70	70	70

3.10.2 Ghana Standard on Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236:2019)

The Ghana Standard on Environment and Health Protection - Requirements for Ambient Air Quality and Point Source / Stack Emissions provides the maximum limit for ambient air pollutants (Table 3.2). These are compared with the WHO/WBG general EHS guidelines on ambient air quality. For this project, the most stringent of the two applies.

Table 3. 2 Requirements for Ambient Air Quality – Maximum Limit for 24 Hours

Substance	Maximum Limit (µg/m^3)	World Bank / WHO
Sulphur Dioxide (SO_2)	50 (24 hours)	50 (24hr; interim target 2)
Nitrogen Oxide (NO_2)	250 (1 hour)	200 (1 hour)
Total suspended particulate matter	150	-
Particulate Matter (PM_{10})	70 (1 year)	50 (1 yr; interim target 2)
Particulate Matter ($PM_{2.5}$)	35 (I year)	25 (1yr; interim target 2)
Black Carbon	5	-

3.10.3 Ghana Standards Environment Protection-Requirements for Effluent Discharge (GS 1212:2019)

The Ghana Standard for Environment Protection – Requirements for Effluent Discharge (GS 1212:2019) require every undertaking to install pollution control system for treatment of effluent discharges from the operations, based on best available technology. In the absence of pollution control equipment, an undertaking shall implement measures to control pollution. Any effluent discharged from a facility shall be within permissible levels.

Table 3. 3 Requirements for Effluent Discharge

Parameter	Unit	Maximum Permissible Levels	World Bank
Colour (TCU)	TCU	200	
pH	pH Units	6 – 9	6 - 9
Conductivity	µS/cm	1500	

Total Suspended Solids (TSS)	mg/l	50	50
Total Dissolved Solids (TDS)	mg/l	1000	500
Total Phosphorus	mg/l	-	2
Total Nitrogen	mg/l	-	10
COD	mg/l	250	125
BOD		-	30
Oil and grease	mg/l	5	10
Aluminium	mg/l	1.0	
Copper	mg/l	5	
Lead	mg/l	0.1	
Total Coliform Bacteria	MPN/100ml	-	400

3.11 International Requirements, Safeguard Policies, Conventions and Agreements

3.11.1 World Bank Group Environmental and Social Framework

The 10 Environmental and Social Standards (ESSs) for sustainable development in the ESF and their relationship with the FSRP2 is summarised in Table 3.4 below.

Table 3. 4 Summary of Environmental and Social Standards of the ESF

Policy	Summary of Core Requirements	Relevant
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	ESS1 sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with all stages of a project supported by the Bank	**Yes** All project activities must be assessed for E&S risks and impacts and appropriate safeguards instruments prepared
ESS2: Labour and Working Conditions	ESS 2 recognizes how Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.	**Yes** Particularly relevant for physical works involving the use of contractors and production activities requiring substantial number of workers
ESS3: Resource Efficiency and Pollution Prevention and Management	This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life-cycle since economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people and ecosystem services.	**Yes** Relevant to project activities requiring the use of natural resources from the environment and activities such as use of pesticides and fertilizers with the potential to pollute environmental media
ESS4: Community Health and Safety	ESS4 address the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.	**Yes** Project activities such as crop and animal production, physical work, etc will be implemented in communities and could have potential risks and impacts on inhabitants of these communities

Policy	Summary of Core Requirements	Relevant
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	This ESS emphasizes that involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.	**Yes** Project activities such as the establishment of the grazing reserves could result in the relocation, resettlement or restriction to access for some individuals and communities
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	This ESS recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. It addresses sustainable management of primary production and harvesting of living natural resources and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project.	**Yes** Most project activities will require the use of some form of natural resource such as riverine and forested landscapes; construction activities could pose risks and impacts on these ecosystems
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities.	This ensures that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	**No** There are currently no groups of persons that fit into the definition of indigenous people in the project areas
ESS8: Cultural Heritage	This recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. It sets out measures designed to protect cultural heritage throughout the project life-cycle.	**Yes** There is a high chance of encountering cultural heritage issues in the project areas since Ghana is a country with rich culture
ESS9: Financial Intermediaries (FIs)	FIs are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI.	**No** The project design does not foresee the need for a financial intermediary during project implementation
ESS10: Stakeholder Engagement and Information Disclosure	This recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice.	**Yes** The project will have many stakeholders with various interests which ought to be managed using a stakeholder engagement plan

3.11.2 World Bank Group Safeguard Policies

Relevant safeguards policies that apply to FSRP2 for which the new ESSs have not replaced.

Table 3. 5 Safeguards Policies Relevant to this Programme

Policy	Summary of Core Requirements	Triggered
OP 4.37 Safety of dams	For large dams, technical review and periodic safety inspections by independent dam safety professionals	**Yes** FSRP2 seeks to complete works under the rehabilitation of Irrigation schemes (KIS and KLBIP) for which substantive dam safety reports exists. Technical review and periodic safety inspections are therefore necessary.
OP 7.50 Projects on International Waterways	The Bank recognizes that the cooperation and goodwill of riparians is essential for the efficient use and protection of the waterway. The Bank therefore ascertain where riparian agreements are in place and ensure that riparian states are informed and do not object to the project intervention	**Yes** Flood management activities along the White Volta. GoG will have to notify other countries e.g Burkina Faso on its activities along the White Volta

3.11.3 World Bank Group General Environmental, Health and Safety Guidelines

The WBG General Environmental Health and Safety (EHS) Guidelines is a technical reference document containing information on cross-cutting environmental, health and safety issues potentially applicable to all industry sectors. The General guidelines applicable to potential development projects are:

- Environmental;
- Occupational Health and Safety;
- Waste Management;
- Community Health and Safety; and
- Construction and Decommissioning.

3.11.4 WBG EHS Guidelines for Annual Crop Production

The EHS Guidelines for Annual Crop Production includes information relevant to large-scale production, harvesting, post harvesting processing and storage of major annual crops, including maize, pulses, roots and tubers, oil-bearing crops, fiber crops, vegetables, and fodder crops, located in both temperate and tropical regions. It does not include the processing of raw materials into semi-finished and finished products.

The programme in Ghana will develop irrigation sites for hybrid seed annual production and support the production of quality foundation seeds of maize, rice and soybean for distribution. The Programme would also support the value chains of yellow maize and soya for the livestock and poultry sector and the value chain of white maize for consumption and export to other countries in the sub-region.

3.11.5 WBG EHS Guidelines for Perennial Crop Production

The EHS Guidelines for Perennial Crop Production include information relevant to large-scale plantation crops and outgrower systems and focuses on the primary production and harvesting through farming and plantation forestry of major multi-year food, fiber, energy, ornamental, and pharmaceutical crops, located in both temperate and tropical regions. It includes tree crops (such as olives, citrus, coffee, rubber, eucalypts,

and cacao) as well as banana, sugarcane, and palm oil. It does not include the processing of raw materials into semi-finished and finished products.

In Ghana, cassava, yam, plantain, and cocoyam contribute about 59% of the Agricultural Gross Domestic Product compared with cocoa's contribution of 13%. Subsequently, this programme will support the production of these perennial crops.

3.11.6 WBG EHS Guidelines for Mammalian Livestock Production

The EHS Guidelines for Mammalian Livestock Production includes information relevant to cattle ranching and farming, dairy farming, and hog and pig farming. Sheep and goat farming operations, while not explicitly discussed, are similar to the operations included in this document, and the recommendations presented here are also generally applicable. This document does not address feed production, dairy processing, or meat processing, which are covered under other EHS Guidelines.

The Programme would take advantage of existing dairy infrastructure at the Amrahia Dairy Farm and those in other regions (Volta, Ashanti, Central, Upper East and Upper West and Northern region) to upscale dairy production. Artificial insemination will be the cardinal tool for breed improvement to increase milk yields. The project would support private operators to develop their own improved breeds. Development of a market to link dairy farmers, processors and off-takers by establishing milking / collecting centers for supply to processors and consumers.

3.11.7 WBG EHS Guidelines for Aquaculture

The EHS Guidelines for Aquaculture provide information relevant to semi-intensive and intensive/super-intensive, commercial aquaculture production of the main aquatic species, including crustaceans, molluscs, seaweeds and finfish, located in developing countries in temperate and tropical regions.

The Programme in Ghana will undertake interventions to include promotion of aquaculture, education on good fishing practices, promotion of use right fishing gear, stocking of water bodies with fingerlings, integrating fish farming into crop farming through culture based fisheries, cage aquaculture, pen or pond culture, to reduce pressure on wild capture and help recovery of over exploited stocks. In addition, institute a comprehensive ecological water quality monitoring programme on the Lower Volta Basin to enhance management, identify climate change early warning signs to safeguard domestic fish production.

3.11.8 WBG EHS Guidelines for Poultry Production

The EHS Guidelines for Poultry Production include information relevant to intensive poultry (including ducks and turkeys) production.

This intervention would seek to support the development and promotion of the poultry (broiler) value chain in four (4) regions namely in the Greater Accra, Ashanti, Eastern, and Central regions by supporting and creating the enabling environment for private sector actors along the value chain to operate with efficiency and to maximize resources. This component will provide support to value chain actors, especially feed processors and broiler meat processors with emphasis on value addition and market linkages with the Government’s One District One Factory (1D1F) programme which has supported the construction of two large poultry processing factories

3.11.9 WBG EHS Guidelines for Nitrogenous Fertilizer Production

The EHS Guidelines for Nitrogenous Fertilizer Production include information relevant to facilities that produce ammonia-based nitrogenous fertilizers, including ammonia (NH_3), urea, nitric acid (HNO_3), ammonium nitrate, calcium ammonium nitrate (CAN), ammonium sulfate and mixed nitrogenous fertilizers,

such as urea-ammonium sulfate (UAS) and urea ammonium nitrate (UAN) liquid fertilizers (28, 30 or 32 percent nitrogen (N)).

3.11.10 WBG EHS Guidelines for Pesticides Formulation, Manufacturing and Packaging

The EHS guidelines for pesticides manufacturing and formulation address the synthesis, optimization of the active ingredients, process development (manufacturing), the formulation and packaging of pesticides from these active ingredients. The main pesticide groups that are formulated include insecticides, herbicides, fungicides, acaricides (or miticides), nematicides and rodenticides.

3.11.12 WBG EHS Guidelines for Phosphate Fertilizer Manufacturing

The EHS Guidelines for Phosphate Fertilizer Manufacturing includes information relevant to facilities that produce phosphoric acid, single superphosphate (SSP), triplesuperphosphate (TSP), and compound fertilizers (NPK).

3.12 World Bank Environmental and Social Framework vs Ghanaian Environmental Assessment Policies

Table 3. 6 Measures to bridge Gap between WB and Ghana EA Safeguards Policies

Environmental and Social Standard	Summary of Core Requirements	Ghana Environmental Assessment Policy	Measures to Bridge Gap
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	ESS1 sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with all stages of a project supported by the Bank	The Environmental Protection Agency Act, 1994 (Act 490) and Environmental Assessment Regulations, 1999 (LI 1652). These require assessment of all projects with potential environmental and social impacts	Clear guideline should be provided for the need for timely and effective consultation, timely and responsive grievance mechanism and adequate consideration of project affected persons and communities in stakeholder engagement
ESS2: Labour and Working Conditions	ESS 2 recognizes how Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.	Labour Act, Act 651 (2003): Part XV, Section 118 (1) and (2a-h) of the Act requires employers to ensure that every worker employed by him or her works under satisfactory safe and healthy conditions, and is further obliged to provide necessary information, instructions, training and supervision to ensure the health and safety at work of those other. Workmen Compensation Act (1987); Factories, Offices and Shops Act, Act 328 (1970) Children's Act	There is a need to strengthen Workers organization to ensure that grievance mechanism systems are set up. More focus should be given to industry standards for occupational health and safety of workers as well as issues of child labor and forced labor. Develop Labour Management Procedures and Grievance Redress Mechanism for workers. Also there should be a signed Code of Conduct

Environmental and Social Standard	Summary of Core Requirements	Ghana Environmental Assessment Policy	Measures to Bridge Gap
			(CoC) by all workers, and the contractor. The CoC should include strong wording regarding Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH) and should be translated into local language. Also training should be provided on SEA and SH to all workers, including the contractor by an experienced GBV Specialist engaged by the PIU or Client in order prevent SEA and SH cases, which could if they happen stop the project
ESS3: Resource Efficiency and Pollution Prevention and Management	This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life-cycle since economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people and ecosystem services.	The Environmental Protection Act 1994 (Act 490), Part I of the Act include the environmental permits and pollution abatement notices and the prescription of standards and guidelines. Part II of the Act sets out provisions for enforcement and control. The Act empowers the EPA to appoint ''Environmental Protection Inspectors'' and any other employees necessary to provide the functions of the Act Water and Sewerage Corporation Act, Act 310 (1965) & Environmental Sanitation Policy (1999): These policies cover both solid waste management and sewage. Pesticides Control and Management (regulated under Part II of the EPA Act 490 (1994))	While there are policies in Ghana to address waste and pollution issues, there are challenges in the effective implementation of these policies. More focus must be put on effective waste management, water management and prevention of pollution by fertilizers and pesticides, and efficient use of natural resources.
ESS4: Community Health and Safety	ESS4 address the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility	The Environmental Protection Agency Act, 1994 (Act 490) and Environmental Assessment Regulations, 1999 (LI 1652) require that the public and	Beyond consultation with project affect communities stated in LI 1652, there is a need to give more attention to

Environmental and Social Standard	Summary of Core Requirements	Ghana Environmental Assessment Policy	Measures to Bridge Gap
	of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.	community members are consulted during project development and implementation to enhance proposed mitigation measures put in place to safeguard public health. Labour Act 651 (2003):	vulnerable groups in project communities
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	This ESS emphasizes that involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.	The State Lands Act, 1962 (Act 125); Lands Commission (LC) Act 2008, Act 767; The Lands (Statutory Wayleaves) Act, 1963, Act 186; Land Use and Spatial Planning Act, 2016 (Act 925)	Clear guidelines should be provided for timing of compensation payment (based on full replacement costs and not on market value), calculation of compensation and valuation, livelihood restoration and assistance, vulnerable groups, squatters, information disclosure, and the use of resettlement instruments such as RPF, RAP
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	This ESS recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. It addresses sustainable management of primary production and harvesting of living natural resources and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project.	The Wild Animals Preservation Act 235 (1964) enforced by the Wetland Management (RAMSAR sites) Regulation, (1999); The Wild Reserves Regulations LI 740 (1971); Forestry Commission Act, 571 (1999); Fisheries Commission Act, 457 (1993); Fisheries Act, 625 (2002)	Screening should involve the determination of Critical or Natural Habitat. More attention should be given to the protection of livelihood sources for project affected parties during the implementation of project activities.
ESS7: Indigenous Peoples/Sub-Saharan African Historically	This ensures that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of	No provisions for indigenous people	Not required as there are no identified indigenous people in the project area

Environmental and Social Standard	Summary of Core Requirements	Ghana Environmental Assessment Policy	Measures to Bridge Gap
Underserved Traditional Local Communities	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities		
ESS8: Cultural Heritage	This recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. It sets out measures designed to protect cultural heritage throughout the project life-cycle.	Environmental Assessment Regulations (1999), LI 1652; Ghana National Museum Act, 1969 (NLCD 387)	More must be done to address the protection of intangible cultural heritage during project implementation
ESS10: Stakeholder Engagement and Information Disclosure	This recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice.	Environmental Assessment Regulations, 1999 (LI 1652) Sections 15 and 17 require a proponent to initiate a public information and consultation program for the area likely to be affected by the undertaking	The use of the Stakeholder Engagement Plan is an add on to the public information and consultation program which should be focused on. Additionally, a Grievance Redress Mechanism must be developed for affected / host communities

3.13 Regional Policies and Frameworks

3.13.1 Cadre Harmonisé Framework

The Cadre Harmonisé (CH) is a regional framework aimed to prevent food crisis by quickly identifying affected populations and proffering appropriate measures to improve their food and nutrition security. The CH is a set of functions and protocols for analysing the severity of acute food and nutrition insecurity to inform decision-making, and to provide appropriate urgent responses in particular. The CH helps to answer the key questions policy-makers face during food and/or nutrition crises. It fits into the overall framework of early warning and prevention of food and nutrition crises by answering the following questions:

- How severe is the situation?
- How many people are affected?
- When to intervene?
- Where to intervene first?
- What are the key drivers and limiting factors?
- For whom should we intervene? and
- Which action is needed?

Component 1 of FSRP2 will develop its early warning system in accordance with the function and protocols of the CH framework.

3.13.2 Volta River Basin Convention

The convention declares the Volta River and its tributaries and sub-tributaries within the territories of the Republics of Benin, Burkina Faso, Côte d'Ivoire', Ghana, Mali, and Togo as an international river. The convention establishes the Volta Basin Authority (VBA) as an international body for the purpose of ensuring international cooperation for the rational and sustainable management of water resources of the Volta Basin and for socioeconomic integration among the 6 riparian countries (called the parties) that make up the VBA. The Parties commit to cooperate closely on the basis of the following principles:

- Use of the water resources of the basin and the participation in their development in an equitable and reasonable manner;
- Regular exchange of data and information among the State Parties; and
- Notification of planned activities that can have negative effects, as well as the related consultations and negotiations.

The Parties may enter into agreements on any portion of the Volta Basin for a project, or utilization of water resources consistent with the provision of the convention, under the Authority, such as promoting implementation of integrated water resources management and the equitable distribution of benefits, authorizing the development of infrastructure which could have substantial impact on the water resources of the basin, and developing joint projects and works. The jurisdiction of the Authority includes the reservoirs and lakes, groundwater and wetlands as well as the aquatic and land ecosystems linked to the basin, the estuary of the river including the zone of coastal and oceanic influence. The proposed flood management activities along the White Volta in the Upper East Region of Ghana will require the notification of other countries who also use the Basin.

3.13.3 Water Charter for the Volta River Basin

The purpose of the Water Charter is to set out the principles, procedures, rules and modalities for the equitable, coordinated, and sustainable use of shared water resources in the Volta Basin, in accordance with the mandate of the Volta Basin Authority. The State Parties to the Water Charter are to cooperate on the basis of the principles of international law for the Authority to fulfil legally binding obligations.

The types of use of the Basin's shared water resources include any requirements the Authority deems to be necessary or legitimate and specifically for:

- Drinking water supply and sanitation;
- Agriculture, industry and energy;
- Navigation and transport; and
- Tourism and recreational activities.

3.14 International Conventions

The international conventions, to which Ghana is signatory, relevant to this programme are presented in the following table 3.7.

Table 3. 7 International Conventions relevant to FSRP2

Convention	Main Characteristics	Participation of Ghana
Atmospheric Area		
UN Framework Convention on Climate Change	To stabilize the concentration of greenhouse gases in the atmosphere at a level that should prevent dangerous anthropogenic interference with the climate system. This level	S = June 12th, 1995

Convention	Main Characteristics	Participation of Ghana
(UNFCCC) (Rio, June 1992)	should be reached in sufficient time for ecosystems to adapt naturally to climate change, food production would not be threatened and economic development could continue in a sustainable.	AR = September 6, 1995
The Montreal Protocol (1987)	The Montreal Protocol is a global agreement to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances (ODS).	S = 24th February, 1988
Protection of Biodiversity		
African Convention for the conservation of nature and natural resources (Algiers, September 15, 1968)	The African Convention on the Conservation of Nature and Natural Resources is the primary Pan-African legal instrument for the conservation of the environment in general and biodiversity in particular, including birds. Its objective is to improve environmental protection, promote conservation and sustainable natural resource use, as well as to synthesise and coordinate resident policies with an eye to develop policies and programs that are ecologically reasonable, economically sound and socially acceptable. The Convention provides measures to ensure conservation, use of soil, water, flora and fauna resources in accordance with scientific principles and taking into account the best interests of the people. These provisions illustrate a forward looking treaty which is well in tune with the wide conservation objectives of the Convention on Biological Diversity (CBD). The Contracting States shall ensure conservation, wise use and development of faunal resources and their environment, within the framework of land-use planning and of economic and social development.	R = July 20, 2007 S = October 31, 2003
UN Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (Paris, June 17, 1994)	Aims to fight desertification and eradicate the effects of drought in countries severely affected by the problem through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.	R = December 27, 1996 S = October 15, 1994
Convention on Biological Diversity (CBS, December 29th, 1993)	The Convention on Biological Diversity underlines that threats to biological diversity had increased everywhere in the world, mainly as a result of the continuing destruction of natural habitats. It has 3 main objectives: - The conservation of biological diversity; - The sustainable use of the components of biological diversity; - The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.	R = August 29,1994 S = June 12, 1992
Convention on International Trade in Endangered Species of Wild Fauna and Flora	To regulate the trade of wildlife and flora species that is or may be threatened with extinction due to international commerce CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Because	R = November 14, 1975 S = December 16, 1974

Convention	Main Characteristics	Participation of Ghana
(CITES), Washington, 1973	the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. CITES was conceived in the spirit of such cooperation. Today, it accords varying degrees of protection to more than 35,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.	
Convention on Migratory Species of Wild Animals (CMS), Bonn, 1979	The CMS focuses its efforts on a list of migratory species that are either endangered or threatened. It focuses on the protection of migratory species (not only birds, but also mammals and invertebrates) in recognition of the fact that protection is needed throughout every part of migratory ranges and that this requires international conservation agreements. Each party seeks to prohibit or restrict taking migratory species, to limit the degradation of habitats, the introduction of invasive species, and any other activity or condition that may block migration or disrupt migratory species, and to enter into separate international agreements concerning certain specific migratory species or groups of species whose ranges or migration routes extend over areas under party jurisdiction.	R = January 19, 1988
International Plant Protection Convention	Aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. The Convention extends beyond the protection of cultivated plants to the protection of natural flora and plant products. It takes into consideration both direct and indirect damage by pests, so it includes weeds.	A= 22nd Feb, 1991
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971)	To assure reasonable and sustainable use of resources in wetlands, particularly by designating wetlands of international importance, and guaranteeing resource conservation, now and in the future.	R = February 22, 1998
Cultural Heritage		
World Heritage Convention	The Convention links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two.	S = November 16, 1972 R = July 4, 1975
Convention for the Safeguarding of the Intangible Cultural Heritage	A purpose to safeguard the uses, representations, expressions, knowledge and techniques that communities, groups and, in some cases, individuals, recognise as an integral part of their cultural heritage.	R = February 4, 2016
Social Inclusion and Social Risks		
Convention on the Elimination of All	Follows the basic principles of the United Nations who have proclaimed their faith in fundamental human rights, in the	S = July 17, 1980

Convention	Main Characteristics	Participation of Ghana
Forms of Discrimination against Women (CEDAW, 1979)	dignity and worth of the human person and in the equal rights of men and women.	R = January 2, 1986
Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol)	The Maputo Protocol guarantees comprehensive rights to women including the right to take part in the political process, to social and political equality with men, improved autonomy in their reproductive health decisions, and an end to female genital mutilation.	R = June 13, 2007 S = October 31, 2003
Convention on the Rights of the Child, 1989	Commitment to defend and guarantee the rights of children and to meet these commitments before the international community. States which are members of the Convention are required to develop and implement measures and policies which take into account the best interests of the child.	R = February 5, 1990 S = February 5, 1990
Convention on the Rights of Persons with Disabilities, 2006	A purpose to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms of persons with disabilities and to promote respect for their inherent dignity	S = March 2007 R = August 21, 2012
Workers' Rights		
Convention on Discrimination (Employment and Occupation), 1958	Enables legislation which prohibits all discrimination and exclusion on any basis including of race or colour, sex, religion, political opinion, national or social origin in employment and repeal legislation that is not based on equal opportunities.	R = April 4, 1961
International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families	Aims at protecting migrant workers and members of their families, sets a moral standard, and serves as a guide and stimulus for the promotion of migrant rights in each country	R = September 7, 2000 S = September 7, 2000
Other Conventions (health, pesticides, hazardous waste and chemicals)		
International Code of Conduct for The Distribution and Use of FAO Pesticides	The code encourages voluntary standards of conduct for all public and private entities engaged in or associated with the distribution and use of pesticides, particularly where there is inadequate or no national legislation to regulate pesticides. To achieve this objective, it promote practices which reduce risks in the handling of pesticides, including minimizing adverse effects on humans and the environment and preventing accidental poisoning resulting from improper handling; ensure that pesticides are used effectively and efficiently for the improvement of agricultural production and of human, animal and plant health; adopt the "life-cycle" concept to address all major aspects related to the development, regulation, production, management, packaging, labelling, distribution, handling, application, use and control, including post registration activities and disposal of all types of pesticides,	N/A

Convention	Main Characteristics	Participation of Ghana
	including used pesticide containers; and are designed to promote Integrated Pest Management (IPM) (including integrated vector management for public health pests)	
Rotterdam Convention	The Rotterdam Convention provides Parties with a first line of defence against hazardous chemicals. It promotes international efforts to protect human health and the environment as well as enables countries to decide if they want to import hazardous chemicals and pesticides listed in the Convention. Together with the Stockholm and Basel conventions and FAO's voluntary Code of Conduct, the Rotterdam Convention promotes a life cycle approach and provides the necessary tools for managing pesticides.	S = 11 September, 1998 R = 30th May, 2003 AA = 30th May, 2003
Basel Convention	The Basel Convention was created to protect people and the environment from the negative effects of the inappropriate management of hazardous wastes worldwide. It is the most comprehensive global treaty dealing with hazardous wastes from its generation, transport to disposal.	R = 9th June, 2005 DE = 5th December, 2019
Stockholm Convention	The Stockholm Convention is a global treaty to protect human health and the environment from highly dangerous, long-lasting chemicals by restricting and ultimately eliminating their production, use, trade, release and storage	S = 23rd May, 2001 R =30th May, 2003
International Standards for Phyto-sanitary Measures (ISPM) FAO	Promotes sanitary and phyto-sanitary measures that aims at the protection of human, animal or plant life or health from certain risks.	N/A
The International Treaty on Plant Genetic Resources for Food and Agriculture	The objective of the International Treaty on Plant Genetic Resources for Food and Agriculture are the conservation and sustainable use of all plant genetic resources for food and agriculture and equitable sharing of the benefits arising out of their use, in harmony with the Convention of Biological Diversity, for sustainable agriculture and food security.	N/A
African Convention on the Conservation of Nature and Natural Resources (Revised) Algier, 1968	The objectives of this convention is to enhance environmental protection, foster the conservation and sustainable and use of natural resources and harmonise and coordinate policies in these fields.	S = 7th April 1969
Trade		
African Continental Free Trade Agreement	The agreement will reduce tariffs among member countries and cover policy areas such as trade facilitation and services, as well as regulatory measures such as sanitary standards and technical barriers to trade. Full implementation of AfCFTA would reshape markets and economies across the region and boost output in the services, manufacturing and natural resources sectors. The African Continental Free Trade Area has the potential to increase employment opportunities and incomes, helping to	S = March 21, 2018 R = May 7, 2018

Convention	Main Characteristics	Participation of Ghana
	expand opportunities for all Africans. The AfCFTA is expected to lift around 68 million people out of moderate poverty and make African countries more competitive.	
ECOWAS Protocol on Free Movement of Peoples and Goods	The ECOWAS Protocol on the Free Movement of People and Goods ensures free mobility of the community citizens i.e. citizens of member states. The Protocol on free movement conferred on Community citizens the right to enter and reside in the territory of any member state, provided they possessed a valid travel document and international health certificate. However, it also allowed member states the right to refuse admission to any Community citizens who were inadmissible under the member state's own domestic law.	S = 28th May, 1975
Signature = S; Ratification = R; Accession = A; Authorisation for ratification or accession = AR Letters of ratification = LR; Participation = P; Letters of accession = LA. N/A: Not Available.		

3.15 Institutional Framework

3.15.1 Ministry of Food and Agriculture

The Ministry of Food and Agriculture (MOFA) is the ministry responsible for the development and growth of agriculture. The primary roles of this ministry are the formulation of appropriate agricultural policies, planning and coordination, monitoring and evaluation within the overall economic development. Currently, MOFA has the following technical directorates:

- Directorate of Crops Services (DCS);
- Directorate of Agricultural Extension Services (DAES);
- Plant Protection and Regulatory Services Directorate (PPRSD);
- Veterinary Services Directorate (VSD);
- Animal Production Directorate (APD); and
- Women in Agricultural Development (WIAD).

The FSRP2 will be implemented by a Project Implementing Unit (PIU) to be set up by MoFA. The PIU will manage day-to-day implementation of the Programme. The staff will ensure the following PIU roles: Project Coordinator, Procurement Specialist and Assistant, Environmental and Social Safeguards Specialists, Financial Management Specialist and Accountants, Monitoring and Evaluation Specialist, Agribusiness Specialist, ICT Specialist, Private Sector Specialist, two technical experts (crops and Livestock) and a Communication Specialist.

3.15.2 Ministry of Environment, Science, Technology and Innovation

The Ministry of Environment, Science, Technology and Innovation (MESTI) exists to establish a strong, national scientific and technology base for accelerated sustainable development of the country to enhance the quality of life for all. The EPA and the CSIR are under this ministry.

3.15.3 Environmental Protection Agency (EPA)

The EPA is responsible for enforcing environmental policy and legislation, prescribing standards and guidelines, inspecting and regulating businesses and responding to emergency incidents. It is responsible for issuing environmental permits and pollution abatement notices for controlling waste discharges, emissions,

deposits or others sources of pollutants and issuing directives, procedures or warnings for the purpose of controlling noise. The EPA has the authority to require an ESIA and is responsible for ensuring compliance with ESIA procedures.

3.15.4 Council for Scientific and Industrial Research

The Council for Scientific and Industrial Research (CSIR) is mandated to pursue, among others, the implementation of government policies on scientific research and development, coordinate R&D activities in the CSIR and other scientific & technological institutions nationwide and assist the government in the formulation of scientific and technological policies for national development. There are currently 13 research institutes making up the CSIR. The Crop Research Institute (CRI), Soil Research Institute (SRI), Industrial Research Institute (INI), Animal Research Institute (ARI), Water Research Institute (WRI) and the Food Research Institute (FRI) will be involved in the FSRP2 components.

3.15.5 Ministry of Local Government and Rural Development

The Ministry of Local Government and Rural Development exists to promote the establishment and development of a vibrant and well-resourced decentralised system of local government for the people of Ghana to ensure good governance and balanced rural based development.

3.15.6 Metropolitan /Municipal/District Assemblies (MMDAs)

The District/Municipal/Metropolitan Assemblies are the planning authorities, charged with the overall development of the district/municipal/metropolis. A key feature of the Assembly System is the involvement of communities or zones or whole villages who elect their representatives (Assemblymen) to the Assembly. The structure of the Assembly comprises Unit Committees which are usually formed at the community levels, and the Urban/Town/Area Councils.

3.15.7 Land Commission

The Land Commission is the body charged primarily with the management and administration of state and vested lands. It is responsible for advising on policy framework for development of particular areas so as to ensure that development of such areas is coordinated. The functions of the Lands Commission are spelt out in Article 256 of the 1992 Constitution and the Lands Commission Act, 1994 (Act 483). The Commission's role in compulsory acquisition is that it serves as a member/secretary to the site selection committee, a technical committee that considers request for compulsory acquisition by the state agencies and recommends its acceptance or otherwise. The proprietary plan covering the site to be acquired is plotted by the Commission in the government records. Also recommendation on the acquisition is processed by the Commission for the approval by the Minister responsible for lands, before an executive instrument would be issued and gazetted.

3.15.8 Department of Town and Country Planning

The Town and Country Planning Department prepares planning layouts for towns and cities and defines safety zones and rights-of-way. It also vets and approves layouts prepared by prospective developers and specifies all road reservations based on forecasted land use plans. The department is required to approve developments and grant permits in conformity with the already prepared layout of the area.

3.15.9 Ministry of Lands and Natural Resources

The Ministry of Lands and Natural Resources (MLNR) established under Section 11 of the Civil Service Law, 1993 (PNDCL 327), is mandated to ensure the sustainable management and utilization of the nation's lands, forests and wildlife resources as well as the efficient management of the mineral resources for socio-economic growth and development. The broad aim of the Ministry is to provide leadership and guidance in the Management of the Nation's, Natural Resources through effective policy formulation, market regulation and asset management. The Ministry is responsible for the following:

- Ensuring the efficient formulation, implementation, co-ordination, monitoring and evaluation of policies and programmes;
- Ensuring efficient and equitable land delivery services
- Facilitating the promotion of sustainable forest and wildlife resource management and utilization;
- Ensuring efficient management of mineral resources to catalyse sustainable development;
- Facilitating the promotion of effective inter-agency and cross sectorial linkages;
- Protecting the country's boundaries in collaboration with other state agencies.

3.15.10 Office of the Administrator of Stool Lands

Act 481 established the Office of the Administrator of Stool Lands and provided for the administration of stool lands generally.

4.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

This section presents a description of the existing environment and social conditions, comprising the bio-physical and socioeconomic conditions of the country and proposed project areas / regions. The targeted areas of interventions are mainly within communities in the Lower Volta Basin, the White Volta Basin (which traverses the SADA or NDA regions), the Forest Transition and Guinea Savannah areas, and to some lesser extent, a few communities in the Eastern, Greater Accra and Central regions.

Table 4. 1 Regional Distribution of Targeted Program Areas

Target Area of Intervention	Region	Districts
Target Area 1 – Lower Volta Basin (covering 6,950km^2 with 565,330 population)	Volta Region	Agotime Ziope, Adaklu Anyingbe, Central Tongu, North Tongu, Ketu North
	Eastern Region	Lower Manya Krobo
	Greater Accra Region	Shai-Osudoku
Target Area 2 – White Volta Basin (covering 12,000km^2 with 1.4million population)	Upper East Region North-East Region Savannah Region Northern Region	Not yet identified
Target Area 3 - Forest Transition and Guinea Savannah areas ((covering 27,810km^2 and 834,787 population)	Bono East Region	Techiman North, Techiman South, Atebubu Amantin, Nkoranza North, Nkoranza South, Sene West
	Ashanti Region	Ejura Sekyedumase, Sekyere Central, Sekyere Affram Plains, Asante Akyem North, Offinso North

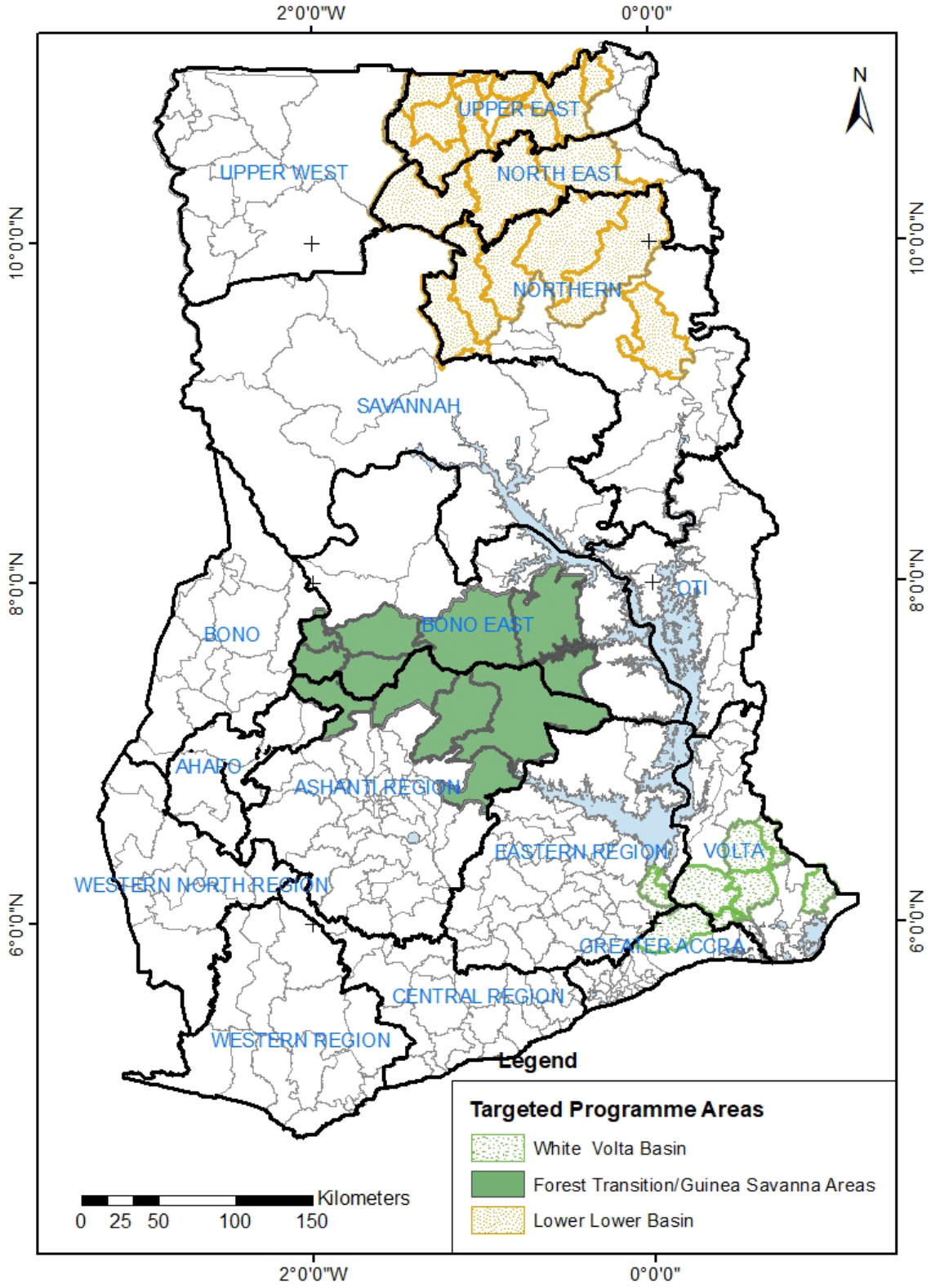


Figure 4. 1 Regional Distribution of Targeted Programme Areas

4.1 Methodology for Data Collection

Various techniques were applied for gathering data on the project environment. These included document review, institutional consultations, focus group discussions and field surveys of the existing environment. An

account of the existing physical and biological environment and socio-economic conditions (ethnic groups, culture, economic activities, etc.) were assembled. These formed a part of the baseline information and the information obtained used in the environmental analysis / assessment.

The description of baseline information relevant to the FSRP2 covers:

1. The project areas
2. Land use categories
3. Land acquisition and tenure system
4. Socio-economic
5. Cultural resources
6. Healthcare situation
7. Natural resources
8. Wildlife and biodiversity
10. Climate, and Air Quality
11. Hydrology of the Area
12. Physical environment

4.2 General Country Characteristics

The Republic of Ghana is located between latitudes 5^{o} 36'N and longitudes 0^{o} 10'E. It has a total border of 2,093km, including 548km with Burkina Faso to the north, 688km with Cote d'Ivoire to the west, and 877km with Togo to the east. It has a coastline on the Gulf of Guinea, part of the Atlantic Ocean, measuring 539km. The country has an area of 239,540 sq km, and is divided into 16 administrative regions and 170 districts.

The country is characterized by fairly low relief with few areas of moderate elevation in the north and east. The land is generally 600 meters above sea level (ASL). Physiographic regions include the coastal plains, the forest dissected plateau, and high hill tops which are important ecological subsystems in a generally undulating terrain. At the southern and northern margins of the Volta Basin, there are two prominent areas of highland – the Kwahu Plateau, and the Gambaga Escarpment. On the eastern margins of the Volta Basin is a relatively narrow zone of high mountains running in a south-west to north-east direction with the Akwapim, Buem, Togo Ranges registering the highest point (Mt. Afadjato) in the country.

Average rainfall over the country is about 1,260 mm/year but ranges from 890 mm/year in the coastal zone near Accra to 2,030 mm/year in the southwestern rainforests. The rainfall is bi-modal in the southwestern forest zone, giving a major and a minor growing season; elsewhere, a uni-modal distribution gives a single growing season from May to October. Except for the southwestern zone, the reliability of the rainfall, particularly after crop germination, is a major factor affecting crop growth and agriculture in general.

Ghana is drained by three (3) main river systems comprising the Volta, South-Western and the Coastal River Systems. The Volta river system in Ghana occupies nearly two thirds (70%) of the land area of Ghana, followed by the south western (22%) and the minor coastal (8%). Global water resources are estimated at 53.2 km^3 per year, consisting of 30.3 km^3/year of internally produced water resource, and 22.9 km^3/year of runoff from other countries which share the Volta basin.

Major sources of water in the Volta River system and riparian countries are natural rainfall, rivers, streams, lakes, groundwater and artificial impounded water (dams, dugouts and reservoirs). The estimation of direct recharge to the system is based on the assumption that recharge occurs when actual evapotranspiration and direct run-off are balanced by precipitation. This occurs when the soil is saturated to the field capacity, which is likely to occur when precipitation exceeds evapotranspiration. Analyses of rainfall data from various stations within the Volta River system indicate that the months in which precipitation exceeds the

evapotranspiration are usually June, July, August, and September. The annual recharge for the Volta River system ranges from 13.4% to 16.2% of the mean annual precipitation. On average, the mean annual recharge of the Volta River system is about 14.8 % of the mean annual precipitation.

4.2.1 Hydrogeology

Ghana has two major hydrogeologic provinces: (1) the Basement Complex composed of Precambrian crystalline igneous and metamorphic rocks, and (2) Paleozoic consolidated sedimentary formations (Figure 4.2). Minor provinces consist of (1) Cenozoic, Mesozoic, and Paleozoic sedimentary strata along narrow belts on the coast; and (2) Quaternary alluvium along the major stream courses. The basement complex underlies about 54% of the country and is further divided into sub-provinces on the basis of geologic and groundwater conditions. Generally, these sub- provinces include the metamorphosed and folded rocks of the Birimian system, Dahomeyan system, Tarkwaian system, Togo Series, and the Buem Formation (Figure 4.3). The basement complex consists mainly of gneiss, phyllite, schist, mihnatite, granite- gneiss, and quartzite.

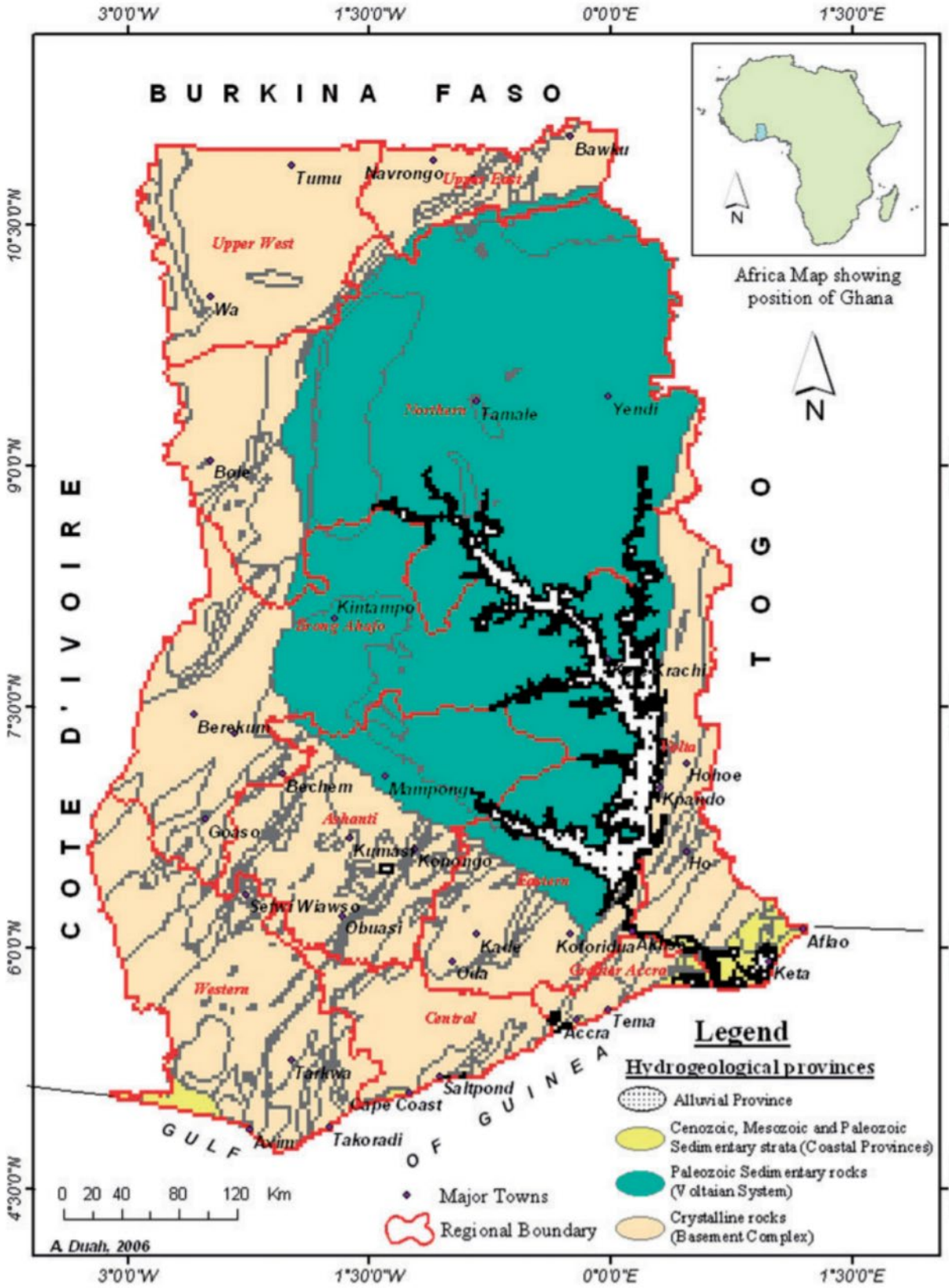


Figure 4. 2 Hydrogeological provinces of Ghana (Geological Survey of Ghana 1969)

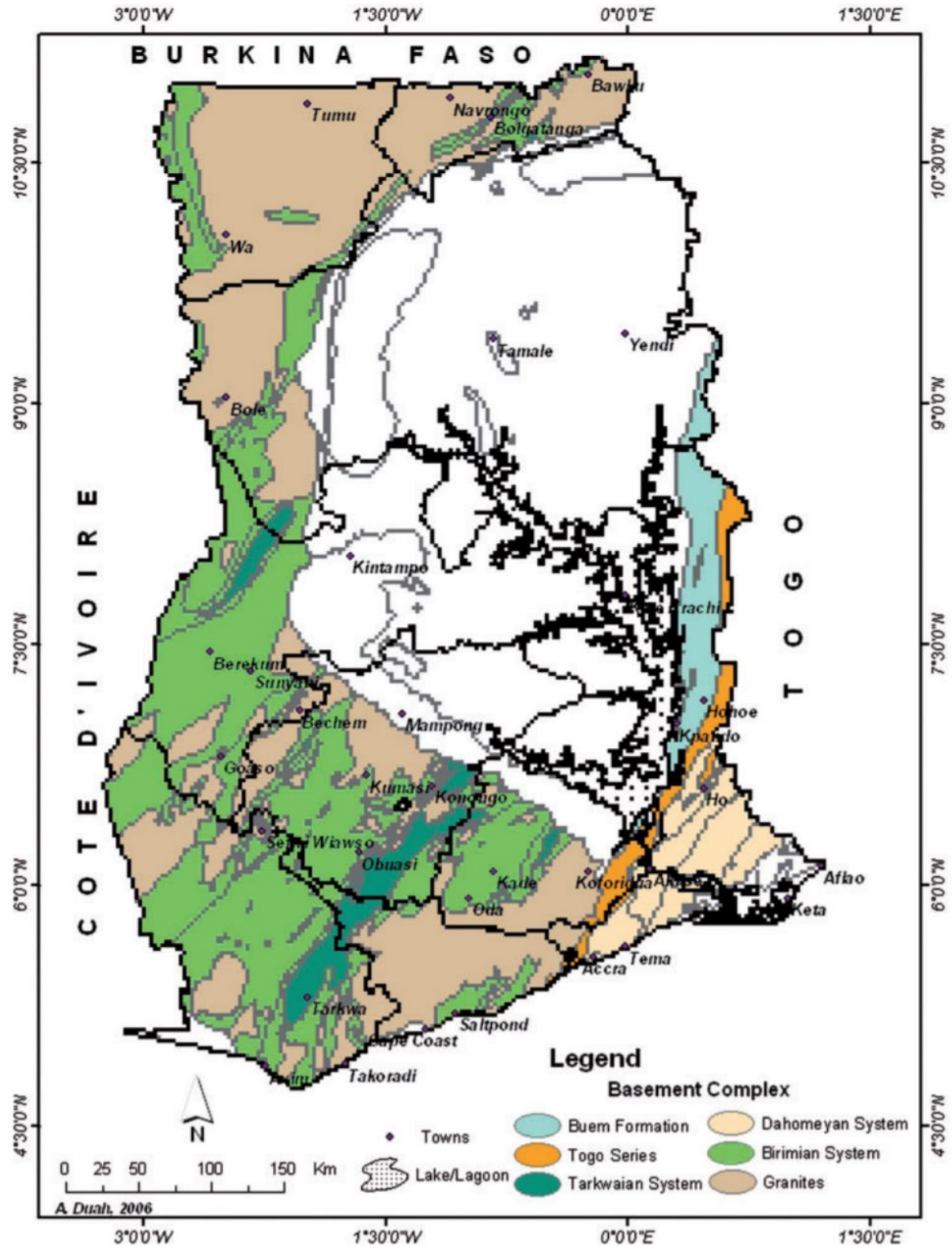


Figure 4. 3 Hydrogeological sub-provinces of the Basement Complex (Ghana Geological Survey 1969)

The Paleozoic consolidated sedimentary formations, locally referred to as the Voltaian Formation, underlie about 45% of the country and consist mainly of sandstone, shale, arkose, mudstone, sandy and pebbly beds, and limestone. The Voltaian Formation is further subdivided on the basis of lithology and field relationships

into the following sub- provinces: (1) Upper Voltaian (massive sandstone and thin-bedded sandstone); (2) Middle Voltaian (Obusum and Oti Beds); and (3) Lower Voltaian (Figure 4.3).

The remaining 1% of the rock formation is made up of two coastal provinces (the Coastal Block-Fault Province and the Coastal-Plain Province) and the Alluvial Province. The coastal block-fault province consists of a narrow discontinuous belt of Devonian and Jurassic sedimentary rocks that have been broken into numerous fault blocks and are transacted by minor intrusion. The coastal plain hydrogeologic province is underlain by semi-consolidated to unconsolidated sediments ranging from Cretaceous to Holocene in age in south eastern Ghana and in a relatively small isolated area in the extreme south western part of the country. The Alluvia hydrogeologic province includes narrow bands of alluvium of Quaternary age, occurring mainly adjacent to the Volta River and its major tributaries and in the Volta delta (Ministry of Works and Housing, 1998; Dapaah-Siakwan and Gyau-Boakye, 2000).

4.2.2 Aquifers found in Ghana

The rocks that underlie 99% of Ghana (the basement complex and the Voltaian formation) are essentially impermeable and have little or no primary porosity. Therefore, groundwater occurrence in Ghana is associated with the development of secondary porosity as a result of jointing, shearing, fracturing and weathering. This has given rise to two main types of aquifers: the weathered zone aquifers and the fractured zone aquifers. The weathered zone aquifers usually occur at the base of the thick weathered layer. The weathered layers vary, from 0m (outcrops) to about 100m. The weathered layer is thickest in the wet forested south-western part of the country where it reaches an average thickness of 60m and is thinnest in the semi-arid zone in the extreme northeast where the mean thickness is 10m. The fractured zone aquifers are normally discontinuous and limited in area. Due to the sandy clay nature of the weathered overburden, the groundwater occurs mostly under semi-confined or leaky conditions. The yield of these aquifers rarely exceeds 6 m^3/h (Ministry of Works and Housing, 1998).

Three aquifers occur in the remaining 1% of Ghana, mainly in the extreme south eastern and western part (with cenozoic and mesozoic sediments formation). The first aquifer is unconfined and occurs in the recent sand very close to the coast. It is between 2m and 4m deep and contains fresh meteoric water. The intermediate aquifer is either semi-confined or confined and occurs mainly in the red continental deposits of sandy clays and gravels. The depth of this aquifer varies from 6m to 120m, and it contains mostly saline water. The third aquifer is the limestone aquifer. It varies in depth between 120m and 300m. The groundwater in this aquifer, which occurs under artesian condition, is fresh. The average yield of the limestone aquifer is about 180m^3/h (WRC, 2021).

Aquifer Recharge

Little information is available on groundwater recharge in Ghana. Recharge to all the aquifer systems in Ghana is mainly by direct infiltration of precipitation through fracture and fault zones along the highland fronts and also through the sandy portions of the weathered zone. Some amount of recharge also occurs through seepage from ephemeral stream channels during the rainy seasons. Some indirect recharge mainly occurs in the lower rainfall, low relief and low permeability areas. This happens when runoff from watershed outside the areas or a particular storm event is of sufficient magnitude to cause runoff. The drainage courses or stream which act as conduit for the overland flows are generally weak fissured zones which allow a greater part of the runoff to infiltrate through their beds to the groundwater table.

Data on water level fluctuation are scarce but support the contention of high recharge in some areas; observations carried out in the Upper Regions between 1976 and 1979 show oscillation of 0.3 to 5.4 m between the dry and wet seasons with the peaks normally in September/October. Wells monitored by the Water Resources Research Institute between 1980 and 1989 show generally irregular movements of groundwater levels and may have been affected by pumping either of the monitoring well itself or other wells

in the vicinity. Nevertheless, there are some indications that the groundwater system is active rather than passive, and is affected by significant recharge and discharge on an annual cycle (World Bank Country Report, 1992). Climate change can cause reduction in groundwater recharge between 5 and 22% by the year 2020, while reductions for the year 2050 are projected to be between 30 and 40% by the World Bank's Climate Knowledge Portal.

4.2.3 Groundwater Quality

Previous studies (Nathan Consortium studies, 1970; Amuzu, 1978; Andah, 1993; Kortatsi, 1994; Ministry of Works and Housing, 1998; Darko *et al*, 2003) revealed that the quality of groundwater in Ghana is generally good for multi-purpose use except for the presence of low pH (3.5-6.0) waters, high level of iron, manganese and fluoride in certain localities as well as high mineralization with TDS in the range 2000-14,584 mg/l in some coastal aquifers particularly in the Accra plains. In Tamale and Atiave, fluoride concentration levels could be as high as 5.0 mg/l and 20.0 mg/l respectively. About 30% of all boreholes in Ghana have iron problems (Ministry of Works and Housing, 1998). High iron concentration in the range 1-64 mg/l have been observed in boreholes in all geological formations. This iron originates partly from the attack of low pH waters on corrosive pump parts and partly from the aquifers (Ministry of Works and Housing, 1998). The percentage of iron derived from the aquifers is however unknown. Table 4.2 gives the mean values of chemical analyses of many water samples in the various geologic formations in Ghana.

The waters in many hand-dug wells look turbid and polluted as they contain high levels of nitrate in the range of 30-60 mg/l and abundant total and faecal coliform (Kortatsi, 1994). This is probably due to improper construction and inadequate protection of wells sites from surface runoff and animal droppings.

4.2.4 Borehole Yields

Yields from boreholes are highly variable because of the lithological varieties and structural complexities of the rocks. In 1994, the Water Resources Research Institute analysed borehole yields for the various geologic formations in the country. The least explored geologic unit is the Voltaian system (underlying also the Volta basin). Table 4.2 gives a summary of borehole yields for the various hydrologic units in the country.

Table 4. 2 Summary of Borehole Yields of Hydrologic Provinces and Sub Provinces

Hydrogeologic province and sub province	Borehole-completion success rate (%)	Range of yield (m^3/h)	Average Yield (m^3/h)
Basement Complex			
Lower Birimian System	75	0.41 - 29.8	12.7
Upper Birimian System	76.5	0.45 - 23.6	7.4
Dahomeyan System	36	1 - 3	2.7
Tarkwaian System	83	1 - 23.2	8.7
Togo Series	87.9	0.72 - 24.3	9.2
Buem Formation	87.9	0.72 - 24.3	9.2
Voltaian System			
Lower Voltaian	55	1 - 9	8.5
Middle Voltaian (Obusum and Oti beds)	56	0.41 - 9	6.2
Upper Voltaian	56	1 - 9	8.5
Cenozoic, Mesozoic, and Palozoic Sedimentary Strata (Coastal Provinces)			
Coastal Block-Fault Province	36	1 - 5	3.9
Coastal-Plain Province	78	4.5 - 54	15.6
Alluvial Province	67	1 - 15	11.7

Source: Dapaah-Siakwan and Gyau-Boakye (2000)

Again, in 1994, the Water Resources Research Institute prepared a borehole-yield map of Ghana based on available data on borehole yields; static water level and other vital information (Figure 4.4). This map indicates the borehole yield to be expected in any area within the country.

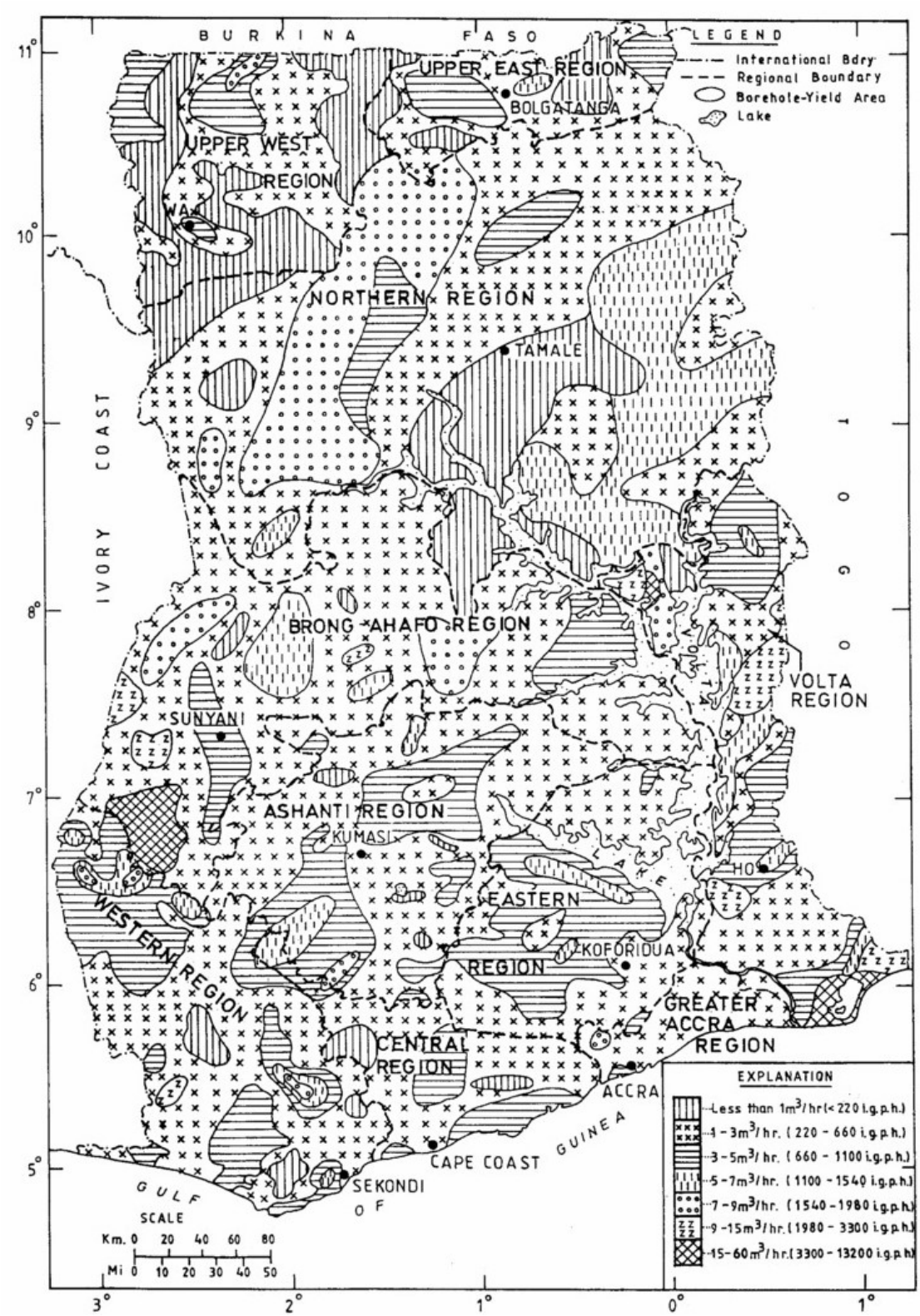


Figure 4. 4 Distribution of borehole yield in Ghana (Water Resources Research Institute 1994)

4.2.4 Groundwater Abstraction and Distribution

Groundwater is abstracted from all the geological formations in the country. In 1994 there were over 45,000 abstracting systems made up of approximately 10,500 boreholes, 45,000 hand-dug wells and some dug out, all over the country (Kortatsi, 1994). Current available information shows increase in the number of abstraction systems, possibly due to increase in population, which has resulted in a higher demand for water for various uses particularly domestic. As at March 1998, the number of hand dug wells had risen to about 60,000 while the number of boreholes reached 11,500 in the year 2000 (Dapaah- Siakwan and Gyau-Boakye, 2000); making a total of over 71,500 systems. From the borehole and well figures, it could be inferred that the rate of construction of wells in Ghana (1994-1998), and that of boreholes (1994-2000) was 10 per day and 1 every other day respectively. A hand-dug well is a cost-effective device for extracting shallow groundwater bodies and it is a technology that has found extensive use as a traditional water supply system in many rural and urban communities throughout Ghana.

A typical hand dug-well in Ghana consists of three components, the intake, a shaft and the wellhead (DANIDA, 1993). Boreholes are also found in use in several areas in Ghana though the cost involved limits its use (the average cost of drilling a borehole in Ghana, including pump testing is about US $3,920). Most boreholes have been drilled through one project or the other for community use. Few private organizations and very few individuals own their own boreholes. There is limited data on hand-dug wells in the country, except the Volta region where an inventory has been done and from this inventory, it can be inferred that hand-dug well yield varies from 0 (dry well) to 26 m^3/day with a mean of 6 m^3/day (Kortatsi, 1994). Therefore, the estimated total abstraction of hand dug wells per year is $1.3x10^8$ m^3. Figure 4.5 gives the regional distribution of borehole (NB) and the estimated annual abstraction (AA) of groundwater based on 12 h of pumping per day. The estimated total annual abstraction of boreholes is $1.41x10^8$ m^3.

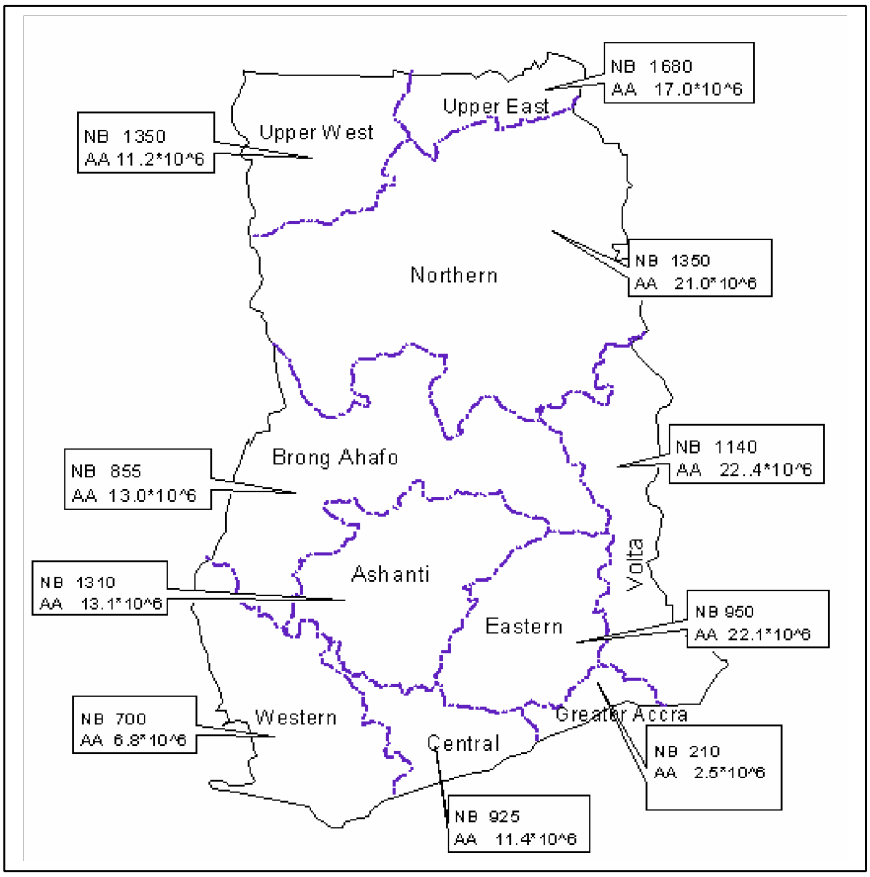


Figure 4. 5 Regional Distributions of Borehole and Annual Abstraction Figures

4.3 Lower Volta Basin Area

4.3.1 Surface Water Resources

The Lower basin is located below the confluence of the Black Volta and the White Volta rivers, excluding the Oti river drainage area. The surface water resources in the basin consist of flows from outside the country and flows from within the country. Discharges of White Volta at Nawuni and Mole River at Lankatere were used to estimate the total basin discharge (Table 4.3).

Table 4. 3 Surface Water flows of the Lower Volta of Ghana

Station	River	Catchment area	Annual discharge (m^3/s)	Dry season discharge (m^3/s)	Wet season discharge (m^3/s)
Nangodi Yarugu	Red Volta White Volta	10,974 41,619	30.72 80.00	0.34 2.17	61.12 157.00
Total inflow			**110.72**	**2.51**	**218.12**
Nawuni Lankatere	White Volta Mole	96,957	229.98 73.31	18.95 15.78	440.05 131.33
Total outflow			**303.29**	**34.73**	**571.38**
Total flow from within the catchment area in Ghana			**192.57**	**32.22**	**353.26**
% Total inflow / Total outflow			**36.5**	**7.2**	**38.0**

The Lower Volta Basin covers a total area of about 68588 km^2 and most of that (50432 km^2) is located in east-central Ghana. The basin includes also portions of the Northern, Brong Ahafo, Volta, Ashanti, Eastern Regions and parts of Togo.

Annual rainfall in the basin varies from about 1100mm in the northern part of the basin to about 1,500mm in the central, and to about 900mm in the southern part. Pan evaporation is about 1,800mm per year and runoff from within the basin is estimated to be about 89 mm per year. The natural total mean runoff from the Basin is estimated to be about 1,160 m^3/s; the Volta Lake behind Akosombo dam providing extensive regulation. Current river water withdrawals in the basin include about 1.86 m^3/s domestic water supplies, about 0.71 m^3/s for irrigation water supply, and about 566 m^3/s for power. In the future, nearly all the regulated outflow from Akosombo will be used for power generation. Table 4.4 gives the estimated annual flow of the tributaries of the Main Volta River basin.

Table 4. 4 Sub-basins of the Main Volta River in Ghana

Sub-basin	Area (km^2)	Specific yield ($m^3/s/km^2$)* 1000	Estimated Annual Basin Flow (m^3/s)
Daka	8,283	7.996	66.2
Kularakum	5,931	8.000	47.4
Pru	8,728	2.176	19.0
Sene	5,366	2.176	11.7
Obosom	3,620	2.176	7.9
Dayi	1,828	8.289	15.7
Asukawkaw	2,233	8.081	18.0
Alabo	1,023	3.086	3.2
Afram	11,396	8.766	99.9
Total flow from the tributaries	**48,478**		**289.0**

4.3.2 Land Use, Ownership and Degradation

Current land use is short bush fallow cultivation along the immediate banks of the river, and less intensive bush fallow cultivation elsewhere. Animal grazing is common while the lakeshores are extensively settled by

fishing families. Charcoal burning involving the cutting of wood has become an extensive economic activity in the southern dry forest and transitional environments (e.g., various parts of the Afram sub-basin).
The Afram plains and other areas in the south have been the focus of increasing settlement and agricultural development since the 1960s, having been generally thinly populated in the past as part of the empty "middle belt". The forest and transitional areas are intensively farmed with cocoa, coffee, plantain, cocoyam, cassava, oil palm, and maize on small bush fallow plots. A large modern commercial farm at Ejura specializes in maize production. Some timber extraction takes place in these areas.

Recent developments, particularly below the Akosombo Dam, include irrigated rice, sugarcane, and vegetable cultivation in the areas immediately adjoining the Volta River. The construction of the Akosombo Dam has reduced the annual flooding in the Lower Volta areas. The areas around the coastal lagoons, such as the Songhor, are used for salt mining. Urban land use is limited to a few towns like Kpandu, Kwamekrom, Akuse Sogakpe, and Ada-Foah. Figure 4.6 illustrates the land use cover changes of the Lower Volta Basin between 2003 and 2015.

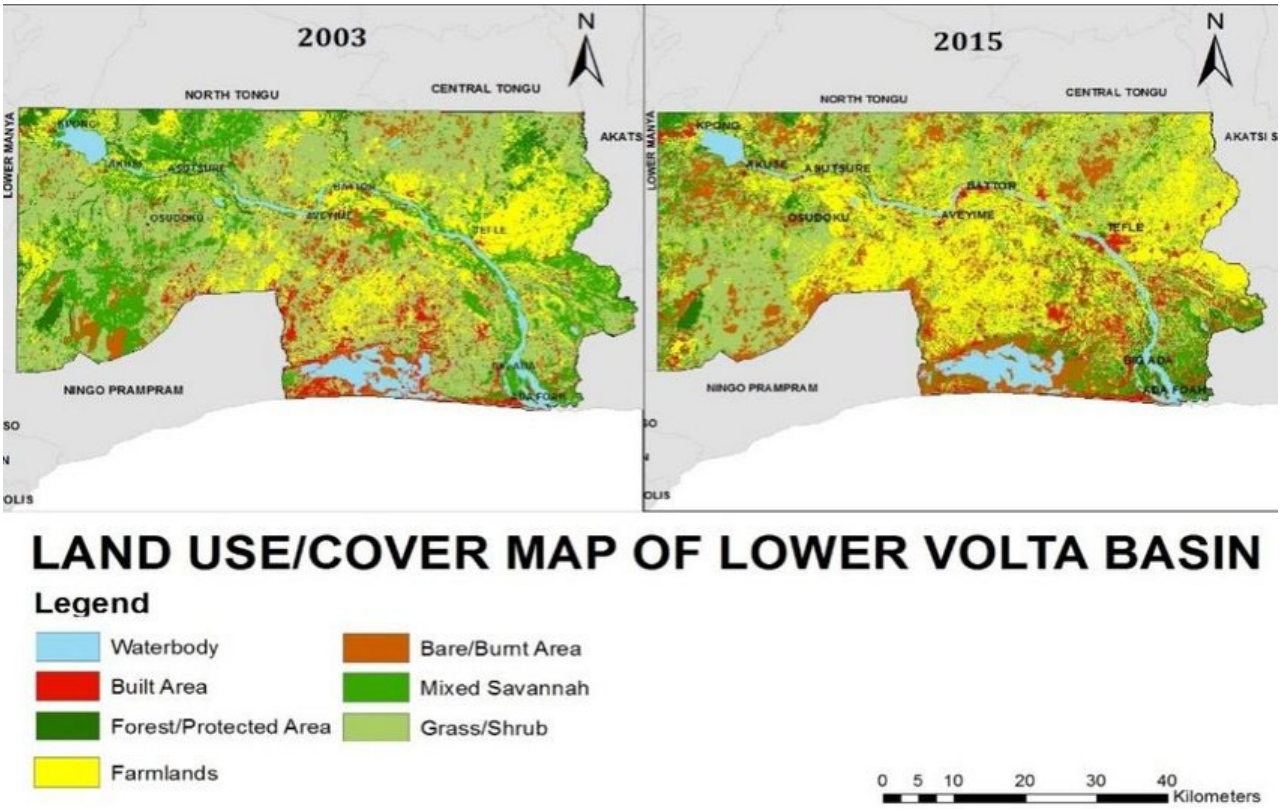


Figure 4. 6 Land Use Map of the Lower Volta Basin (2003, 2005)

4.4 White Volta Basin Area

4.4.1 Surface Water Resources

The White Volta sub-basin covers about 49210 km^2 in Ghana, representing 46% of its total catchment area of 10741.67 km^2 distributed in Ghana, Burkina and Togo. Its main tributaries are Morago and Tamne. The Morago has a total area of 1608 km^2 with an area of 596km^2 in Ghana and 912km^2 in Togo. The Tamne lies entirely in Ghana with an area of 855 km^2. The White Volta covers mainly the north-central Ghana and some parts of the Upper and Northern Regions. It is located within the Interior Savanna Ecological Zone and is underlain by the Voltaian and granite geologic formations.

Annual rainfall in the sub-basin ranges between 1000 in the north and 1200 mm in the south; pan evaporation is about 2550 mm per year and runoff from within the basin averages about 96.5 mm per year. The average annual runoff from the White Volta is about 272 m^3/s and the mean monthly runoff from within the basin varies from a maximum annual flow of 1216 m^3/s to a minimum of about 0.11 m^3/s. Potential storage sites have been identified within the basin totaling nearly 8180 10^6 m^3 which could regulate the basin yield at a minimum flow of about 209 m^3/s. It contributes about 20% of the annual total flows to the Volta Lake. Specific suspended sediment yield in this basin is between 8.5 and 14.0 tonnes/yr/km^2. Current surface water uses in the basin are estimated at about 0.11m^3/s for domestic water supply and about 2m^3/s at numerous small irrigation projects.

Development potentials have been identified in the White Volta Basin which include a total of 63 megawatts of installed hydroelectric generating capacity, 155,809 hectares of irrigation, flood control, domestic water supply, navigation and recreation.

4.4.2 Land Use, Ownership and Degradation

The predominant land use is extensive land cultivation which is 2 - 6 miles from the villages on upland areas (NAES, 1993), with widespread grazing of large numbers of cattle and other livestock up to 100 cattle per km^2 (FAO, 1991); and compound cropping (home gardening) around the house (Wills, 1962; Adu, 1967: USAID / ADB, 1979; FAO, 1963; NAES, 1993). Estimates of land use and land cover in 1989 showed that about 50% of the land in the northeast and northern parts of the basin was in the compound and bush fallow cultivation cycle (IFAD, 1990). Farm sizes are usually less than three acres. Grazing land including that obtainable under natural condition is generally poor. Annual bush burning further reduces the quality and quantity of fodder.

Extensive valley bottoms in many parts of the basin, particularly in the guinea savannah areas, have in recent years been cultivated for rice under rain-fed conditions. In the north and northeast, the best agricultural soils are derived from granites, sandstones, and greenstones. These areas remain the most densely populated. A long period in the upland areas away from the valley bottoms, which had been infested with the *Onchocerciasis simulium* vector, and the intensive cultivation and grazing without proper management practices have led to widespread soil erosion and loss of fertility of the upland soils. Outcrops of rocks, iron pan soils, as well as the scarps are usually avoided by farmers and may be uninhabited or only sparsely inhabited. Fuelwood and other wild produce gathering is widespread.

Urban land use is small and most intensive in such centres as Bolgatanga, Bawku, Wa, Navrongo, Tamale, and Tumu. Due to the decentralisation of administration to the district level, urban type land use is becoming important in some of the district capitals, especially those along major trunk roads.

4.5 Agro-Ecological Zones in the Volta Basin of Ghana

The natural vegetation of Ghana is classified based on ecological zones. Six agro- ecological zones, defined on the basis of climate, reflected by the natural vegetation and influenced by the soils are recognized in Ghana (Figure 4.7). These consist of the Sudan, Guinea and Coastal Savanna Zones, Forest-Savanna Transitional Zone, the Semi-deciduous Forest Zone and the High Rainforest. In all these zones, the natural vegetation has undergone a considerable change as a result of human activities. Also considerable variations exist between successive rainy seasons in time of onset, duration and amounts of fall. Rainfall is also generally accompanied by high intensities and energy loads and is therefore erosive. Generally, Alluvia soils (Fluvisols) and eroded and shallow soils (Leptosols) are found in all the agroecological zones (FAO- RAF, 2000/1).

With the exception of the Tropical Rainforest Zone, the Volta Basin of Ghana (covering most of the FSRP2 areas) falls in all the agro-ecological zones of the country. The largest portion is in the Sudan Guinea Savanna

zones (24.2%) followed by the Forest Savanna Transition zone (11.2%) and the Semi Deciduous Forest zone (5.4%). The Coastal Savanna occupies a small area of about 0.5%.

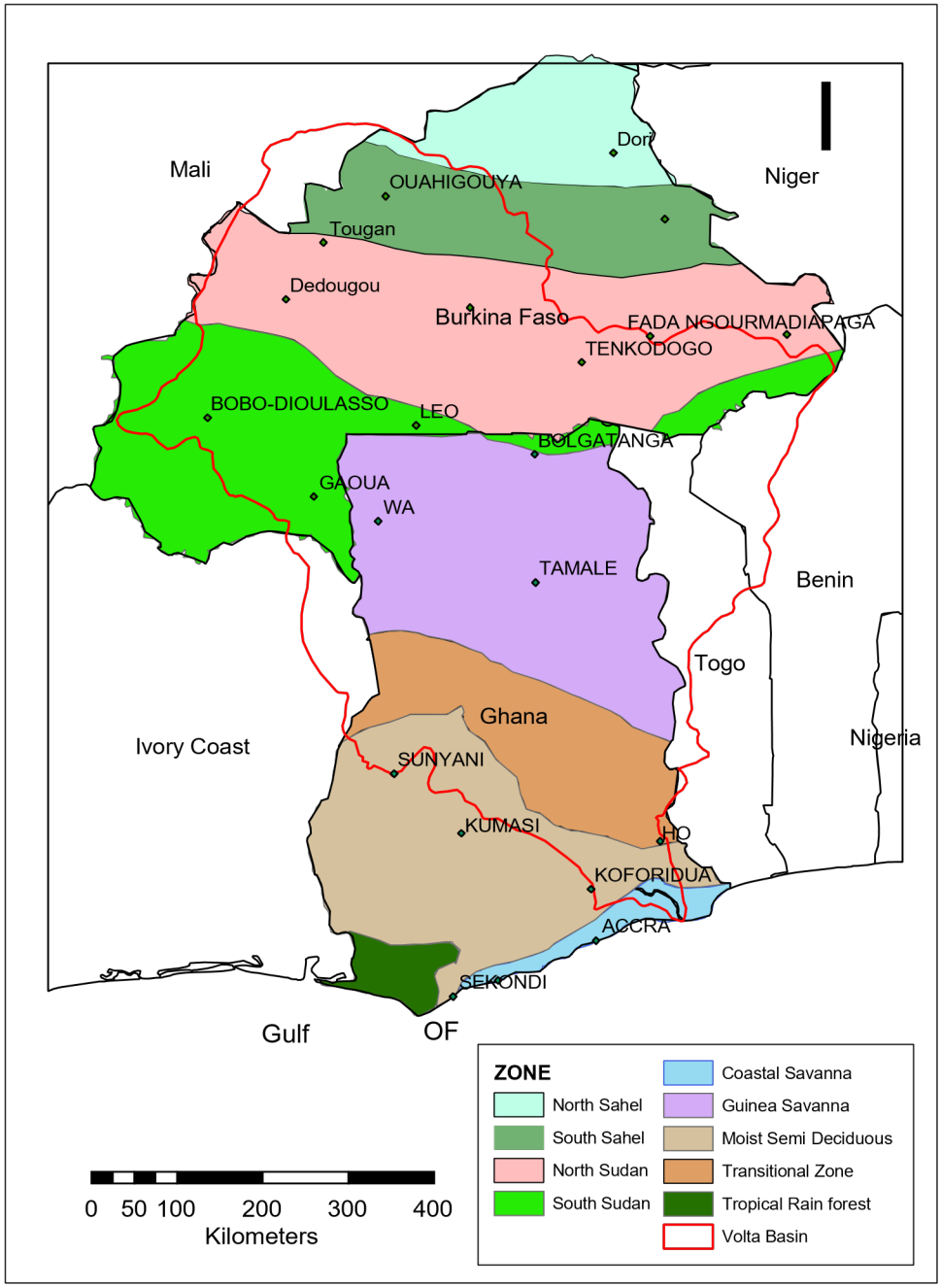


Figure 4. 7 Map showing the agro-ecological zones of Ghana and Burkina Faso

4.5.1 The High Rainforest Zone (HRF) Zone

The rainforest covering an area of about 7500km^2 is located in the south-western corner of the country. This zone is characterised by a bimodal rainfall distribution pattern with a mean annual total ranging from 1750 to 2200 mm. The major rainy season occurs from March to mid-July with a peak fall in June. The minor rainy season starts from early September and tails off at the beginning of November. The major dry season commences from mid-November and lasts till the end of February. Temperatures are generally high throughout the year. The mean annual maximum temperature varies from 28.7 to 31^{o}C with a corresponding minimum temperature of 20.6 to 23.2^{o}C. The mean temperature is about 26.5^{o}C. Relative humidities in the

morning are over 90%. In the dry season, the value falls below 80%. Potential evapotranspiration in this zone is about 1350 mm/yr (FAO-RAF, 2000/1).

The vegetation in the rainforest is generally evergreen although some species common to the semi-deciduous forest may be found. Such species tend to shed their leaves during the dry season. The zone is characterized by the *Cynometra-Lophira-Tarrietia* association with *Cynometra ananta, Lyphira alata* and *Tarrietioa utilis* as indicator trees (Lane, 1962). The topography is undulating to rolling with numerous fresh water swamps potentially suitable for rice cultivation occupying the low lying valley bottoms. The swamp vegetation consists of Raphia palms with shrubs such as *Alchornea cordifolia*, *Caropa procera* and *Macaranga* spp. entangled by various climbers. The soil types in this zone are: Acrisols, Nitrisols and Gleysols (FAO-RAF, 2000/1).

4.5.2 The Semi-Deciduous Forest (SDF) Zone

The Semi-deciduous forest zone is about 66300 km^2 in extent and forms about 90% of the total forest zone. Like the HRF zone, the SDF zone is characterized by a bimodal rainfall distribution pattern with mean annual totals ranging from 1400 – 1750 mm. Conditions of temperature potential evapotranspiration and relative humidities are similar to that in the HRF zone (FAO-RAF, 2000/1).

The characteristic associations are Celtic-Triplochiton and Antiaris-Chlorophora. The indicator trees for the former consist of *Celtic milbraedii* and *Triplochiton scleroxylon* whilst the latter is characterized by *Antiaris africana* and *Chlorophora excelsa*. It is within this zone that most food crops and cocoa cultivation takes place. Most of the timber for both local needs and export comes from the zone. As a result of these activities the vegetation outside forest reserves consists mainly of forb regrowth, thicket, secondary forest and swamp thicket. Soils present in this zone are: Acrisols, Nitrisols and Gleysols (FAO-RAF, 2000/1).

4.5.3 The Forest-Savanna Transitional (FST) Zone

This zone also known as a derived savanna, covering about 8300 km^2 occurs as a normal strip of about 48km wide along the north and the north eastern limits of the semi-deciduous forest. This zone is also characterised by a bimodal rainfall distribution pattern with mean annual totals ranging from 1200 - 1400 mm. The mean temperature is about 26.5^{o}C. Morning and mid-day relative humidity values range between 85.5 and 88% and 70% and 74% respectively. Potential evapotranspiration in this zone is about 1350 mm/yr (FAO-RAF, 2000/1).

Most tree species of the forest zone occur in this area in addition to such species as *Daniella oliveri*, *Borassus aethiopum* and *Terminalia macroptera*. These trees occur in association with tall to medium grass such as Andropogon and *Pennisetum* spp. The soil types here are: Lixisols, Nitrisols, Plinthosols and Cambisols (FAO-RAF, 2000/1).

4.5.4 The Guinea Savanna Zone

The Guinea Savanna Zone which covers almost the northern part of the country is the largest ecological zone. Its aerial extent is about 147900 km^2. This zone is characterized by a unimodal rainfall regime lasting from April to October with a mean annual rainfall varying between 1000 and 1200 mm. Monthly total increases gradually from March until a maximum is reached in August or September, after which monthly total falls rapidly. It is dry November and March. This is the period when the desiccating effect of the harmattan is strongly felt. Mean annual maximum temperature ranges from 33^{o}C to 35^{o}C with a minimum of about 22^{o}C and a mean of 27.8 to 28.5^{o}C. Relative humidity is about 40% in the dry season but may reach 84% during the peak of the rainy season in August. Potential evapotranspiration varies between 2000 and 2300 mm/year (FAO-RAF, 2000/1).

The vegetation consists typically of a ground cover of grasses of varying heights interspersed with generally fire resistant, deciduous, broad leaved and gnarled trees at the forest margins in the south. This grades into a more open grassland with widely spaced shorter trees towards the north. Owning to the tussocky nature of the grasses bare patches of land are common. During the dry season, November to March, the dry grasses are highly inflammable. In the less eroded areas, *Andropogon gayanus*, the commonest grass, may be replaced by *Hyparrhenia* and *Heteropogon* spp. While *Aristida* and *Cymbopogo gigantus* dominate the badly eroded sites. *Vetiveria nigritana*, *Seteria anceps* and Sedges occur in alluvial sites. The common tree species, including Lophira lanceolata, Anogeissus, Afzelia Africana, Prosopis africana, Pterocarpus erinaceus, Parkia clappertoniana, Butyrospermum parkii and Antiaris Africana. Fringe forest and woodland may be found along the water courses. Soils present in this zone are: Lixisols, Acrisols, Luvisols and Gleysols (FAO-RAF, 2000/1).

4.5.5 The Sudan Savanna Zone

The Sudan savanna zone covers an estimated area of 1900 km^2. It is characterized by a unimodal rainfall pattern with a mean annual rainfall varying between 900 and 1000 mm. Mean annual maximum temperature ranges from 27.8 to 28.5^oC. Relative humidity and potential evapotranspiration are similar to that of the Guinea Savanna Zone (FAORAF, 2000/1). This zone consists of short drought and fire resistant deciduous trees, interspersed with open savanna grassland. Grass cover is very sparse and in most areas, the land is bare and severely eroded. Tree cover is very low. However, in the densely settled and cultivated areas, important economic trees such as *Adansonia digitata*, *Ceiba pentandra*, *Butyrospermum parkii*, *Parkia clappertoniana*, *Tamarindus indica* and *Acacia albida* still remain. The soil types here are: Lixisols, Acrisols, Luvisols and Lithosols (FAO-RAF, 2000/1).

4.5.6 The Coastal Savanna Zone

The Costal savanna zone covers an estimated area of 4500 km^2 with mean annual rainfall varying between 600 and 900mm. This zone has a bimodal rainfall pattern with a characteristic distribution similar to that of the forest zone. The mean annual maximum and minimum temperatures are 30.5 and 22.9^oC respectively. Relative humidity varies from 55 to 65 % during the day and fall to about 40 % during the major dry season (FAO-RAF, 2000/1).

The vegetation consists of mainly grassland interspersed with dense short thickets often less than 5 m high with a few trees like Antiaris africana, Ceiba pentandra and Melicia excelsa, Albizia zygia and Azadirachta indica. Short and medium grasses are the dominant plant species, notable among which are Andropogon gayanus and Hyparrhenia dissoluta in upland areas and Vetiveria fulvibarbis, Brachiaria falcifera and Bothriochloa bladhii in low lying areas. Soils present in this zone are: Acrisols, Luvisols, Cambisols, Gleysols, Vertisols, Solonetz and intergrades (FAO-RAF, 2000/1).

4.6 The SADA (now NDA) Regions

The erstwhile Savanna Accelerated Development Authority (SADA), now Northern Development Authority (NDA) regions form more than half of the total Ghana land surface cover of about 239,000 square km (23.9 million ha). The project area lies between latitudes 8^0N and 11^0N and longitudes 1^0E and 3^0W. Togo bounds it to the east, Burkina Faso to the north, Cote d'Ivoire to the west and Ghana's high forest ecological zone to the south. The economy of the northern savanna ecological zone is based mainly on agriculture, which is the basis of livelihood for a majority of the population. The small-scale family holding is the basic unit of production. Most of the project area falls within the Guinea Savanna zone, although activities may extend into a small area of Sudan Savanna in the extreme northeast corner of the country.

NDA's Agriculture Strategy & Network

The FSRP2 has been identified to be complementary to NDA's Agriculture Strategy to ensure the integration of priority agriculture areas, irrigation and flood control projects covers the following:

- Over 8 million ha land suitable for rain-fed or irrigated agriculture;
- Land highly suitable for 25 studied crops by QG, Possibility of double and triple cropping;
- Suitable land for rice paddy field development;
- Suitable land for large scale livestock production; and
- 23 potential large and medium-sized dam sites for power, irrigation, aquaculture, flood control, tourism, and other uses.

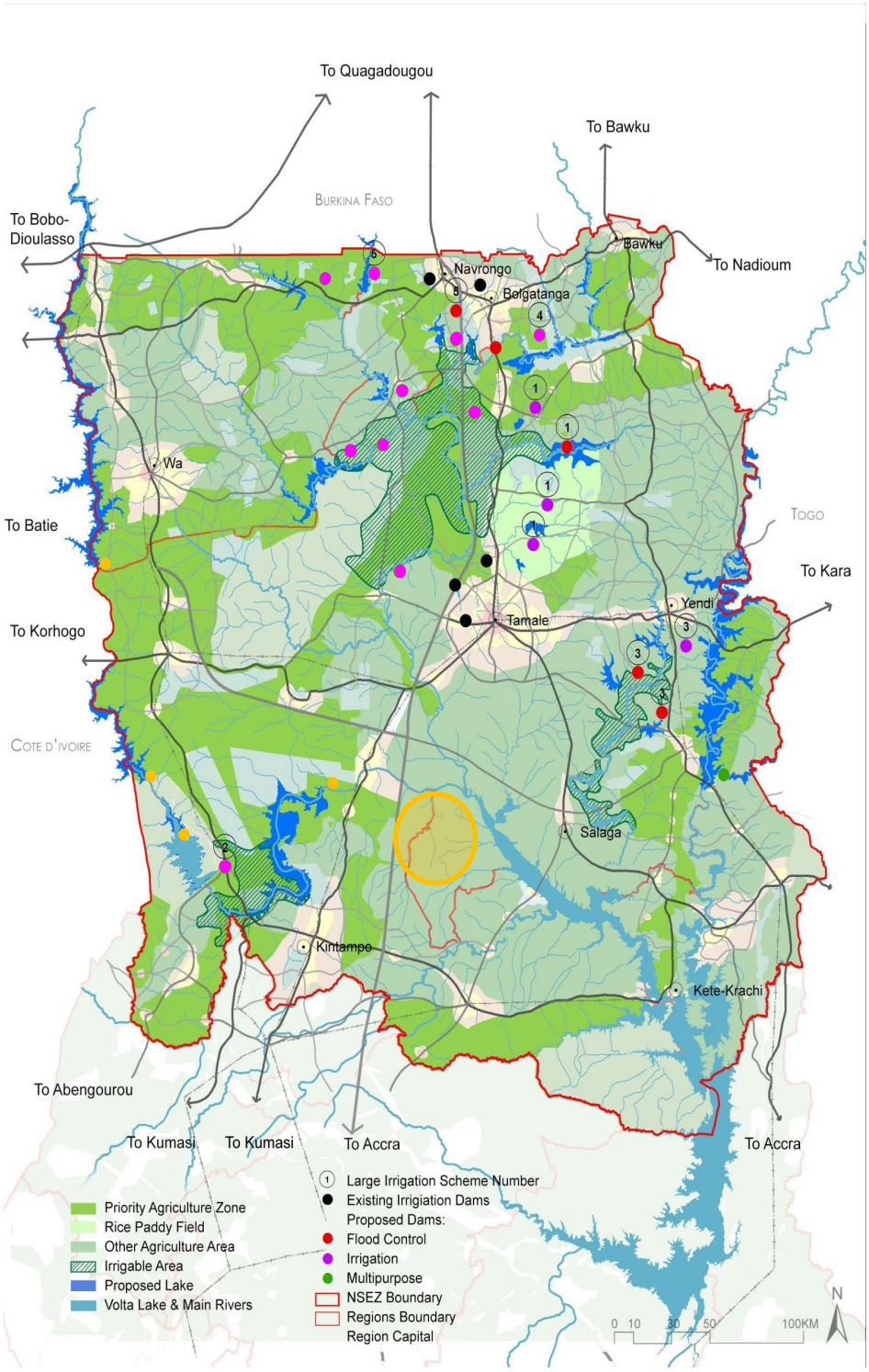


Figure 4. 8 NDA's Agricultural Network

4.6.1 Climate and Meteorology

The three regions fall within the Guinea savannah climatic zone (also known as the Tropical continental or savannah climatic zones). The climate is influenced by the movement of two air masses; Northeast Trade Winds and the Southwest Monsoons. These air masses converge at the Inter-Tropical Boundary (ITB) which, depending on the season determines the rainfall pattern over the district. The Guinea and Sudan Savanna zones are both characterized by a unimodal rainfall regime lasting from April to October, although mean annual rainfall is higher in the Guinea Savanna zone (1000 - 1200 mm), than in the Sudan Savanna (900 - 1000 mm) The period between November and March is dry and characterized by the desiccating harmattan winds, rendering the zone prone to bush fires. The mean annual maximum temperature ranges from 33°C to 35°C with a minimum of about 22°C. During the dry season, the harmattan prevails, causing high rate of evapo-transpiration and soil moisture deficiency. Relative humidity is high during the rainy season but falls to about 20% in the dry season.

4.6.2 Geology and Topography

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

4.6.3 Savanna High Plains

This is a gently rolling plain with average heights between 180 and 300 metres above sea level (ASL). Small rounded hills or inselbergs of Birimian origin can be found occasionally. This zone is found north of the forested dissected intermediate belt. With the exception of the Mole National Park, part of which is in the Voltaian sandstone basin, other protected ecosystems are located within this topographic region. They are: Gbele Resource Reserve, Kenikeni, Nuale, Naaha, Ambalara, Kulpawn Tributaries, Kulpawn Headwaters, Mawbia, Sisili Central, Chiana Hills, Tankwidi West, Tankwidi East, Red Volta and Morago forest reserves. Figure 4.8 is a biodiversity map of Ghana showing the key national parks and reserves within the project areas and beyond. The soils of these areas include ground-water laterites and savanna ochrosols, which are widely distributed. Less widely distributed are various lithosols and brunosols as well as acid gleisols and some tropical black earth. The soils of the high plains are more fertile compared to those of the Voltaian Basin but erosion is a serious problem.

4.6.4 Voltaian Sandstone Basin

This is an almost flat and extensive plain covering more than 80% of the Northern Region. The bulk of the area falls within heights between 60 and 150 metres above mean sea level (AMSL). Gentle dipping or flat-bedded sandstones, shales and mudstone underlie it, which generally speaking are easily eroded, resulting in almost flat and extensive plain. In this basin soils are relatively poor. Laterite is the most extensively distributed soil, covering 75% of the basin. The upper horizons of the soil become waterlogged during the rainy season but dry up in the dry season. The texture ranges from silty to sandy loam when developed on shales and coarse sand when developed over sandstone. The soils, including the savanna ochrosols (a prominent soil group in the basin) are generally low in organic matter and nutrients and sometimes highly acidic and very susceptible to erosion. The river valleys of the region are generally associated with acid gleisols (Acheampong, 2001).

4.6.5 Soils

The most extensive soil type in the study area is the Groundwater Lateritic Soil which covers approximately 75% of the area. The principal characteristic of this soil type is the presence of a well cemented layer of iron stone (iron pan) at a relatively shallow depth below the surface. This layer is largely impervious to infiltrating rainwater resulting in the top soil becoming water logged right up to the surface in the wet season, but dry out completely in the dry season. Soils in the UER are generally formed by weathering of the bedrock although some drift of soil transported by wind and water is also found. The soils have predominantly light textured surface horizons with heavy textured soils confined to valley bottoms. There are extensive areas of shallow concretionary and rocky soils which have low water holding capacities and limited suitability for agriculture

Figure 4. 9 Map of Ghana showing major National Parks and Cultural sites

4.6.6 Surface and Groundwater Hydrology

The Northern Savanna Zone is mainly drained by the White Volta and its tributaries Morago, Red Volta, Atankwindi and Asibelika in the Upper East Region, Kulpawn with its tributary, Sisili in the Upper West Region and the Black Volta, Nasia and Oti in the Northern Region. All the principal tributaries of the Volta are perennial. In the dry season the volume of water in the rivers of the two upper regions reduce considerably, breaking into pools or drying up at the peak of the dry period. The Volta with its tributaries is an important

source of surface water in the Northern Savanna Zone. Ground water is the most important source of potable water in the project area, although generally insufficient to meet the needs of large communities or irrigation agriculture. Water supply thus, becomes one of the key demands of the project areas. In all the communities visited, water supply was one of the major concerns raised by the people (Acheampong, 2001).

4.6.7 Biological Environment

Ecology

There are six broad ecological divisions in Ghana that are rich and varied. The SADA (now NDA) area has savanna ecology, which extends into the neighbouring countries of Burkina Faso and Togo. It is classified into the Guinea savanna and the Sudan savanna ecological zones (Figure 4.6).

Flora

The Guinea savanna covers more than 90% of the land surface area of the Northern Savanna Zone but not restricted to it (Figure 4.6). It stretches from the upper regions down south to the forest fringes. The zone includes the grassland of the north and the derived savanna on the fringes of the forests.

The interior savanna contains 1,519 vascular species known to be indigenous or naturalised to the savanna zones of Ghana. Six species including *Ceropergia gemmifera, Commiphora dalzielii, Ptleopsis habeensis* and *Eugenia coronta* are rare in Ghana and internationally. The Guinea Savanna consists generally of fire tolerant, deciduous, broad-leaved trees interspersed in a ground flora of mainly grass, sometimes more than 1.5m high. The more important grasses of grazing value include *Andropogon gayanus* and in densely populated areas, *Diectomis fastigiata, Pennisetum pedicellatum* and *Loudetia togoensis* are common. Other species that occur are *Hetropogon contortus, Schoenfeida gracilis and Aristidaa hordeacea.* The common trees include *Vitellaria paradoxa* (shea), *Parkia biglobosa* (dawadawa), *Piliostigma thonningli, Combretum glutinosum, Anogeissus sp., Detariums p., Afzelia sp., Prosopiss p., Pterocarpuss p., Butyrospermums p., Antiaris sp., Vitex sp., Piliosstigmas p., Lonchocarpuss p.* and *Acacias sp.* Table 4.5 provides the IUCN statuses of the flora identified above.

The Sudan savanna occurs mainly in the Bawku East, Bawku West and Bolgatanga districts at the extreme northeastern corner of the Northern Savanna Zone. Its total coverage is less than 10% of the zone. The vegetation is made up generally of open savanna with short grass interspersed with relatively short low branching deciduous, broad and thin-leave trees. The common trees include species of *Adansonia, Butyrospermum, Acacia* and *Parkia.* The vegetation in most of the project area is characterised by a mosaic of forest, savanna, marshes and grassland. The ecology is for the most part severely altered. This is a reflection of prolonged unregulated grazing, burning, and intensive cultivation.

There are 72 forest reserves in the northern savanna made up of 23, 33 and 16 in the Northern, Upper East and Upper West respectively. They range in size from 0.4km^2 to 1,116 km^2. However, many of these areas are under pressure from subsistence farmers, livestock herders and others who engage in illegal activities in the reserves (Acheampong, 2001). Table 4.5 provides the IUCN statuses of the fauna afore-mentioned.

Fauna

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

edouardi (guinea fowl) and many more. Savanna fauna comprises at least 93 mammal species, about half of which can be considered to be large ones, over 350 bird species, 9 amphibians and 33 reptiles. About 13% of the 860 recorded butterfly species in Ghana are associated with the savanna. The Wildlife Conservation Regulations of 1971 (LI. 685) has schedules which contain lists of wild animals found in Ghana. Fifty-five of these are completely protected (Acheampong, 2001)

Rare or Endangered Species

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

Table 4. 5 IUCN Statuses of Typical Flora and Fauna Species

Scientific Name	IUCN Status	Scientific Name	IUCN Status
Flora		**Fauna**	
Ceropegia gemmifera	Critically Endangered	*Panthera leo*	Vulnerable
Commiphora dalzielii	Endangered	*Panthera pardus*	Least Concern
Pteleopsis habeensis	Endangered	*Loxodonta africana*	Endangered
Eugenia coronta	Critically Endangered	*Syncerus caffer*	Not Threatened
Andropogon gayanus	Least Concern	*Neotragus pygmaeus*	Least Concern
Diectomis fastigiata	Endangered	*Colobus*	Vulnerable
Pennisetum pedicellatum	Least Concern	*Cercopithecus sp*	Vulnerable
Loudetia togoensis	Data Deficient	*Hippopotamus amphibius*	Vulnerable
Heteropogon contortus	Least Concern	*Crocodilus sp*	Least Concern
Schoenefelda gracilis	Data Deficient	*Naja nelanoleuca*	Least Concern
Aristidaa hordeacea	Critically Endangered	*Bitis gabonica*	Vulnerable
Vitellaria paradoxa	Vulnerable	*Veranus niloticus*	Least Concern
Parkia biglobosa	Least Concern	*Francolinus sp*	Least Concern
Piliostigma thonningii	Data Deficient	*Falconidae sp*	Vulnerable
Combretum glutinosum	Least Concern	*Psittacus erithacus*	Least Concern
Anogeissus sp	Least Concern / Endangered	*Neophron sp.*	Endangered
Detarium sp.	Least Concern	*Guttera edouardi*	Least Concern
Afzelia africana	Vulnerable		
Prosopis sp	Data Deficient		
Pterocarpus sp	Least Concern		
Butyrospermum sp	Vulnerable		
Antiaris toxicaria	Least Concern		
Vitex sp	Critically Endangered		
Lonchocarpus sp	Least Concern		
Acacia sp.	Least Concern		

Wild Animal Migration

Wild animal movement between reserves, groves and sanctuaries in the northern savanna may be limited because these are either fragmented or interspersed with farmlands. Studies have shown that wild animals move from Togo into Ghana and vice versa, using gallery forests along the Red Volta River. It is also on record that wild animals move from the GEF supported Nazinga Game Ranch in Burkina Faso to farms on the Ghana side of the Ghana-Burkina Faso border. Communities outlying protected areas have occasionally had their farms and property destroyed by wild animals mainly elephants that move outside the reserves, particularly in the dry season, in search for water and food. In 1997 elephants invaded some villages including Widinaba, Zongoiri, Nangodi, Sekoti and Datoko, all at the fringes of the Red Volta Forest Reserve, which is a natural trail for elephants moving from Togo into Ghana. Where villages received no help from the staff of Wildlife Division in driving these animals back into the reserves (or gallery forests) they resorted to killing the rampaging animals (Acheampong, 2001).

4.6.8 Socio-Cultural Environment

According to the 2010 Population and Housing Census (PHC) released by the Ghana Statistical Service (GSS), the population of the three northern regions (Northern, Upper East and Upper West) stood at 4,228,116 (representing an increase of 26% over the 2000 PHC figure of 3,346,105). With an average annual inter-cessal increase of about 38.8% between 1960 and 2010, it is anticipated that the population of the NDA regions in 2020 will equal about 5,868,625. The Northern region carries the highest human population of 2,479,461, followed by the Upper East region with 1,046,545 and the Upper West region with 702,110 in that order. However, population densities follow the reverse order: 118.4 persons/km^2 for Upper East, 38.0 persons/km^2 for Upper West and 35.2 persons/km^2 for the northern region. Land hunger is greatest in the Upper East, where soil productivity is lower and climate harsher than in the two other regions. Most areas in the three regions are food deficient, but food security situation is worse in the Upper East region than in the Upper West and Northern regions. The main ethnic groups in the project pilot areas include the Dagbani, Mamprusi and Gonja in the Northern Region, Dagaaba and Sisala in the Upper West Region, Builsa, Kassena, Nankana, Grunnie, Nabdam and Kussasi in the Upper East Region. In all these regions/areas, ethnic patrilineal inheritance is the norm and traditional authority is vested in the chief, who sits on a skin, an acknowledged symbol of identity of the group and authority.

On-farm livelihood activities

The majority of people in the three northern regions are traditionally crop and livestock farmers, growing cereals, root and tubers and keeping livestock, mainly goats, cattle and sheep for subsistence and gain. Outside farming season activities include farm produce processing and marketing, livestock grazing and "pastoralling", bush fire prevention and control and rehabilitation of residential accommodation. Cattle husbandry plays an important role in the socio-economic life of people of the three regions. Wealth is mostly invested in cattle. Cattle are used for bride price and on other important social occasions. Most cattle owners, therefore, put greater emphasis on the herd size, rather than the quality of their stock. To them large herds mean security, wealth and prestige in the community. This leads to overstocking in many parts of the northern savanna area. With respect to range tenure, grazing is on communal basis and anyone with animals may graze his/her animals on communal lands in the community where he/ she lives. On the contrary, herders from other communities will have to obtain grazing rights from the village chief or head of the land-owning group before putting their animals on communal lands to graze. For inhabitants of a village or community there are no restrictions to the use of the communal grazing lands provided that the user of the land does not change the land use form, for instance, into human habitation.

Traditionally, forage crops are not grown and livestock graze on communal pastures, for which no one has management responsibility. Communal lands are "common good" and are rather taken for granted as

limitless gift of nature available to be used. Even in the communities, there is growing concern about the rate of deterioration of pastures, particularly in heavily populated areas (Acheampong, 2001).

Culture and Religion

Each of the NDA regions consists of at least three ethnic groups and spoken languages are varied accordingly. The major ethnic groups are each represented by a paramount chief. The Northern Region has four paramount chiefs who represent four major ethnic groups. Islam is the dominant religion in all 5 Northern Regions, whereas Traditional and Christian religions are prominent in the Upper East and Upper West Regions respectively. Aside agriculture, the people engage in the manufacture and sale of traditional artifacts and musical instruments. Blacksmithing and pottery are also common in these regions. Figure 4.8 is a country map showing the key national parks and cultural sites within the project areas and beyond.

Disaster Risk Exposure

Risk sources range from erratic climatic conditions, limited opportunities for off-farm economic activities, poor planning and implementation of development policies to annual incidence of bushfires, floods and droughts, which are the bane of the area's underdevelopment. Additionally, persistent inter- and intra-ethnic conflicts result in heavy loss of lives and property, with resources redeployed into conflict resolution.

4.6.9 Land Tenure

In the Upper West and Upper East regions, ownership of land is vested in the Tindanas (Landowners), while in the Gonja area of the Savanna Region the land-owning authority are the "skins" or chiefs. In most parts of the three northern regions undeveloped and unoccupied land may be described as communal lands and subject to common rights. These may be termed as local 'public' lands since they are for the benefit of the whole community. Land that may appear to be unoccupied is in many cases land that is utilized by local communities for a variety of livelihood activities such as hunting, harvesting of wood and herbs.

The essential principle is that all lands, including wasteland and unoccupied land, are owned by the community or group on a communal basis. The Tindana determines new areas that are to be put under cultivation every farming season. Once a plot is allocated to an individual the person obtains a user's right and continues to till it for any number of years. An individual acquires land user's rights by purchase, gift, membership of the clan/community or through inheritance but he cannot sell it to anyone outside the group, unless the right was acquired through purchase). A person who obtains a user right to land cannot be deprived of the land without his/her consent - even by the owner of the allodial title. A person who does not belong to the land-owning group can acquire stool or family land only by some form of grant; license or contract irrespective of whatever use it will be put to (Acheampong, 2001). The Resettlement Policy Framework for the project addresses land tenure issues in more detail.

4.6.10 Gender and Vulnerable Groups Issues

Role of Women in Ghana's Economy

In Ghana, although women's roles and participation in economic activity have been defined and shaped along biological and cultural lines, women have made significant strides in all aspects of the Ghanaian economy especially in the agricultural and service sectors. Presently, more Ghanaian women are now getting out of their home jobs into paid jobs and are required to combine their work at home as homemakers and their jobs outside the home.

Although females make up about 51% of Ghana’s population as at 2010, illiteracy is more prevalent among women than men. The 7th edition of the Ghana Living Standards Survey (GLSS 7) for instance found out that twice as many females as males have never been to school. This among other factors implies that in Ghana

more males have access to education than women. This situation explains why the concentration of women in skill and knowledge-based industries is low, as against the high concentration of women in the informal private sector employment and informal self-employment.

According to GLSS7, the gender characteristics of the unemployed indicate that the unemployment rate among women is lower than among males. In terms of women's participation in the labour force and economic activity, the survey finds that women although they make up almost half of the economically active population mostly are in the lower tiers of economic activity especially the private informal sector where women are predominantly entrepreneurs of small and medium scale businesses. Women are found to be mainly employed in agriculture and allied fields: sales work and to a lesser extent production, transport, professional and technical fields. Women in recent times have increasingly become the backbone of their families as breadwinners.

Existing programs to enhance women's participation in economic activities have covered financial assistance in the form of micro credit as well as skills training and retraining through workshops, seminars, etc. However due to various operational constraints, financial assistance from micro-financial institutions has been poor and woefully inadequate.

Women in Agriculture

Within the agriculture sector women are predominant in all the sub-sectors namely farming, processing and distribution. As farm owners, farm partners and farm labourers, women are estimated to account for 70% to 80% of food consumed in Ghana. The predominant role of women in agriculture has enabled most women farmers to become increasingly responsible for the educational and other material needs of their wards, especially for female headed households.

Women face a myriad of problems in carrying out agricultural activities and these include the following:

- access to and control over land due to traditional/ cultural factors
- access to credit due to lack of collateral, inadequate savings needed for equity payment required for loans, cumbersome bureaucratic procedures for accessing formal credit facilities
- access to training due to ignorance on the awareness of training programs and low educational qualification
- access to hired labour on their farms due to rural-urban migration
- access to other inputs: fertilizer, extension services, information, technology, etc.
- time constraints

Access and Control Over Agricultural Land

On access to and control of land it is argued that most of the problems facing women in this area are associated with customary laws that are discriminatory to women as well as inefficiencies in land administration that tends to impact negatively women and other on minority groups. With regard to access to land by tenure, a survey revealed that 40.9% of the respondents accessed land through family inheritance, 27.2% hiring of land, 19.4% marital access, 9.1% outright purchase/acquisition and 3.4% others for all players along the agricultural value chain. Majority (58.7%) of the farmers interviewed cultivated less than 3 acres. Only 11.1% who had access to land were able to cultivate 10 acres or more within a farming season. Whilst 9.1% cultivated 7 to 9 acres, while 21.1% cultivated 4 to 6 acres (Gender and Agricultural Development Strategy - GADS II, 2015).

Access to Extension Services Delivery

Frequency of access to extension services among male and female farmers was 34.4% and 9.5% respectively (GADS II, 2015). Along the value chain farmers/producers were found to have better access to extension

services than the other players along the agricultural value chain. Furthermore, only 13% of AEAs were females. The AEA to farmer ratio in Ghana was 1:1,500 instead of the recommended 1:500 (MoFA, 2013 Progress Report). The situation over the years has improved to 1: 1,907 in January, 2017 and 1: 706 in 2019 (using farmer population of 3,025,297: GSS 2015 Labour Force Report). This notwithstanding the number of women AEAs still remains at (15%) *MoFA Annual Report, 2020*. Also, extension approaches favoured commercial farmers who are mostly men who were able to give incentives to the AEAs.

Access to Improved Technologies

Approximately 33% of males as opposed to 12% of females had access to new technologies. However, under agro-processing technologies, women dominated. About 33% of farmers and 25% of processors along the Agricultural Value Chain have access to new technologies in their areas of operations while 12% had access to new technologies among the produce traders and marketers (GADS II, 2015).

Agro-Input Support: Certified Seeds, Fertilizer and Irrigation Supply

Most small-scale farmers (especially women, PLWD, the youth and socially excluded men) find it difficult to have access to certified seeds during planting seasons. Majority of the small-scale farmers use seeds from their own farms. Seeds in the planting seasons are generated by farmers from their previous harvest and stored for planting in the next season. Well-to-do farmers could access certified seeds characterized with good fruiting and higher crop yields. (GAASG 2014, FASDEP 2008:34). Furthermore, access to and cost of fertilizer and crop protection materials (FCPM) is high for the rural farmer. There is always a distortion in the supply chain leading to frequent shortages. Proper application of fertilizer is limited among the illiterate and most women farmers. Application of other chemicals to support plant growth and protection also face similar situation. Also access to improved irrigation practices due to low knowledge and skills in irrigation farming among farmers is limited. Commercial farmers are mostly better positioned financially to procure pumping systems to irrigate their farms. Small-scale farmers were therefore more vulnerable to climate change effect.

The Survey also made the following recommendations, consistent with suggestions given in the 2004 Women's Manifesto for Ghana document. These include:

- Customary laws of access to land and inheritance, which are discriminatory and unconstitutional, be reformed. Furthermore, Customary and other tenancies are reformed to ensure that rents are affordable and accessible to both men and women.
- The government should ensure that achieving equity in access to and control of land becomes an integral component of the land administration reforms.
- Measures should be put in place to ensure that land registration and titling processes promote joint registration of conjugal family farmlands to enhance women's land tenure security.
- Women's contribution to the development of farms be recognized and compensated at divorce and on death of their spouses.
- The State takes steps, in conjunction with National House of Chiefs and traditional councils to address customary laws and practices of access to and control over land that are discriminatory to women.

To address access to labour, technology and extension services the following are recommended:

- provide women with labour and time saving machinery through the setting up of plant pools within reach such as districts and communities through the collaboration of the Ministries of Agriculture, Trade and Industry, and Women and Children.
- enhance access to improved variety of seeds and seedlings as well as fertilizers and other chemicals needed to improve agricultural methods, by making them affordable to women farmers.
- educate women farmers on new variety of crops that are being introduced as well as on other new and improved methods of farming through extension services.

- allocate more female extension services workers to districts and communities where women farmers predominate as this will enhance their interaction, especially in areas where married women are traditionally barred from being friendly with other men.
- provide extension services for women in manufacturing and other processing activities in the form of how to maintain standards both locally and internationally which will enhance marketability of the product in and outside Ghana.
- improve access to business sensitive information and technology by improving rural telephony and Internet services.
- factor women's time constraint needs in designing programmes for them, be it training or otherwise.

Women's Rights to Own and Use Land

Gender challenges may be tackled from the traditional point of view. In the Accra Plains, women are involved in farming, harvesting, marketing and all aspects of irrigation farming. They are allowed to own land and usually priority is given to community members including women. Women mostly cultivate rice and vegetables.

In many parts of the SADA Regions, women do not have the customary right to own land. However, they do have a long-established right to borrow land from their husbands or male partners skin to cultivate a crop of their own. If a woman is unable to obtain land from these men, she will negotiate the loan of land from another compound. With the introduction of the Water Users Association, women are increasingly getting involved in dry season irrigation farming which to a large extent represents a change in cultural behavior towards women. In Bongo Central for instance, women participation in dry season irrigation increased by 64% in four years. Other vulnerable groups in the project area include: Children, Orphans, Elderly, Widows, Female Heads of Households, Migrant/Settler farmers, and Nomadic cattle herders.

Concerns about Participation of Women and other Vulnerable Groups in the programme issues of concern arising from public consultation include:

- The need for the programme to streamline processes for land acquisition by women
- Women involvement in the market value chain
- Involvement of women in decision making
- Youth involvement and their roles
- Knowledge and understanding of the out-growers scheme
- Extension services available to women or just men
- Women understanding and knowledge of the programme
- Negative impacts of the programme on women, youth and children
- In case of disaster, floods or drought which group will be mostly affected
- Possible barriers preventing women from accessing aspects of the programme
- Verification that the programme will not make women worse off
- Programme support to improve project objectives to the beneficiaries
- How the programme will affect current food security situation
- The need to educate women on the usage of chemicals since some of them are illiterates

4.7 Major Farming Systems in the Volta Basin of Ghana

The term farming-system refers to a particular arrangement of farming enterprises (e.g cropping, livestock-keeping, processing farm products) that are managed in response to the physical, biological and socio-economic environment and according to the farmers' goals, preferences and resources. Farming is used here in a wide sense to include not only crops and livestock but the other natural resources available to the farm

household, including resources held in common with others (Reijntjes *et al*, 1992). Two farming systems are dominant in Ghana: the bush fallow system (temporary system) and the permanent system. Some variants of both systems are also found in the Volta basins: the HUZA and the mixed farming systems.

4.7.1 The Bush Fallow System

This is a system of land rotation between crops or fields and bush. A plot of land is cultivated for several farming seasons and abandoned when necessary to revert to secondary vegetation. It allows the soil to keep its nutrients qualities. The length of this resting period depends on how pressing the need is for land for cultivation. In the sparsely settled areas, the length rotation may reach 15 years, whereas in the densely settled areas, the period may be as short as 3 years. As soon as the farmer abandons a plot, he starts to cultivate the new plot. Thus he moves from one plot to another plot in different farming seasons. This system could be named shifting cultivation instead of bush fallowing. The latter term implies the movement of both settlements and farming to new areas when old farm lands are abandoned. In Ghana, farm settlements are usually permanent.

The average size of food farm cultivated under the bush fallow system is 1.10 hectares. During the dry season, men clear the land by hand. The vegetation is cut down and burnt. All trees of economic importance, such as shea butter, dawadawa and the oil palm trees are left standing. Sowing begins with the first rains. For planting yams, plantain and cocoyam, the hoe is used. In the case of cassava, maize, guinea corn and millet, cutlass is used. To improve the soil occupation and the yields, several kinds of crops are grown together on the same farm. Indeed, the nutrient requirements are not the same for all the crops, so it is possible to obtain high yields from all the crops grown on the same farm or plot. Moreover, the different crops grow in different ways, this means that all the different crops together provide a better cover for the soil and as a result, help to fight the erosion.

This system of bush fallowing has some advantages in the peculiar environmental conditions of the tropics:

- The rotation allows the growing crops to make use of the plant food that accumulates in the soil as a result of the decay of leaves and twigs from the fallow vegetation. Consequently, the harvest is satisfactory in the first seasons of cultivation. After 2 or 3 years, the farmer abandons the food plots to allow it to regenerate fresh supplies of plant nutrients.
- The burning of cleared vegetation on plots intended for cultivation saves time and labour. It also improves the soil. The ash contains carbonates and phosphates which are washed into the soil by the first rains, and so increase the soil fertility. The danger of this burning method is to affect the protecting vegetal cover and thus increases the risk of erosion.

The disadvantage of the system is that it is generally thought that a fallow period of 25 to 30 years is desirable. When the pressure on the land is too high this period cannot be respected. As a result, the length of the fallow period has consequently decreased and this has resulted in low crop yields. For the last two decades, the fallow period has been shortened to approximately 2 - 3 years. This has led to decline and deterioration of cultivated soils and yields. Using fire for cleaning vegetation exposes the soil to the sun and torrential rains until the first crop forms an effective protective cover.

4.7.2 The HUZA Farming System

It differs from the bush fallow because of the peculiar system of land ownership, which gives rise to the strip pattern of land. A co-operative regroups all the financial resources of the farmers. The company is organized for the sole purpose of collecting land. The land so acquired is called ‘huza’ described as “a tract of land bought by a group of people, often but not necessarily kinsmen, under an elected leader (Hutze) who makes all negotiations with the seller (Gyasi, 1976)”. When the land is acquired, it is divided into strips for each farmer. The width of the strip is proportional to the farmer’s financial participation. After two or three

seasons of cultivation, when yields decline, the field is left fallow. Due to the pressure of population and the great demand for land, the length of the fallow period is now short (4-6 years).

4.7.3 The Permanent Systems

Contrary to the bush fallow system, these systems are intensive and a piece of land is cultivated continuously. In Ghana, there are 2 permanent systems of food farming: the compound farming system and the Anloga-Keta system. In the Volta Basin, only the compound farming system is used.

The Compound Farming System

It is used in the densely settled areas of northeastern and northwestern Ghana. This system centres on the household compound. The land immediately surrounding the compound house is intensively cropped with vegetables and staples using organic soil regeneration techniques, which involve using household refuse and manure from livestock. The average size of a compound farm is less than an acre. These pieces of land are used for cultivating okra, tomato, pepper, maize, cocoyam and plantain. These farmers cultivate also larger fields at some distance away from the household. In these fields, they adopt the temporary bush fallow system. These outfields provide the main bulk of the farmers' food supply.

4.7.4 The Mixed Farming System

It is characterised by a combination of cultivation with keeping of livestock. The latter provides power and manure on the farm. This system was introduced in the 1930s to check the rapid deterioration of soils as a result of population pressure on land and to increase agricultural production. In addition to using manure to increase production, many technical innovations were introduced such as the use of bullock plough and planting on ridges. Cow-dung, compost of household refuse, kitchen refuse and goat pens are applied to compound farms. Mixed farming is restricted to areas which are free from tsetse fly. The growing season is based on when rainfall is more than one-half of the potential evapotranspiration, and ends when there is less than half the potential evapotranspiration.

In the Sudan Savanna Zone, the climate, which is characterised by the alternation of clear-cut wet and dry seasons, has a direct effect on soil forming processes in the area. Although the prevailing climatic conditions permit accelerated chemical decomposition and deep weathering of rocks, the sudden and torrential rainfall following a prolonged dry season, during which the vegetation cover is burnt, induces great soil erosion.

4.8 Cropping Systems in the Volta Basin of Ghana

4.8.1 Sudan Savanna Zone

The basis of the cropping system throughout the zone consists mainly of pearl millet. The early millet is inter-planted with late millet or sorghum in fields close to compounds where fertility is highest. Maize was highly available at subsidized rates. Since fertilizers was no longer available and soil fertility had declined, crop planting of crop fell drastically in 1997. There has been a spread of European vegetable cultivation with the gradual decrease of some minor indigenous crops. Carrots, cabbage, lettuce and peas are now available and grown on irrigated plots close to towns and were probably originally planted for expatriates

4.8.2 Guinean Savanna Zone

Maize is the major cereal crop produced in this zone. More than 80% of the small-scale farmers grow maize. Maize has a special position because of government support for the crop. Improved varieties are used. Every farm family cultivates sorghum either as a sole crop or as an inter-crop. Cereals like maize, sorghum and millet cover most of the cultivated land. However, areas under maize decrease with increasing population density, while areas under millet or sorghum increase. Cotton, a cash crop, is found at specific sites throughout the Savanna Zone. Other cash crops cultivated include groundnuts, cowpeas, maize and rice.

Marketing of cereals is done mainly by women, who pass on moneys generated to their husbands. The women also sell products to the market when the quantity harvested is large.

4.8.3 Forest Savanna Transitional Zone

Food crop production dominates the farming system. Animal production is higher in this area than in the forest. It is the zone for major commercial food production: maize, cassava, groundnut and yam. Oil palm is also important as it is reserved in fallow land rather than grown plantations. Cotton and tobacco are important cash crops.

4.8.4 Deciduous Forest Zone

Cassava and plantain are the important food crops while cocoa and oil palm are important as cash crops. Vegetable production is increasing in importance in the zone. Cocoa is the most important cash crop in this area, and the local communities and settlers grow it.

4.9 Crop Husbandry Processes and Activities

4.9.1 Sudan Savanna Zone

Population density has a great influence on cultivation systems. Until recently, shifting cultivation was the dominant system with the increase in land pressure, farmers started to practice permanent cultivation. Compound farms and bush farms are found in this zone. On the bush farm, no manure is applied and it consists in land rotation. The plots take place 2-4 kilometres away from the farm. In the compound system, the land cultivated is directly around the homestead and is fertile because household and farm refuse are used as manure. Tobacco, gourd, melon, okra, tomatoes, pepper and sweet potatoes are usually cultivated in the compound lands. Further away is another zone planted with early and late millet, guinea corn, bambara beans and cowpea. This second zone is fertilized with farmyard manure though this is often inadequate. The rest of the compound area, usually the largest, has no manure application and is cropped to guinea corn and late millet.

The compound farms produce higher yields than the bush farm. In the first case, the soil fertility is maintained due to manure whereas in the bush farm, soil is left to nature to restore through the fallow system. With increase in land pressure, the compound system has its advantages. The bulk of cereals are however produced in the bush fallow farm. Usually the system of cropping is guinea corn and late millet mixed together, or both planted singly and often inter-cropped with groundnut, bambara beans or cowpeas. Rice may be planted in poorly drained soils, or grown inter-planted with early millet.

The pressure on land and the need to produce cash crops for sale have gradually brought about innovative farming techniques. Migrants like Muslims, seem to be the first to practice horticulture in riverine areas. Many of the larger rivers are not exploiting in this way because of a lack of adequate methods of lifting water. However, most of the shallow rivers and seasonally flooded land are now given over to dry-season gardening. In addition, gardens have been established on the edges of dugouts, after they had been excavated. There is still an opportunity to develop some of the larger rivers for irrigation, given appropriate water-lifting technology.

Onion cultivation is particularly popular and probably represents one of the most important agricultural exports from the zone. Cereals produced are locally consumed and so, are not open to the commercial market. Sheanuts are bought and exported on small scale. Tomatoes and onions are produced for sale as cash crops and are exported to Southern Ghana.

4.9.2 Guinea Savanna Zone

Animal production is more important than it is in the rest of the Savanna Zone. However, food production dominates. Bullock is also used for ploughing although some farmers are not able to afford it. Tractor may be used but at a higher price (between ¢25,000 and ¢30,000 per acre for the bullock, and ¢35,000 for the tractor.) Like in the Sudan Savanna Zone, farming systems practiced are bush fallow and compound farming.

The major cropping system is mono-cropping of early maturing maize within the compound. The following groups of cropping systems may be distinguished in the zone:

- Maize, sorghum, groundnut and cowpea with root crops, namely yam and cassava that occur in the central portion of the zone;
- Sorghum based but mixed with maize or cowpea and yam, occurs in the western part of the zone;
- Yam, maize, sorghum, groundnut based system, occur in the southeastern part of the zone.

The choice of soil tillage is influenced by ecological and economic factors such as soil type, land use of the preceding year, crop that is actually to be sown or planted, and the available technological options. Tractor is used for heavier lowland soils whereas hoe and bullocks till sandy upland soils. Soil preparation is done by hoe. Soil nutrient stocks are replenished by fallowing, the use of organic manure, biological processes, rainfall, sedimentation and mineral fertilisation. The application of fertiliser and manure is still not a common practice and it fluctuates from year to year. The majority is applied to crops which show an elastic response to the fertiliser, such crop as maize, rice and vegetables.

Men and women have distinct roles: men usually carry out land, clearing and ploughing, while women gather and burn the cleared weeds and later plant all crops. Women do most of the marketing and are responsible for the daily cooking and childcare. Almost every farmer in the zone has some livestock. About 90% of all women have 5 - 10 chickens; about 29% have 2-5 goats. Some 89% of all men have sheep, particularly in the Dagbon area and 10% have cattle.

4.9.3 Forest Savanna Transitional Zone

In this zone, permanent mechanized cultivation of food crops is common. Many farmers have adopted technologies based on ploughing, permanent cultivation and use of chemical fertilisers. The transitional character of the ecosystems, the ethnic and cultural diversity resulting from migration led to a considerable diversity in farming systems and crops. The widest variety of crops is grown in the transition zone. Mixed or sole cropping is used and the major cropping systems in the forest area are sole maize, maize/cassava, maize/cassava/plantain and /maize/pepper. In the Savanna area of the zone the cropping systems are sole yam, sole groundnut, rice/cassava and yam/cassava.

If the maize is planted in the first season, the inter-cropped culture (cassava or plantain) is relayed to the maize field at maize tasselling stage. To lower costs, maize is cropped twice a year or inter-cropped with cassava. Groundnut is planted during the first season; it normally follows yam. In this zone, single stand maize gradually displays the maize- cassava intercrop. Sole yam is the second most important cropping system. Mixture of pepper, garden egg and okra is the third. Legumes like cowpeas and groundnuts are rotated with cereals and yam.

4.9.4 Deciduous Forest Zone

In this zone, the systems all have combination of food crops and at least one tree crop. For example, cocoa or oil palm is combined with food crops like plantain, cassava, cocoyam and some other minor crops. The farming system involves permanent cultivation of tree crops, and rotational bush fallow of food crops. The first crop usually planted is maize, which is planted in almost every part of the farm. Two or three weeks later,

trees (cocoa or oil palm) are planted, followed by plantain, cassava or vegetable in the same piece of land. Farm sizes vary from 1 acre to 15 acres with the most recurring farm size being 2 acres followed by 1 acre.

4.10 Livestock Production

4.10.1 Sudan Savanna and Guinea Savanna Zones

Livestock may be owned individually or by a family. Sheep, goats, fowls and guinea fowls are kept by many households. The animals are free during the dry season and tethered to a post in uncultivated patches of grass near the farm in the rainy season. Grazing lands are poor and are those obtained under natural conditions.

4.10.2 Forest Transitional Savanna Zone

In this zone, poultry, sheep, ducks and goats are kept in extensive and or semi-intensive management systems, whilst pigs are kept under an intensive system. Chickens are kept in coops during the night and left on free-range during the day. The animals are seen to be liquid assets, which can be sold easily on the local markets. Pigs are kept in the relatively urban settlements.

4.10.3 Deciduous Zone

As a result of the susceptibility of livestock to Trypanosomiasis and other diseases, the zone keeps very few livestock. It also results from a difficulty of integrating livestock with arable farming particularly where farmers have to walk long distances to farm. Small livestock are allowed to roam and graze around the village.

5.0 Stakeholder Engagement and Consultations

5.1 Purpose of Stakeholder Engagement

Stakeholders were engaged as required by good EA practice, and also in line with the Ghana Environmental Assessment Regulations, 1999 (LI 1652) and the World Bank Group's Environmental and Social Framework (i.e. Standards 1 & 10) to demonstrate and engender openness in eliciting useful contribution to project design and implementation, improve environmental sustainability and enhance social acceptability of the project. The stakeholder list will be continuously revised to cater for new stakeholders to be engaged in the course of project preparation and implementation. This will be guided and facilitated by the standalone Stakeholder Engagement Plan (SEP) which this chapter was carved out of.

Public involvement in the assessment process engages relevant stakeholders, including those likely to be affected (either positively or negatively) and those that have power or interest in proposed undertaking. This helps identify potential conflict and minimize misinformation, develop alternatives and aide in decision making through increased mutual understanding. It promotes the feeling of ownership and cooperation and also helps to establish good rapport, manage single-issue viewpoint, gain technical expertise and first-hand knowledge on a subject matter.

For these reasons, a major activity in the scoping process is the identification of relevant stakeholders. These may include government agencies and institutions, businesses, associations, nonprofit/ NGO organizations, research and other interest groups and civil society, elected officials, indigenous people, community groups, persons likely to be impacted (project affected persons-PAPs) traditional authority and opinion leaders with varying levels of interest and involvement. The institutions and agencies identified for consultation have either regulatory mandate, oversight responsibility, development promotion or enforcement powers in the related sector. The other stakeholders identified were any group of people, companies, individuals or associations that have interest in any of the sectors, or whose operations fall within the sphere of influence of the programme.

5.2 Stakeholder Engagement Methodology

5.2.1 Stakeholder Identification and Mapping

In identifying the stakeholders, an initial prospective list was developed by matching the main components of the project (location features, project environment, etc.), as well as potential impacts and baseline areas with the various stakeholder groups in a Stakeholder Identification Matrix (SIM). Table 5.1 lists the key institutions and farmer groupings identified under the respective stakeholder categories, while Table 5.2 defines the matrix used to help elicit inputs from the various stakeholders with respect to their relevance for involvement in the engagement processes.

Table 5. 1 Categorisation of Stakeholders

Government Ministries / Agencies	Ministry of Food and Agriculture (MoFA) Ministry of Finance (MoF) Ministry of Lands and Forestry (MoLF) Ministry of Gender, Children and Social Protection (MoGCSP)
Development Promotion	National Food Buffer Stock Company (NAFCO) Women in Agriculture Development (WIAD) Animal Production Directorate (APD) Ejura Sheep Breeding Station (ESBS) under the Animal Production Directorate (APD) Livestock Breeding Station (LBS) under the Animal Production Directorate (APD)

	Directorate of Agricultural Extension Services (DAES) Veterinary Services Directorate VSD Directorate of Crop Services (DCS) e-Agricultural Programme (e-AP) Regional Training and Application Centre in Agro-meteorology and Operational Hydrology (AGRHYMET)
Regulatory Institutions & Enforcement, Safety and Protection Agencies	Land Valuation Division (LVD) Africa Continental Free Trade Authority (ACFTA) Ghana Irrigation Development Authority (GIDA) Water Resources Commission (WRC) Meteorological Services Authority (MSA) Environmental Protection Agency (EPA) Food and Drugs Authority (FDA) International Water Management Institute (IWMI) National Disaster Management Organization (NADMO) Ghana Police Service (GPS) Customs Division of GRA (CD) Ghana Commodity Exchange (GCX) Ghana Standards Authority (GSA) Ghana Export Promotion Authority (GEPA) Plant Protection & Regulatory Services Directorate (PPRSD) Fisheries Commission (FC) Volta River Basin Authority (VRBA) Forestry Commission (FoC)
Planning Authority	Land Use and Spatial Planning Authority (LUPSA) Regional Coordinating Council (RCC) Northern Development Authority (NDA) Metropolitan, Municipal and District Assemblies (MMDAs)
Research Institutions	Institute of Environment and Sanitation Studies (IESS) University of Energy and Natural Resources (UENR) Centre for Remote Sensing and Geographic Information Services (CERSGIS) Council for Scientific and Industrial Research (CSIR): Food Research Institute (FRI) Crop Research Institute (CRI) Water Research Institute (WRI) Institute for Scientific and Technological Information (INSTI) Industrial Research Institute (IRI) Soil Research Institute (SRI) Animal Research Institute (ARI) KNUST – Land Administration Research Center (LARC) Forestry Research Institute of Ghana (FORIG)
Utility Agencies	Ghana Grid Company Limited (GRIDCo) Northern Electricity Distribution Company (NEDCo) Electricity Company of Ghana (ECG) Telecommunication Companies (TELCOs)
Trade Unions and Associations	Crop Life Ghana (CLG) Ghana Agric-Input Dealers Association (GAIDA) Ghana National Association of Farmers and Fishermen (GNAFF) Apex Farmers Organisation (APFOG)

	Peasant Farmers Association of Ghana (PFAG) Agogo Women Plantain Producers and Exporters Association (AWPPEA) Water Users Association (WUA) with members including the Global Agri-Development Company (GADCO) and the Kpone Irrigation Scheme (KIS)
Civil Society/NGOs	CARE International (CI) Agricultural Development and Value Chain Enhancement Program (ADVANCE) International Fertilizer Development Center (IFDC) Alliance for Green Revolution in Africa (AGRA) Ecological Restorations (ER)
Project Community	PAPs including farmers and other facility users Women, People with Disability and Other Vulnerable Groups (WPDVG) Traditional Authority (TA) including chiefs, opinion leader, Assemblymen Community elders

Table 5. 2 Stakeholder Identification Matrix

No.	Stakeholder Categories / Project Components and Activities	Sector Oversight	Development Promotion	Research Institutions	Regulatory Authority	Planning Authority	Enforcement, Safety & Protection	Trade Unions & Associations	Local Communities	Utility Agencies
1)	Land/flood plains restoration	MoLNR		IESS, UENR	EPA	NDA, MMDAs, RCC, LUSPA	EPA, NADMO	WUA	PAPs	
2)	Watershed restoration	MoLNR		IESS, UENR, WRI	EPA, WRC	NDA, MMDAs RCC, LUSPA	EPA, NADMO	WUA	PAPs	
3)	Irrigation development	MoFA	GIDA, DCS, WIAD	FRI, IESS, DFSA, WRI	EPA, GIDA, WRC	NDA, GIDA, MMDAs, RCC, LUSPA	IWMI, GIDA, EPA	CLG, WUA	PAPs, TAs	GRIDCo, ECG
5)	Agro-sylvo pastoral farming	MoFA	DCS, APD WIAD	FRI, DCS, CRI, ARI	EPA, FoC, PPRSD	NDA, MMDAs, RCC	PPRSD, EPA	GAIDA, GNAFF	PAPs, WPDVG	
7)	Livestock production	MoFA	DAES, APD WIAD	ARI	EPA	NDA, MMDAs RCC	EPA	GAIDA, GNAFF	PAPs WPDVG	
8)	Poultry production	MoFA	DAES, APD WIAD	ARI	EPA	NDA, MMDAs RCC	EPA	GAIDA, GNAFF	PAPs WPDVG	
9)	Roots and tube farming	MoFA	DCS, DAES WIAD	CRI, SRI	EPA, PPRSD	NDA, MMDAs RCC	PPRSD EPA	CLG, GAIDA GNAFF	PAPs, TAs, WPDVG	
10)	Aquaculture	MoFA	DAES, WIAD	DFSA, IESS	FC, EPA WRC	NDA, MMDAs RCC	IWMI EPA	GNAFF, WUA	WPDVG, TAs	
12)	Woodlot development	MoLNR		UENR, FORIG	EPA, FoC, PPRSD	NDA, MMDAs RCC	PPRSD EPA		PAPs	
13)	Cattle grazing reserve and corridor	MoFA	DAES, APD		EPA, LUSPA	NDA, MMDAs LUSPA, RCC	EPA	GNAFF	PAPs, TAs, WPDVG	GRIDCo, NEDCo, ECG
15)	Resettlement	MoLNR MoF	PIU	LARC	LVD, EPA LUSPA	NDA MMDAs LUSPA, RCC	EPA	GNAFF	PAPs, TAs, WPDVG	

No.	Stakeholder Categories / Project Components and Activities	Sector Oversight	Development Promotion	Research Institutions	Regulatory Authority	Planning Authority	Enforcement, Safety & Protection	Trade Unions & Associations	Local Communities	Utility Agencies
16)	Compensation	MoLNR MoF	PIU	LARC	LVD	MMDAs	LVD	GNAFF	PAPs, TAs, WPDVG	
17)	Grievance redress	MoF MoGCSP	PIU		EPA, LVD	MMDAs	TAs	GNAFF	PAPs, TAs, WPDVG	
18)	Monitoring and evaluation	MoF	PIU		EPA LVD	MMDAs	MMDAs	GNAFF	PAPs, TAs, WPDVG	
19)	Ground and weather station upgrade		e-AP, MSA AGRHYMET	AGRHYMET	MSA, EPA				TAs	
20)	Electronic agriculture management system	MoFA	e-AP, DCS APD, WIAD	CRI, INSTI, CERSGIS, AGRHYMET	MSA			CLG, GAIDA GNAFF	WPDVG	TELCOs
21)	e-extension services	MoFA	e-AP, DAES WIAD	CERSGIS INSTI				CLG, GAIDA GNAFF		TELCOs
22)	Waste management	MMDAs	DCS, APD DAES	DFSA, IESS CRI, CRI, CERSGIS	EPA, PPRSD	NDA, MMDAs LUSPA	PPRSD, EPA MMDAs		TAs, PAPs	
23)	Food processing	MoFA	DCS, FRI, WIAD	CRI, FRI, IESS, IRI	EPA, GCX	NDA, MMDAs	EPA, GCX	GNAFF		
24)	Food storage	MoFA	NAFCO	FRI, IRI	GCX, GRA	NDA, MMDAs	EPA, GRA	GNAFF		
25)	Food produce transportation	MoFA	NAFCO, WIAD,GEPA ACFTA	FRI	EPA, GCX GRA, GEPA, ACFTA,GSA	MMDAs, NDA	GRA, EPA GPS, GSA	GNAFF		TELCOs
26)	Seed production	MoFA	DCS	CRI, SRI	EPA, PPRSD	NDA, MMDAs	PPRSD, EPA	CLG, GNAFF		
27)	Fertilizer, production and usage	MoFA	DAES, DCS	CRI, IESS IRI, SRI	EPA, PPRSD	NDA, MMDAs	PPRSD, EPA	CLG, GNAFF	WPDVG, TAs	
28)	Veterinary services	MoFA	APD, DAES	ARI	VSD	NDA, MMDAs				

No.	Stakeholder Categories / Project Components and Activities	Sector Oversight	Development Promotion	Research Institutions	Regulatory Authority	Planning Authority	Enforcement, Safety & Protection	Trade Unions & Associations	Local Communities	Utility Agencies
			VSD							
29)	Reclamation activities	MoFA		UENR, IESS LARC	EPA, LUSPA	NDA, MMDAs LUSPA	EPA			
30)	Pest management	MoFA	PPRSD	CRI, FRI	EPA	NDA, MMDAs	EPA	GNAFF, CLG	PAPs, TAs, WPDVG	
31)	Children and social protection	MoGCSP	WIAD			NDA, MMDAs		GNAFF		
32)	Screening		PIU		EPA	NDA, MMDAs	EPA	GNAFF	PAPs, TAs WPDVG	

***** Full meanings of acronyms provided in Table 5.1**

5.2.2 Stakeholder Engagement Planning

A formal introduction was made by MoFA via voice calls to all the stakeholders introducing the ESMF consultants for the proposed programme and requesting their involvement in the consultative engagement process.

The initial engagements were organized between 23rd and 29th March, with 3 others following on April 28 and May 18, 2021. These took place remotely either through voice calls or over a virtual zoom meeting. Subsequent communication was held via emails as follow-up to clarify information provided at the first engagement or to request for relevant documents. Between the 19th of May and 10th of June, a second round of consultations was conducted onsite at the various offices of institutional stakeholders and within selected communities.

The engagement schedule employed is presented in Table 5.3 showing the respective engagement tool used, the key contact person and their contact details.

Table 5. 3 Stakeholder Engagement Schedule

Date	Stakeholder ***	Engagement Tool	Main Contact Person	Position	Contact Details
23/03	WIAD	Voice call	Paulina Addy	Director	addypolly@yahoo.com 0244422712
24/03	EPA	Voice call	Joseph Edmond	Director	0501301396
24/03	CERSGIS	Virtual meeting	Mr. Foster Mensah	Executive Director	fmensah@ug.edu.gh 0243352468
24/03	NAFCO	Voice call	Emmanuel J.K. Arthur	Senior Manager, Corporate Affairs	emmanuel.arthur@nafco.gov.gh info@nafco.gov.gh 0244669709
24/03	DCS	Voice call	Dr. Solomon Gyan Ansah	Head of Seed Unit	crowzee2000@yahoo.com 0208133029
24/03	NDA	Voice call	Dr Emmanuel Abeere-Inga	Director, Infrastructure, Land and Natural Resources	asanamzoya@yahoo.com 0548314461
24/03	CSIR-FRI	Voice call	Prof. Charles Tortoe	Ag. Director	ctortoe@yahoo.co.uk 024 3241801
25/03	IESS	Voice call	Dr. Benjamin Ofori.	Senior Research Fellow	bdofori@ug.edu.gh bdofori@staff.ug.edu.gh 0208134292
25/03	CSIR-WRI	Virtual meeting	Dr. Ruby Asmah	Principal Research Scientist	rubyasmah@yahoo.com 0205424161
25/03	APD	Virtual meeting	Edwin Bekoe	Director	eddbekoe@yahoo.com 0274747847
25/03	DAES	Virtual meeting	Mr. Paul Siameh	Director	paulsiame@yahoo.com 0244641260
25/03	MSA	Virtual meeting	Francisca Martey	Deputy Director, Research and Applied Meteorology	0244130093
25/03	GIDA	Voice call	Ing. Richard Boateng	Director	0244662243

Date	Stakeholder ***	Engagement Tool	Main Contact Person	Position	Contact Details
29/03	PPRSD	Voice call	Eric Dzimado	Senior Agricultural Officer	agabusm2@gmail.com
28/04	CropLife	Voice call	Rashad Kadiri	Program Manager	rkadiri@croplifeghana.org 0249689725
18/05	APFOG	Voice call	Alhaji Nashiru	President	0243665458
18/05	PFAG	Voice call	Charles Nyaaba	Head of Programs and Advocacy	0203035672
19/05	WUA	In-Person	Isaac Akpatie	Executive	0540727247
19/05	KIS	In-Person	Joseph Nartey	Manager	0244508060
08/06	AWPPEA	In-Person	Nana Akosua Tawia	President	
09/06	UENR	In-Person	Prof. Elvis Asare-Bediako	Vice- Chancellor	0554322941
09/06	ESBS	In-Person	Robert Dodoo	Head	0201046636/ 0548060609
09/06	LBS	In-Person	Lawrence Dartey	Farm Manager	0243132341
10/06	NADMO	In-Person	Nyaaba Agambica	Deputy Regional Director, Upper East	0242561474
10/06	WRC	In-Person	Andrew Asaviausa	ABO	

***** Full meanings of acronyms provided in Table 5.1**

The review of the relevant legislation of incorporation and institutional mandates defined the relevance of the identified stakeholders to the assignment and their areas of interest in order to identify the key issues of engagement (Appendix 3.1).

5.2.3 Engagement Issues and Guides

Institution-specific stakeholder issues were developed and delivered through semi-structured questionnaire to elicit initial stakeholder responses. This comprised background information of the FSRP2 as well as the specific issues of relevance and interest to the respective stakeholders. The engagement issues/guides for the specific stakeholders are presented in Appendix 3.1. Figures 3.1 to 3.5 provide pictures of some engagements undertaken as part of this exercise.

5.3 Stakeholder Engagement Highlights

The highlights from the engagement with stakeholders has been provided in the Table 5.4. with the full responses in Appendix 3.2. This will inform the environmental and social assessment on a project-by-project level as well as apprise the environmental and social management framework.

Table 5. 4 Major Highlights from Engagements

Stakeholder	Key Highlight/Concern	Response
WIAD	• Lack of or abandoning the use of PPE exposes women to adverse conditions like extreme heat, smoke and sharp tools during food processing	• The use of PPEs has been encouraged to mitigate the risk that women in processing are exposed to.
EPA	• A specialized registration and screening system can be developed in collaboration with the EPA	• A screening checklist has been developed to provide guidance on

Stakeholder	Key Highlight/Concern	Response
	so that all projects under the program can have a speedy initial environmental assessment. • The assessment of the cumulative impacts of several operations under the project within a certain area can be done	the level of assessment for sub projects. • As part of the assessment process, cumulative impacts have been addressed.
CERSGIS	• Under the program, our existing facilities would be used so there would be no need to acquire additional land • End of life e-waste is stored and either dumped or donated to schools if they are still in working condition	• This has significantly reduced land take impacts, if not eliminated totally. • E-waste impacts are of moderate significance
DCS	• The misuse of pesticides by farmers is a key environmental issue that needs to be addressed because it poses a risk to any nearby water body	• Pesticides use is a major impact and has further been addressed in the Integrated Pest Management Plan (IPMP) for the programme.
MSA	• E-waste from all meteorological stations are transported to the head office in Accra where they are later auctioned. • Quantities of e-waste generated yearly are very small because they are well maintained.	• E-waste impact are of moderate significance • No verifiable impacts of radioactivity have been observed.
NAFCO	• Trucks transporting food are hardly involved in accidents because drivers of such trucks are usually very experienced.	• Accident risks associated with food transport is minimal
WRI	• A negative impact of cage aquaculture is conflict with existing fishermen who may not have access to an areas where they once fished and also because feed put in the water for the caged fish attract fish from the wild but local fishermen would not be allowed to venture close to the cages to make a catch.	• The mitigation measure to allow fishermen to fish in restricted areas under supervision will be employed
NDA	• Within their area of jurisdiction, no intervention would require relocation of settlements or farms	• Land-take impacts have been significantly eliminated
GIDA	• The increase of the height of the irrigation dams may affect some nearby communities and farms due to the increase in the throw back of the reservoir. It is not yet known if the height of these proposed dams will be increased or not.	• During further engagements with MOFA and at the design finalisation stages, the significance of this would be ascertained
IESS	• Typically, land use along the lake at the southern portion of the lake and middle belt is farming	• Farmers and Farmer organisations would be engaged at the subproject level, so that their concerns are addressed
DAES	• On the project level assessment, it is necessary for extension officers to be consulted since they deal directly with the farmers. Their capacity will have to be built so they are in the best place possible to deliver adequate	• The Agric Extension Agents would have a major role in capacity building of farmers in new technology

Stakeholder	Key Highlight/Concern	Response
	guidance to the farmers on all the new interventions as a result of the program.	
APD	• The grazing reserve has the potential to eliminate clashes between migrating or resident Fulani herdsmen and crop farmers	• The beneficial impact of the grazing reserves has been highlighted in this document
CropLife	• A Container Management Programme run by CropLife in the Eastern, Western and Volta Regions, involves positioning cages at vantage points for the collection of empty pesticides containers for recycling. • The Spray Service Provider (SSP) program, also run by CropLife (in collaboration with PPRSD and EPA), applies a criterion in selecting and training a group of people within a farming area/community to provide spraying services within their community. • Farmers lack adequate education on the application of agrochemicals. • CropLife's digitization programme involving over 50,000 farmers, provides directions on the responsible pesticide use through text messages and voice notes	• The successes of this programme will be examined and adopted for implementation on FSRP2. • FSRP2 will collaborate with and enhance the capacities of Spray Service Providers to extend their services to all beneficiary districts and communities. • The ESMF and IPMP have made adequate provision to provide extensive education to all farmers. • FSRP2's digitization agenda as espoused in component 1 will take advantage of the successes of CropIlfe's digitization programme.
APFOG	• The Association advocates for farmer friendly policies to better the life of farmers; Finds and links members to local and international markets to get better prices for their produce; sensitizes members on pest management • There are about 2000 farmers across the country registered with the Organisation, who can also benefit from FSRP2 • The farmers would be very happy to use technology but more education needs to be done to enable the farmers use these technologies	• FSRP2 will insist on the following: Proper checks on imported pesticides; Vigorous monitoring of fake pesticides on the market; and punishment of offenders. • The ESMF and IPMP have made adequate provision to provide extensive education to all farmers.
PFAG	• PFAG consists of individual farmers and farmer groups, as well as, value chain actors numbering over 1,000,055 and 1,962 Farmer Based Organisations (FBOs). Membership is spread across all the 10 (now 16) regions of Ghana • Misapplication of pesticides has dire consequences for human health • Over-application of pesticides poses serious threats to integrity of water bodies and health of consumers and farmers.	• Nationwide training of farmers will be provided to protect themselves with PPEs such as overall, goggles, nose masks, etc. before applying pesticides. • Public education materials will be developed by FSRP2 to demonstrate the proper application and wrong application of chemicals. It will also be broken down into infographics and the materials made available to farmers

Stakeholder	Key Highlight/Concern	Response
WRC	• Annual floods as a result of the Bagre Dam spill • Development and restoration of irrigation so as to provide water for crops in dry season.	• This program seeks to rehabilitate old dams to provide farms with water which will prevent farmers from farming closer to waterbodies • Making improvements to the operational rules of the Bagre Dam will be explored with the VRBA to avoid downstream flooding
NADMO	• Spillage from the Bagre Dam causes destruction such that farms are flooded and yield is completely lost.	• This program seeks to rehabilitate old dams to provide farms with water which will prevent farmers from farming closer to waterbodies
AWPPEA	• Lack of agricultural extension officers to attend to the farmers, thereby leading improper farming practices hence, reduction in productivity. • Public safety risk as robbers attack farmers who transport and sell produce to Burkina Faso.	• The incorporation of e-agric in the program would provide farmers with tips on farming • The ESMF has made provision to safeguard female farmers during transportation of farm produce
LBS	• Perennial fires during the dry season by game hunters which leads to shortage of feed for cattle and sheep	• This program seeks to introduce the bailing of straws to curb the negative impact of bush fires.
ESBS	• Waste from drenching is dislodged onto the ground as outlet for proper disposal is damaged. • Perimeter fencing of the station has been breached thereby, leading to theft and encroachment by the surrounding community.	• The ESMF has made provision for management of waste and social impacts (security issues).

***** Full meanings of acronyms provided in Table 5.1**

Figure 5. 1 Consultations with Male Farmers from Asutsuare

Figure 5. 2 Consultations with Female Rice Farmers from Asutsuare

Figure 5. 3 Consultations with Members of the Agogo Plantain Market

Figure 5. 4 Consultations with the Animal Production Department of the CSIR and Upper East NADMO

Figure 5. 5 Consultations with the Water Resources Commission and the Ejura Sheep Breeding Station

6.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

The assessment of E&S risks and impacts focused on significant potential risks and impacts, and concerns associated with the implementation of the FSRP2. The potential risks and impacts identified (at the Scoping stage) were based on the type and scale of the various project component-associated activities, inputs from stakeholders, and special insights from the consultants.

The potential risks and impacts likely to be associated with the proposed programme have been presented under beneficial and adverse risks and impacts.

6.1 Methodology for Assessing and Ranking Impacts

The likelihood of occurrence of adverse environmental and social risks and impacts associated with the project as well as the level of significance were evaluated, based on a modified methodology for assessing and ranking impacts adapted from the ISO 14001 Environmental Systems Handbook (Whitelaw, 2004). The ranking system used eight assessing criteria, qualitatively scoring 'low', 'medium' or 'high' scores for ranking the likelihood of occurrence and significance of impacts. The eight criteria used are listed and further outlined in the box below:

- Knowledge about similar/past projects
- Level of risk of impact
- Actual or potential nuisance
- Spatial scale of impacts (spatial extent)
- Timescale of impacts (temporal extent)
- Inducing future incompatible activities
- Legislative requirements and standards
- Information availability

a) Knowledge of Similar/Past Projects or Project Environment

The knowledge of similar projects or various aspects of a project or in relation to the project environment. Aspects and related activities that have had environmental and social problems in the past would have a higher score, since they would have a higher likelihood of occurrence as compared to incident-free record of other activities. Likewise, aspects that generated complaints in the past would be deemed significant.

b) Level of Risk of Impact / Likelihood of Impact Occurrence

This looked at the probability of impact (or risk) occurrence (i.e. likelihood), and the likely consequences should an incident occur. It also assessed concerns such as whether there could be associated risks before and even after mitigation measures are taken (residual risks*).*

c) Actual or Potential Nuisance

Actual or potential damage or nuisance that the impact could cause surrounding areas or recipients, or any potential nuisance resulting from the proposed activities to the public or other sensitive receptors within the area of influence. Also considered impacts that are direct or indirect, reversible or irreversible.

d) Spatial Scale of Impacts

The spatial extent of impacts considered were whether local only (spatially limited), or community-wide, or district-wide effects or at the national scale.

e) Time Scale of Impacts

The duration over which impacts would occur or would be experienced (duration of exposure). Impacts could be intermittent or occasional, or frequent, persistent, but of less acute or long-term consequence (less serious) than effects with serious and/or long-term consequences.

f) Future Induced Activities

The likelihood of induced activities or adverse situations that may arise (could be cumulative) in the future due to the presence of the project, and what the nature or scale of these potential activities or situations could be (social- or environmental- or health-wise). Any likelihood of future incompatible activities or situations in the area of influence that may affect the objective of the project.

g) Legislative Requirements and Standards

The available legislation, policy, standards/discharge limits or guidelines in place to facilitate evaluation of significance and management of impacts; where available the relevant aspects or impacts were considered less significant, or otherwise considered significant.

h) Information Availability

For lack of information to base a satisfactory assessment on, the relevant aspect or impact was considered significant. In other words, knowledge gaps in the assessment meant it would be based on inadequate information/data, potentially introducing a high degree of uncertainty, hence an evaluation of high significance.

6.2 Beneficial Impacts

The implementation of the programme is expected to be overwhelmingly beneficial to the socio-economic lives of people in the beneficiary Communities and districts as well as the entire nation and sub region, without necessarily posing many significant potential adverse impacts and risks. The beneficial impacts will include:

1. Improved regional economy;
2. Improved national economy;
3. Improved food security;
4. Improved land and environmental management;
5. Employment opportunities and improved income profiles; and
6. Inundation and flood control.

6.2.1 Improved Regional Economy

It is expected that the project will accelerate the pace of regional development. This will occur in development of infrastructure and operation of digital advisory services for agriculture and food crises prevention and management, rehabilitation of irrigation schemes, reclamation of land at Wheta among others. The dams associated with the proposed irrigation schemes are not expected to meet the threshold of ESS4 (Annex 1 – Safety of Dams) which requires dam safety assessment. However, the need for a dam safety assessment will be confirmed through the feasibility studies which will precede the rehabilitation works. Where dam safety assessment and any other site-specific E&S instruments are confirmed to be required, the instruments will be prepared, consulted upon, cleared by the Bank and disclosed before commencement of the construction works. During construction, work on the project will provide markets for local goods and services including food and housing. Local businesses will take advantage of the situation to increase the supply of basic goods and services to meet the increase in demand. The trend is expected to continue in the operational phase of the project. Over 2,000 farmers will be working on the plains and SADA regions after the completion of the project. There will be other people engaged in ancillary services in areas such as transport. The influx of migrants into the regions to farm and provide other ancillary services to support the irrigation scheme will expand markets for local goods and services. New business opportunities

will also be created for the local people. The expansion of business activities in the districts will enhance the revenue base of the Assemblies through increase receipts from local taxes (tolls) and ground rent. In the long term the project will contribute to the poverty reduction and wealth creation efforts of the beneficiary districts.

6.2.2 Improved National Economy

The intended project will reduce food dependent inflation and food imports. The project will increase the output of rice, maize, poultry and livestock in Ghana. The direct impact of the project will be a reduction in rice and other food imports. The increase in food production will positively impact on food prices all things being equal. Inflation attributable to the escalating food prices will be controlled. The project will support government efforts to achieve single digit inflation.

6.2.3 Improved Food Security

Ghana is generally described as food secure. This notwithstanding, pockets of food insecurity occur across regions, among social groups and in between seasons. It is estimated that about 5% of Ghana's population are food insecure and about 2 million people are vulnerable to become food insecure. Agricultural growth has been more rapid than growth in the non-agricultural sectors in recent years, expanding by an average annual rate of 5.5%, compared to 5.2% for the economy as a whole (FAO, 2016). The incidence of food insecurity has been exacerbated by escalating food prices globally since 2007. The inability of local farmers producing under unstable weather and other conditions to meet domestic demand at all times is a major contributory factor to seasonal food shortages experienced across the country. The project proposal to make water available for farming all year round through irrigation is expected to improve productivity and output of farmers by removing the constraints associated with rain fed agriculture. With improved productivity and output unit production costs will reduce leading to a reduction in food prices all things being equal. As prices of food fall it will have a positive impact on affordability. The incidence of malnutrition in Ghana will be reduced. The increase in food stocks will also enhance the country's emergencies preparedness. In sum, the proposed project will support government efforts to improved food security and emergency preparedness of the nation. The project will add to the food stocks in the country and contribute to government initiatives aimed at achieving the Millennium Development Goal One. That is reducing the incidence of hunger by 50% by 2015. In view of this the project impact is significant. It is long term and regional because the agriculture products will be distributed across the country.

6.2.4 Improved Land and Environmental Management

The provision of support for soil fertility test/analysis, establishment of woodlots and plantations and interventions such as land and watershed restoration, floodplains restoration sub component 2.2 of the programme is expected to minimize deforestation and the sustainable use of land resources. This will encourage investment into farming practices that support land conservation in the long term. In addition, the introduction of scientific methods of farming through sustained extension services will ensure the intensive use of land. The effect of these reforms will be minimal land erosion, improved fertility and ultimately higher yields and productivity. The expected output per hectare of the selected crops will compare favourably with achievable yields. This makes the project impact significant, localised and long term.

6.2.5 Employment Opportunities and Improved Income Profiles

The implementation of the FSRP2 will result in the direct employment of locals as labourers, drivers, engineers etc. Women from the local communities will sell food and provide other services for the work force at various sites. The operation of the rehabilitated KIS and some selected small dams will see over 2,000 farmers of various categories engaged in the irrigated fields. This will result in influx of migrants into the project area. As in the case of most infrastructure projects in Ghana, women and men engaged in trading activities in the communities within the project zone will experience increase in their daily sales. The existing

low levels of income will improve during the operational phase of the project. More importantly, the opportunity to farm three or four times a year using scientific methods of farming at the rehabilitated irrigation sites and animal husbandry will improve agricultural output and productivity. The marketing and processing models proposed as part of the project activities will reduce marketing bottlenecks. The effect of these interventions is an improved income profile of beneficiary farmers.

6.2.6 Inundation and Flood Control

Flooding is ranked the second highest natural disaster after epidemics in Ghana (Ansah et al, 2020). It is reported that Ghana loses $200 million every year due to floods and droughts with the agricultural sector accounting for $20 million loss per year. In Ghana, flooding often occurs in the aftermath of intense and/or continuous rainfall, which results in high run-offs. Although floods in some areas are favourable for rice cultivation, many parts of the country suffer damaging consequences.

The programme will harness the beneficial use of flood lands by providing flood spreading weirs and river bank weirs to spread beneficial floods in valleys for use in the dry season. Plot layout pattern would follow soil conservation measures and will include field drains along the least slope within the field. The design will ensure that the drain flow time is higher than the infiltration opportunity time for excess rainfall to percolate down.

The drainage system of plot in irrigable area will be designed to ensure that all the outflows lead to the stream channel. A drainage network will also be constructed along main farm roads and infield access roads to cater for the occasional runoff that may be the outcome of an excessive rainfall event. The drains along the sides of roads and infield roads would be typical open drains – grass waterways. These will be grass-covered to prevent erosion and will be well maintained and the grass well cut.

6.3 Adverse Impacts / Risks

The following risks and impacts, likely to be associated with the implementation of the program, were assessed:

1. Land take impacts;
2. Socio-cultural impact;
3. Potential impacts of expanded transportation of food produce to deficit regions;
4. Risk of imitation in the facilitation of agricultural inputs production;
5. Climate change impact from conversion of forest/woodland to agriculture;
6. Biodiversity impact;
7. Waste disposal impacts;
8. Impacts on water resources;
9. Soil degradation;
10. Fire risks;
11. Health and safety risks;
12. HIV/AIDS transmission risks;
13. Risk of contracting and spreading of coronavirus disease; and
14. Labour and gender issues.

6.3.1 Land Take Impacts

The proposed works under sub-components 1.1 and 2.2 are likely to lead to a degree of land take or restriction of access to sources of livelihood if the grants are used for infrastructure development. The potential sources of land take related to the implementation of these sub-components of the FSRP2 will include:

1. Development of ground based data collection systems and high-end digital tools such as satellites, ground stations, weather stations;
2. Irrigation and storage facilities developments;
3. Grazing reserves development;
4. Land, watershed and flood plain restoration; and
5. Rehabilitation of existing Agriculture Centres

Land acquisition for the development of ground based data collection systems, high-end digital tools such as satellite, weather stations among others and the development of irrigation infrastructure and grazing reserves as well as land, watershed and flood plain restoration could lead to the displacement of existing land users. The rehabilitation of the Asuansi and Mampong Agriculture Centres and the upgrade of the National Agriculture Stations at Kpeve, Wenchi and Babile may require additional land for the proposed civil and other related works.

The current use of such areas could include farming or other forms of agriculture, which could be adversely affected leading to livelihood disruption and economic loss to crops and possibly property. Where such affected persons are women or belong to a vulnerable group the severity of impact could be disproportionally high, since they may not have any other alternative livelihood source. They may also have no rights to own and use land like the case of women in certain cultural backgrounds. Development of the above projects could also deny locals access to their sources of livelihoods, impeding ease of mobility

There could also be cases where compensation for livelihoods loss/disruption (especially crops) and structures on affected land would be paid through the Chiefs. This could invariably deny the affected farmers and other land users the right to negotiate for fair compensation.

The 1992 Constitution of Ghana makes provision for persons whose properties are acquired to be compensated. Section 20 (6) of the Constitution requires that persons whose properties are compulsorily acquired should be compensated with the value of the property at the time of acquisition. However, because land could be abundant in project communities, especially, in the rural areas, affected land users could be given alternative land, but would bear the cost of land preparation.

Furthermore, due to weather conditions, farmlands are usually fallow during the dry seasons, hence, easily ignored for compensation. A similar situation could happen to affected farmers in this case, where they could be completely left out of any compensation entitlement.

6.3.2 Socio-cultural Impact

Ghana has over 100 ethnic groups whose common values and institutions represent collective national heritage. Each of these ethnic groups has unique cultural features and traditions that give identity, self-respect and pride to the people. The socio-cultural features/resources include language, sacred groves and shrines, totems, taboos, archaeological/heritage site, religious artefacts and places of worship, cemeteries, etc. which people tend to have emotional attachments and sensibility towards.

Facilities such as ground station, weather stations, irrigation infrastructure, grazing reserves, etc. could be sited at or close to locations of sacred groves and archaeological resources, which could lead to their destruction. The associated infrastructure development could involve land clearing and some level of excavation which when done without proper care and thought, could lead to damage to potential archaeological and historical resources and cultural heritage. Archaeological discoveries which could have been preserved and served as historical artifacts to trace the histories and heritage of the indigenous people may be lost.

Possible relocation of sacred groves like shrines, graveyards and other historical landmarks during construction activities could offend the community folk and traditional authorities, leading to disruption of construction work, sabotage, and delay.

Construction workers from outside the project communities during subproject development may not be aware of some customs and traditions of local community and may potentially break them. This could offend the sensibilities of the inhabitants of the project communities and could lead to a potential conflict between residents and workers. The situation could result in community agitations and further result in the delay of the project implementation schedule.

6.3.3 Impacts of Transportation of Food Produce to Deficit regions

The expanded distribution of food produce from production centers to deficit areas would involve deployment of more haulage vehicles, with the following potential road transportation risks:

- Frequent breakdown of cargo vehicles in transit;
- Speeding (cargo) vehicles and frequent accidents;
- Inconsiderate driving on bad and pothole riddled roads with associated high vehicular accident rate and road fatalities.

Also, potential unilateral and unannounced border closure decisions by governments in the sub-region often lead to stranding of traders and cargo in transit. The stranded cargo of food produce could go bad if delivery is unduly delayed. The disposal of damaged or unwholesome food cargo in transit, whether by through accident, vehicle breakdown or standard cargo require land and could also pose potential public health risks. The impact has a medium likelihoods of occurrence and its significance ranked medium.

6.3.4 Risk of Use of Substandard Agricultural Inputs

The implementation of the component 2 of the programme could present the risk of the proliferation of sub-standard seeds, fertilizers, pesticides, veterinary products by covert industries which could easily thrive and capture the market by cheap products, patronized by smallholder farmers exploited due to low level of education.

The users of the products could be adversely exposed, given their limited education background or inability to read instruction on labels. The storage of such products, for instance, pesticides in bedrooms could be inhaled by an entire family continually with dire consequence. The empty containers of chemical could be used for fetch water and drinking purposes. The risk of use of substandard agricultural inputs has a medium likelihood of occurrence, however, its effects could be felt nationally, hence ranked high in significance.

6.3.5 Climate Change Impacts due to Conversion of forest/woodland to Agricultural lands

The availability of agricultural inputs such as seeds, fertilizers, pesticides, veterinary products, and technology support as well as promotion of distribution of food produce with guaranteed pricing regime would enhance agriculture productivity and attract more investments and people. The food sectors include cereals (corn, rice, sorghum / millet, etc.), roots and tubers, vegetables and fruits (e.g. onions and tomatoes), and short cycles livestock value chains (poultry and fisheries).

Besides potential conversion of areas covered by forests and woodland into agricultural fields, and thus reducing the carbon sequestration function of these areas, it could promote agricultural expansion or people starting new investments in agriculture, potentially displacing other land users. There could also be changes in rainfall pattern, drought and impact of very high temperatures on food production with implication on food security.

The climate change impacts of the programme would have a medium likelihood of occurrence, however, the availability of seed and other climate change adaptation strategies minimizes the significance of the impact associated with the programme, hence ranked low in significance.

6.3.6 Biodiversity Impact

The Convention on Biological Diversity underlines that threats to biological diversity had increased everywhere in the world, mainly as a result of the continuing destruction of natural habitats. Various areas in the country are home to protected species of plants and animals of which some are endemic to Ghana.

Development of sub-projects requiring large land take such as irrigation and graze land reserves development with accompanying infrastructure could result in the loss of some protected species of plants during land preparation to make way for these developments.

Also, the availability of and access to accurate and timely information related to weather conditions, disasters, longer-term climate trends, land use, environment, hydrology, conflict, agriculture production and market price data, etc. could increase the conversion of the natural habitat for farming activities; an action that drives out wildlife as their habitats become fragmented and eventually are lost. Impacts on biodiversity as a result of programme implementation has a low likelihood of occurrence, though its effect is high, therefore ranked medium. Screening of subprojects should include the identification of the presence of Critical or Natural Habitat, the presence of IUCN Red List species close to the subproject area and to assess the impacts of the subproject on these natural areas.

6.3.7 Waste Disposal Impacts

The implementation of key sub-components associated with the FSRP2 would generate different types of waste at both the construction and operation phases. The sources and the various waste types could include:

Construction Phase

1. Land clearing and preparation for the development of ground and weather station, irrigation, training, storage and grazing reserve infrastructure, etc.:
   - Excavated waste – excavated spoil.
2. Construction works:
   - Construction waste – hydrocarbons (oils), packaging materials, bricks, cables, glass, metals, plastic, etc.
3. Waste produced by workers:
   - Domestic solid waste – plastics, papers, leftover food, etc; and
   - Liquid waste – faecal matter and urine.

Operation Phase

1. Maintenance and repairs of equipment and end of life of electrical and electronic equipment:
   - Electric and electronic waste – Scanners, tablets, GPS, printers, computers, batteries, solar panels, etc.
2. Used agronomical containers -
   a. Used fertilizer bags, pesticide containers, etc.;
3. Waste generated by workers -
   - Domestic waste – plastics, papers, leftover food, etc.; and
   - Liquid waste – faecal matter;

Waste oils and electrical and electronic waste are perhaps the most important waste types of concern to be generated by the implementation of the programme. The establishment of decision support systems to more effectively prevent and manage agriculture and food crisis, and response through the development of ground

stations and weather station would result in the generation of large quantities of e-waste at their end of life of electrical and electronic equipment to be used.

People with access to e-waste often burn them to recover the valuable copper wires, aluminium, etc. for resale. The improper disposal of e-waste is a major concern as these materials could end up in the hands of informal recyclers who use crude recovery methods such as burning. This could release toxic chemicals and heavy metals such as lead, mercury and copper into the environment, which present serious health risks to persons exposed.

The use of agro-chemicals and fertilizers by farmers would generate empty chemical containers and sacks, which could be disposed of indiscriminately at farms. Chemical containers could also be used for various purposes including being used as water and drinking containers. This would be dangerous as the residue of chemical could adhere to the containers and get into the blood stream of users with its consequent health challenges. The containers could also be carried in runoff into the stream and other water bodies. This impact has a medium likelihood of occurrence and its effect is regional. The significance is therefore ranked medium.

Most rural folks believe that the attraction of project investments would precipitate development in their areas through creation of employment, corporate social responsibility projects (e.g. borehole, healthcare facilities), etc., and therefore tend to readily embrace such projects. This position usually compromises their stance on issues, making them less critical, for instance in demanding strict accountability on proper waste disposal and management. Also, such projects could take undue advantage of the inappropriate waste management practices such as waste burning in these areas, to save cost, while abusing the environment. This is a common phenomenon in many rural areas where big project investments are attracted to.

The excavated waste generated from development of infrastructure would likely be pushed to adjoining tracts of land, or dumped on fallow lands or waterways. This could be washed in runoff into water bodies during rainfall and would lead to siltation, reduced water depth and poor water quality, especially for those who depend on them. Shallow water depth also presents potential flood risk.

Domestic waste generated by workers at both construction and operations phases of developed infrastructure could be disposed of indiscriminately on and around the sub-project site. The organic portion could putrefy and cause odour nuisance as well as lead to the production of vermin. Rainwater could collect in empty containers and plastics and breed mosquitoes and other flies, presenting malaria and diarrheal disease risks for both workers and local communities.

Workers could resort to bush defecation in the absence of adequate toilet facility. These practices would lead to insanitary surroundings and proliferation of vermin exposing workers to ill-health from diarrhoeal diseases, typhoid, dysentery, etc. The non-observance of hygienic practices such as hand washing with soap and water after defecation and before eating could further exacerbate the spread of these diseases. The practice could also affect aesthetics of the site. Domestic solid waste, liquid waste and excavated spoil disposal, though have a high likelihood of occurrence is ranked medium in significance.

6.3.8 Impacts on Water Resources

The potential sources of impacts on water resources as a result of the sub-component implementation will include:

Construction Phase:

1. Development and rehabilitation of irrigation schemes and other structures;
2. Servicing of machinery and equipment on-site; and
3. Leakages of fuel in storage.

Operations Phase impacts will emanate from: -

1. Unsustainable water abstraction for irrigation;
2. Farmland/plots development; and
3. Agrochemicals application.

Project activities involving clearing and excavation, deploying bulldozers, excavators, backhoe, etc., tend to expose, loosen and disturb the soil, making it susceptible to erosion, especially during the rainy season.

Construction works involving land clearing and excavation for irrigation structures and ancillary facilities such as canals, roads, farm shed, etc. would lead to major disturbance of topsoil and sub-soil, exposing the soil surface to potential erosion. In addition, large volumes of excavated material would be generated during the development of canals, storage reservoirs, etc.

Loose soil particles on the cleared land surface and heaped excavated spoil could be eroded and washed in runoff into the stream and other water bodies during rainfall with implication on water quality, siltation and associated decrease in the capacity of the stream/water bodies.

Surface water bodies and groundwater contamination could also result from spilled waste oil during vehicle and equipment servicing or from accidental oil spills or leakage of fuel during fuelling. Some construction activities would require the use of bulldozers, excavators, concrete mixers, backhoes, etc., which would undergo maintenance.

During the operation phase, water abstraction for irrigation purposes, which is estimated at a maximum annual withdrawal of 12,000m^3/ha could leave downstream users of streams/rivers with limited water for various activities. However, apart from the Volta River (KLBIP and KIS) most of the Projects under the WAFSRP2 use mainly impounded water from smaller dams which are generated internally which will not have any impact on the main water resources. The Tono and Vea dams also receive water from small streams which flow in from neighboring Burkina Faso. Even with the Volta River, Ghana is at the downstream and uses water from Kpong (about 7.2 m^3 diversion on each site to form the left and right banks) before it flows through the turbines to generate electricity which then flows along the communities into the sea. It will therefore not have any effect on other regional users.

Land preparation for planting would also result in the loosening of the topsoil. Erosion from farmlands may result in the transport of soil sediments in runoff into surface water bodies.

Furthermore, agrochemicals application, including herbicides, pesticides, and chemical fertilizers on vegetable farms and cereals could be washed in runoff into surface water sources with the associated concerns on the water quality of the stream/ river. Also, continuous transportation of nutrient-rich sediments (through fertilizers application) into the stream and river could also result in nutrient enrichment of the stream/river with implication on the water quality and aquatic life. Agrochemicals could leach into the soil and contaminate groundwater upon excessive use. Given that the programme will focus on the rehabilitation of existing irrigation schemes, the impact on water resources has a medium likelihood of occurrence and therefore ranked medium in significance.

6.3.9 Potential Soil Degradation

The potential sources of soil degradation will include the following:

1. Vegetation removal for development of infrastructure and farming
2. Sand and laterite extraction from borrow pit for construction works;
3. Water logging from irrigation activities;

4. Improper agriculture practices including mono cropping and excessive use of agrochemicals;
5. Inappropriate disposal of waste oil;

The removal of vegetative cover for the development and rehabilitation of infrastructure including the development of irrigation and grazing reserves could lead to erosion, where the nutrient rich top soil is washed away, especially, in the rainy season. Thus, soil could become deficient in essential minerals and this results in productivity loss.

The extraction of materials such as sand and laterite for infrastructure development under the WAFSRS could result in abandoned borrow pits and its associated loss of arable land.

The extensive cultivation on land, improper cultivation practices like mono-cropping, poor manuring, misuse of fertilizers or excess use of fertilizers, excessive irrigation, over-grazing, and fragility of soil could also result in soil degradation. Due to shortage of land, and economic pressure, some farmers may adopt intensive cropping patterns of commercial crops in place of more balanced cereal-legume rotations. Intensive cultivation leads to removal of large quantities of nutrients from the soil resulting in loss of soil fertility. This could compel farmers to use more or excess fertilizer inputs to compensate reduced soil productivity with implications on the acidity, alkalinity and salinity of the soil which is unsuitable for crop growth.

Applications of some pesticides (e.g., amitrole, atrazine, bromacil, picloram, etc.) could inhibit nitrification. The nodulation and growth of some leguminous crops and nitrogen fixation are inhibited by different pesticides.

Land harrowing may expose the soil to nutrient leaching, especially in places that get flooded in the rainy seasons. In the event of flooding of the area, draining the land could lead to top soil degradation and subsequent soil fertility loss.

Soil contamination could occur from inappropriate disposal of waste oil, spilled oil at machinery maintenance areas as well as fuel storage sites and leaks from vehicle refuelling. There are relatively large amounts of hydrocarbons in used oil, including the highly toxic polycyclic aromatic hydrocarbons. Soils polluted with petroleum hydrocarbons are known to exhibit changes in properties which tend to affect their physical, chemical and microbiological properties (Liang et al., 2012). Soil degradation affects global climate through alterations in water cycle and energy balances and disruptions of carbon, nitrogen and sulphur cycles. The impact of the programme on soil has a medium likelihood of occurrence and of moderate effects, hence ranked medium.

6.3.10 Fire Risks

Bush burning in Ghana, especial northern and coastal part of the country is quite common, attributable to grazing, slash and burn land preparation, charcoal burning, hunting, and cooking in farms. However, starting a bushfire is prohibited under the Control and Prevention of Bushfire Act, 1990 (PNDCL 229). Bush fire usually takes place in the dry season when the vegetation becomes very dry. Despite measures put in place by the government, supported by the GNFS, to stamp out bush burning through interventions such as educational campaigns, training of fire volunteers, provision of basic equipment, and the establishment of laws to punish culprits, dry season bushfire persists.

Potential sources of fire will include off-site and on-site sources. Off-site sources include bush fire from the activities of herdsmen, hunting, slash and burn and embers from cigarette stubs and cooking in adjoining farms. On-site sources include smoking by workers, faulty electrical gadgets and the use of sub-standard electrical cables.

The main sources of fire risks during project implementation would be the activities of herdsmen grazing their cattle on lands close to the developed infrastructure, especially, during the dry season, to regenerate grass to feed their cattle. Other causes of off-site fire could be hunting with fire, slash and burn farming practices and embers from cooking activities in farm and stubs of cigarettes.

Fire from off-site sources could spread to adjoining project site and destroy facilities developed. Workers could also suffer severe burns and possibly die when trapped by fire in the facilities.

Faulty electrical gadgets, poor electrical wiring, or the use of sub-standard electrical cables for the infrastructure developed, although very unlikely, could be the main sources of on-site fire risk. Workers would be the main recipient of any such fire outbreak aside the destruction to property. Farms and other structures developed on adjoining land could also be destroyed. The likelihood of fire occurrence as a result of programme implementation is low with a local spatial extent and a permanent associated consequence and therefore ranked medium in significance.

6.3.11 Health and Safety Risks

The potential occupational and public health and safety risks as a result of the implementation of the sub components will include the following:

1. Dust and emissions from land preparation (clearing and levelling of the land, excavation works, stockpiling of excavated material, etc.), equipment and machinery use and cement, paint and solvents exposure;
2. Noise and vibration from heavy-duty equipment and machinery use;
3. Risk of drowning from open canals;
4. Health risk from agro-chemical handling; and
5. Risk of accidents and knockdowns from the movement of trucks/vehicles and other machinery.
6. Accidents Trips, slips, falls
7. Risk of manual handling and work-related musculoskeletal disorders etc.

Emissions (including Cement, Paint and Solvents Exposure)

Dust and emissions would be generated from land clearing and levelling, excavation works and stockpiling of excavated material, and the movement of vehicles and machinery, including haulage trucks for the transportation of raw material, excavated spoil, and aggregates. Exposure of workers and the public to dust and emissions from these sources could pose respiratory health risks and diseases like asthma, silicosis, bronchitis, etc.

The workers could be at risk of exposure to/inhaling cement dust during construction works. Such exposure could irritate the nose and throat, resulting in difficulty in breathing. Short and long-term exposure to high quantities of cement could lead to burns, allergic reactions, blindness, and damage to the lungs. Workers could also be exposed to wet cement (which contains alkaline compounds such as lime (calcium oxide), trace amounts of crystalline silica and chromium) which has irritant and corrosive properties when in contact with the skin (HSE, 2005; ELCOSH, 2011).

Finishing and touch up works would involve the use of paints and solvents on various project components. Paints and paint pigments contain toxic materials and heavy metal compounds, such as arsenic, chromium, propane, isobutane, or dimethyl which are harmful when inhaled or in contact with the skin (IARC, 2012). Short-term exposure to solvents can cause dizziness, eye irritation, nausea, coughing, and other symptoms, while long-term exposure could lead to kidney, liver, blood, or nervous system challenges when exposed for about a month (IARC, 2012). The likelihood of workers exposed to this risk under the programme is high, but the effects and could be felt locally and therefore ranked medium in significance.

Noise and Vibration Impacts

Noise levels ranging from 80dB to 85dB at a 15m radius will be generated intermittently from the use of heavy-duty equipment and machinery such as bulldozers, excavators, compactors, and backhoes. These levels exceed the GS1222:2018 permissible noise level of 60dB in mixed-use areas. Workers could be exposed to a high level of noise for 8 hours working period. Prolonged exposure (6 months) to such noise levels could impair the hearing of workers, cause annoyance, stress, irritability, and headaches (Goldsmith and Jonsson, 1973), especially for those working with or close to the noisy equipment.

Long term exposure to vibration from the above heavy-duty trucks and equipment, over 6 months could result in whole-body vibration (WBV). WBV is transmitted through the seat or feet of workers who operate these machines over rough and uneven surfaces as the main part of their job and it could cause adverse health effects such as fatigue, lower back pain. The likelihood of occurrence of noise and vibration impact is certain, however, duration of exposure could be short term hence, the significance is ranked medium.

Risk of Drowning

There is a risk of children and livestock drowning in un-reclaimed excavated pits with stagnant water and canals developed for irrigation purposes. Children could be tempted to swim or bath in canal and could get drown in the process while livestock in attempt to drink from the above sources could end up drowning. The risk of drowning is ranked medium as it has moderate likelihood of occurrence but could be fatal when it occurs.

Health Risk from Agro-chemicals

Agro-chemicals such as Propanil, NPK and Urea will be applied to farms. The quantities of these chemicals (150-200kg per hectare for NPK fertilizer and 75-150kg per hectare for Urea) is a source of concern as their careless use and mishandling could cause a variety of conditions including eye irritation and/ or corneal injury and skin irritation when in contact with the eye and skin without the use of PPEs. Farmers could be chemically poisoned if they accidentally ingest the chemicals. Health risk from agrochemical usage is ranked high considering the long term duration of agrochemical usage.

Sprains, Trips and Falls; and Snakebite Risks

During land clearing, some tall trees could fall on bulldozer operators and other workers in the vicinity in the course of uprooting them, potentially crushing or even killing them in the process. Others in close proximity could be injured severely.

Activities during construction will involve uprooting/lifting tree logs, concrete blocks, cement bags, etc. These actions, which would be repetitive and vigorous, could result in sprains, strains, and back injuries. Construction tools such as hammers, shovels, pickaxes, etc. when placed haphazardly on-site could cause trips and falls. This could result in bone fractures and cuts on different parts of a worker's body.

Snakes such as black mamba, green snake, cobra, and brown snake, which are prevalent in the Savanna and Forested areas, could have their habitats destroyed during land clearing. As a result of the invasion, snakes could attack workers. Snakes could also hide underneath heaps of vegetation and felled trees, and attack workers removing such vegetative parts of trees piled up. Snakebites, if not managed properly and quickly reported to the hospital, could lead to death. The loss of productive hours due to hospitalisation could also delay and affect the project implementation schedule. There is a risk of bee stings also during land clearing and construction activities. This impact is ranked medium as it is limited to the construction phases of various infrastructure to be developed under the programme.

Vehicular Accidents and Worker Knockdowns

There is a risk of haulage trucks and other construction vehicles colliding with one another, or knocking down unsuspecting workers on site. Some of the drivers of these vehicles could be over-speeding on the project site, reversing without looking out for other vehicles and workers in their way or notifying them, or could be intoxicated. Accidents and knockdowns on the project site could also be due to mechanical faults that are out of control of the driver as a result of a poor maintenance regime. Such accidents may lead to injuries and loss of lives of workers and the general public. Vehicular accidents under the programme is ranked medium.

6.3.12 HIV/AIDS and other STDs Transmission Risks

The HIV prevalence is lower in rural areas (1.7%) as compared to 2.4% among the urban population (according to the 2014 Demographic and Health Survey). As a result, the influx of migrant workers mainly from urban to rural areas for employment purposes is an avenue for potential transmission of HIV/AIDS. Majority of the migrant workers, often men, travel to a new work environment without their regular partners and therefore tend to engage in sexual relationships and promiscuous lifestyles.

According to the ILO Guidelines (2008), which is in line with the National Workplace HIV/AIDS Policy, a number of work and lifestyle factors that expose construction workers to the risk of HIV infection include:

- High mobility, resulting in long periods spent away from home and family, or contact with highly mobile workers such as truck drivers;
- Isolation and working in confined environments with limited contacts;
- Male-dominated profession and a predominantly masculine environment, with the cultivation of a 'macho culture' including openness to occasional sexual relations;
- Stress due to working and living conditions; and
- Misinformation or lack of information about HIV/AIDS.

Generally, the income level in rural areas is low, coupled with poverty and unemployment, makes it easy for relatively high earning workers to lure young women into sexual relationships, while some women even turn to prostitution as a new lifestyle. Job seekers and others with various business interests could migrate to the project area and surrounding communities leading to an increase in commercial and related social activities. The enticement of female community folks with money, some women turning to prostitution for livelihoods, and the attraction of sex workers to the community could potentially lead to an increased rate of infection and risk of spread of HIV and other sexually transmitted infections (STIs) in project communities.

For fear of stigmatisation, workers who may be HIV positive may hide their status and could engage in unprotected sexual acts, contributing to the spread of infection. Workers who contract HIV could increase the risk of spread, as they can travel elsewhere and possibly engage in sexual relations. Thus, any occurrence of HIV transmission could potentially spread regionally and even nationally, with long term effects, hence, ranked medium in significance.

6.3.13 Risk of Contracting and Spreading of Coronavirus Disease

The highly contagious COVID-19 infection could readily spread among all group of during the implementation of the programme once an infected worker is present at the workplace. It is, however, known to be most contagious, spreading extremely fast in confined areas, and usually in cold conditions. An infected worker could also readily transmit the virus to family members and any others coming into contact.

Compliance with the known measures for containment and prevention has been a major challenge and a source of risk to increasing spikes of infection. Others risk factors include:

- Lack of knowledge and nonchalant attitude of people;
- Unhygienic personal habits and practices promoting infection;

- Failure of business/industry to allocate budget and to invest in the COVID-19 protocols and other prevention measures; and
- Affected workers concealing infection due to possible stigmatization.

The consequence is that the entire workforce could go down with the infection, be hospitalized or in confinement, with possible deaths. This could severely disrupt work. Any shortage as a result of COVID-19 infection could further reduce the number of workers. This could severely disrupt operations, which could lead to closure of the entire subproject suspected to be infected, and the potential source of infection transmission as majority of workers may have been infected with the virus.

Not only workers would be affected, but their respective families and contacts through a chain of transmission. On the national scale, sliding into another lockdown is unimaginable, because industry cannot afford a shutdown and the magnitude of social and economic disruption that would occur. Furthermore, the healthcare infrastructure and services would be unable to contain and manage any large numbers of COVID-19 active cases. People with Disabilities (PwDs) are one group of persons who have been hit hard by the pandemic, and would therefore be identified in the project areas and provided with targeted support. The risk of contracting and spreading Covid 19 is high and its significance ranked high given its national and global impact on people and the economy.

6.3.14 Labour and Gender Issues

The potential labour and gender issues that could be associated with the implementation of the programme will include:

1. Risk of child abuse;
2. Risk of sexual abuse by workers;
3. Women being side-tracked from the compensation and decision making processes;
4. Disturbance of women's subsistence activities;
5. Marginalisation of women during the employment; and
6. Marginalisation of vulnerable groups.

Of all children in Ghana aged 5 to17 years, about 21% are involved in child labour and 14 per cent are engaged in hazardous forms of labour. This is twice as common in rural areas (UNICEF and QUARMYNE, 2015). For poorer households, child labour is a negative coping mechanism and most of the children are involved in agriculture and fishing industries. In all regions, the vast majority of working children are unpaid family workers between the ages of 5 and 7 years. Under the Ghana Children Act 1998, minimum age for admission of children into employment is fifteen (15). However, children may be employed at the age of 13 to do light work. The minimum age for engagement of persons in hazardous work is 18.

Farmers in order to expand their operation and maximize the benefits of accurate and timely information related to weather conditions, disasters, longer-term climate trends, land use, environment, hydrology, conflict, agriculture production and market price data, etc. under the programme could exploit children from poor households or trafficked from other areas for such purposes.

Close interactions between workers and local communities may result in cases where some workers commit sexual abuse or have sexual intercourse with underage community members.

The impacts of the programme implementation on gender aspects are mostly related to employment opportunities and land use by women. Land loss and subsequent loss of livelihoods due to land take could affect women more than men as women are usually in charge of subsistence activities and struggle to provide for the household when crops are limited. The loss of livelihoods therefore could be severe or disproportionately high in such cases.

Also, compensation payment to PAP for loss of livelihood/asset could make some people more vulnerable (e.g. disabled or elderly persons) to social and family pressures that would reduce their ability to use the funds. Without proper monitoring, heads of households could mismanage the funds and leave their family in difficulty. Moreover, some heads of households could be more vulnerable (e.g.: elderly person living alone) and may be subject to pressure from others regarding compensation received.

Furthermore, the impacts on livelihood benefits of vulnerable groups can be more severe, as these groups generally have less resources and experience difficulty using the services available for their condition. The likelihood of occurrence is high, however, the significance is ranked high.

7.0 MITIGATION AND ENHANCEMENT MEASURES

The assessment revealed a few significant potential programme impacts/risks for which mitigation measures will be required to ensure environmental soundness, social acceptability, health and safety protection and programme sustainability. While some of the measures will be in-built into sub-component project design, others will be implemented during sub-component project execution. Other measures will also aim at enhancement, especially of beneficial impacts. The mitigation measures have been defined to address the following:

1. Resettlement and livelihood restoration measures;
2. Safeguarding socio-cultural values;
3. Traffic and road safety measures;
4. Education on approve agricultural inputs;
5. Climate change adaptation measures;
6. Biodiversity loss minimisation measures;
7. Waste segregation and disposal measures;
8. Water resources protection measures;
9. Soil restoration measures;
10. Fire prevention and control measures;
11. Health and safety measures;
12. HIV/AIDS spread minimisation measures;
13. Covid-19 containment and prevention measures; and
14. Labour improvement and gender protection measures.

7.1 Resettlement and Livelihood Restoration Measures;

The various assessed impacts on livelihoods arising from land acquisition for programme implementation and the resultant loss of property, farmlands and livelihoods will be compensated fully to restore the displaced livelihoods. Other additional measures where appropriate will also apply to mitigate the land take impacts through preparation of a separate Resettlement Policy Framework (RPF) to guide the implementation of the programme. The following principles would be followed during programme implementation:

- As much as possible, subcomponents of the programme would avoid areas with potential displacement/involuntary resettlement issues;
- Screening would be done at the onset of each sub-component to determine potential areas where displacement/involuntary resettlement may occur;
- Resettlement Action Plan (RAP) would be prepared and implemented where there is a likelihood of displacement/involuntary resettlement;
- Compensation at Full Replacement Cost would be paid to project affected persons (PAPs)
- Contractors would be required to use local labour as much as possible and where available;
- Alternative grazing fields would be provided for pastoralists in case project activities impacts on grazing fields;

If a site is acquired, all PAP would be provided with livelihood assistance based on their current income levels or the project would assist such persons obtain new jobs immediately without any loss of income. It should be done in accordance with the Resettlement Policy Framework (RPF) or the Resettlement Action Plans; whichever is applicable.

Due process would be followed to establish the true owner of any land, be it family or stool land. Once established, the project would acquire the site by paying appropriate compensation. Recognition of customary land ownership structure would be reorganized and would require putting in measures

(participation of community in consultation, dissemination of payment information) to ensure that compensation and lease payments are utilized by communities. The land compensation should be in accordance with the resettlement policy framework (RPF).

For a project site to be used, irrespective of the land compensation, appropriate compensation should be paid to the owner for any structures/ properties which are permanent structures at the site. Depreciation would not be factored during valuation of these properties. The compensation process should satisfy the RPF developed for the project. Appropriate compensation would be paid for any damaged or destroyed propriety that belongs to affected persons.

7.2 Safeguarding Socio-Cultural Values

Contractors assigned sub-project works will arrange and hold strategic engagements with the traditional authority:

- Before commencement of project activities through courtesy calls and for purposes of establishing cordial relationships as neighbours, in order to fulfil relevant cultural obligations;
- To agree on relevant socio-cultural protocols and for providing orientation to migrant employees who may settle in the community;
- To sensitise workers on the taboos, cultural norms and values of the local communities; and
- To discuss possible support to the traditional authority during festival celebrations.

A pre-construction surveys would be conducted to identify cultural heritage resources and existing ecologically sensitive areas that the programme would avoid. The programme would implement a chance find procedure (section 8.3.1) and reporting system to be used by contractors in the event that a cultural heritage feature or ecologically sensitive item/issue is encountered.

Communities would be engaged continuously using Participatory Rural Appraisal (PRA) methods. A stakeholder engagement plan with a Grievance Mechanisms (Appendix 4) has been developed and would be implemented as and when the need arises.

7.3 Traffic and Road Safety Measures

The programme will ensure that potential risks and impacts associated with the expanded transportation of food produce to deficit region is minimised by applying the following the measures below:

- Trucks and vehicles deployed will be equipped with safety accoutrement such as reflective breakdown triangle, fire extinguishers, etc.;
- Trucks and vehicles deployed will be in good working condition, regularly serviced to avoid breakdowns in transit;
- Vehicle fleet management system or haulage timetable would be deployed to prevent hauling in fleets, peak traffic periods, and driver fatigue;
- All trucks and other equipment will follow a maintenance regime and records kept;
- Trucks and vehicles will be labelled with complaints and emergency phone numbers for reporting irresponsible driving;
- Impromptu tests on alcohol consumption levels of truck drivers;
- Compliance with the 30km/h speed limit driving through towns and 20km/h in construction sites;
- Only licensed (Class E) drivers will be qualified to drive trucks; and
- Reflectors on haulage trucks will be mandatory for hired trucks to caution other road users.

7.4 Education on Approved Agricultural Inputs

The programme will employ the extensive use of Agriculture Extension Agents who will sensitize farmers to purchase and use only EPA approved agrochemicals from licensed agrochemical shops for use at the recommended application rates. The farmers will also be educated to adopt integrated weed and pest management practices for weed and pest control such as the use of certified and disease tolerant seed varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding, suitable water management practices and the use of agrochemicals where necessary. This will minimise the rate of agrochemical use. A comprehensive Integrated Pest Management Plan (IPMP) has been prepared as a standalone document to guide farmers and other stakeholder on the management of pest and the safe use of agrochemicals.

7.5 Climate Change Adaptation Measures

The sustainable management of ecosystems using the Integrated Landscape Management (ILM) approach proposed under the programme is expected to result in the maximisation of the sustainable potential of natural resources including sustainable use of land resources in the target areas. This will encourage investment into farming practices that support land conservation in the long term.

The introduction of scientific methods of farming through sustained extension services, improved seeds among others will ensure the intensive use of land and reduce shifting cultivation. The effect of these reforms will be minimal land erosion, improved fertility and ultimately higher yields and productivity. The expected output per hectare of the selected crops will compare favourably with achievable yields.

Additionally, the programme would bridge the gap between local, sub-national and national levels by building and sustaining bottom-up, community-level dialogue aimed at:

- Emphasizing socially inclusive approaches to foster communities' resilience to climate and FCV risks,
- Addressing the underlying vulnerability of communities to climate and FCV risks, and
- Empowering vulnerable populations, such as women and youth for building resilience of communities at the local level.

7.6 Biodiversity Loss Minimisation Measures

Unnecessary exposure of and access to sensitive fauna and flora habitats would be avoided during programme implementation. For identified or suspected sensitive habitats (national parks, swamps/ wetlands, forest reserves, etc.), regular inspection or monitoring would be carried out in the area prior to start and during work.

If sensitive habitats or areas with protected species of plants are encountered, project activities would cease and the project would consult with the Wildlife Division (WD) and Forestry Services Division (FSD) of the Forestry Commission to determine the appropriate course of action. If the project site is discovered as a sensitive habitat area or a critical or natural habitat as presented in ESS6, the project would engage the Wildlife Division or the FSD to develop a suitable management plan.

Hunting or keeping of wildlife as pets among project workers and cutting of natural vegetation by workers will be prohibited at project sites. Furthermore, workers would be sensitized on environmental protection and nature conservation.

7.7 Waste Segregation and Disposal Measures

The waste management measures are discussed under the following four captions:

- Topsoil and excavated wastes;
- Segregated waste (construction, domestic, agro-chemical containers, containers of oil, lubricants and paints, oily rags, and e-waste);
- Oily wastes (spent oil, paint, solvents and lubricants); and
- Liquid waste (sewage and grey water).

7.7.1 Topsoil and Excavated Wastes

The excavated materials as well as broken pieces of concrete would be used for backfilling and in cases where irrigation schemes are developed, these materials would be used for borrow pit reclamation. Where the excavated material is not suitable for backfilling, the material would be dumped at the approved dumpsite of the project district. The top soil would be separated and used for landscaping purposes.

Broken pieces of construction wood will also be given out as fuelwood.

7.7.2 Waste Segregation

The following waste types will be segregated: construction, domestic, containers of oil, lubricants and paints, oily rags and e-waste. Once segregated the wastes could become potential resource for re-use or recycling after treatment, and thus, no longer pose any of the assessed environmental and health risks.

Appropriate six (6) types of waste bins will be acquired for the purpose. The bins will be clearly labelled, or colour coded for ease of identification and use for waste segregation and placed at vantage points. The wastes will be segregated at source into five general categories, using five separate bins and a specially labelled bin as follow:

General Bins

- Blue Bin – plastics, glass and bottles;
- Yellow Bin – metal cans and containers;
- Brown Bin – pieces of iron rods and scrap metals;
- Black Bin – paper, cardboard, empty cement bags; and
- Green Bin – organic, wood, other miscellaneous organic waste.

Special Bins

- Specialised Container – fluorescent bulb/tubes, batteries, old computers and accessories, printers, toners, etc.

The segregated construction waste including the following will be outsourced to waste management contractors for removal and further handling and sale to appropriate dealers:

- Cement bags, paper, cardboard, etc.;
- Pieces of iron rods and scrap metals, etc.; and
- Recyclable plastics, bottles, etc.

The following segregated wastes (hazardous containers and e-wastes) will be transferred to a designated and accredited waste treatment company by the outsourced waste collection contractor:

- Metal cans and containers of paints, lubricants, solvents, etc; and
- Fluorescent bulb, batteries, computers, printers, toners, etc.

The Green labelled waste consisting of organic and miscellaneous waste, will be destined for outright disposal. The content of the Green Bin will be transferred to the district approved disposal site by an accredited waste management company. The waste electrical and electronic equipment would be auctioned

to EPA accredited dealers for management. Farmers would be sensitized to perforate agro-chemical containers and return them to the appropriate dealers.

7.7.3 Liquid Waste

Liquid waste will consist of mainly sewage and grey water from bathrooms and kitchen sources. During the construction phase, workers will be provided with mobile toilet units for use, which will be cleaned daily. At the operations phase, septic tank facilities will be developed for use. Severe sanction (including deduction of percentage of salary and dismissal) will be applied to workers who engage in bush defecation.

The septic tanks would be dislodged when about 2/3 full by an accredited liquid waste management company that would be engaged for such purposes.

7.7.4 Oily Wastes

Machinery and vehicle servicing and other repair work during the construction phase will be the responsibility of thirty party contractors undertaking the assigned jobs on-site. However, the following mitigation measures will be adopted to handle oily wastes and rags, etc.:

- Activities involving the use of oils and lubricants will be performed on an impervious platform and a bunded area, fitted with an oil sump for temporary holding of waste oils;
- Waste oil tanks to hold spent oils will be provided at workshops and servicing areas and will be returned to the suppliers as and when the tanks are full and
- Fuel tanks should be stored in an impermeable bunded are of 110% of the volume of the largest tank.

A code of ethics/conduct (CoE/CoC), which will be attached to workers' employment contracts will include aspects on the company's environmental, social and health and safety policy and the demand on employees to adhere to the waste management practices, as well as their role in the attainment of the overall environment goal of the company. In this respect, orientation training will be carried out for all workers as well as others visiting the company to be conversant with the waste management requirements of the company, particularly on waste segregation practices.

7.8 Water Resources Protection Measures

The Projects would require that contractors implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and cleanup of accidental spills. In areas where projects are located close to water bodies, contractors would prohibit the washing of machineries and washing of vehicles 50m away from these water bodies and also be required to do periodic water quality monitoring and ensure protection of the buffer zones of such water bodies. Areas close to water environment that are disturbed during construction activities (such as trench digging) would be rehabilitated as soon as possible after the pipes/cables have been installed to prevent erosion.

The Project workforce and local communities would be sensitized to ensure that the importance of environmental protection and nature conservation are effectively communicated and that wider appreciation of environmental issues and construction best practice are fostered.

7.9 Soil Restoration Principles

Land clearing would be minimized in areas as much as possible to avoid unnecessary exposure of bare ground to the elements of the weather. Cleared areas would be revegetated as early as possible. As much as possible, construction works would be done in the dry season. Measures for handling oils, fuel and other hazardous

materials with implementation on soil deterioration has been addressed under section 7.8 (Water Resources Protection Measures).

Farmers will be sensitised to adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and hardpan formation associated with continuous ploughing at the same depth. After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, among others) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content. Farmers will utilise cover crops at erosion-prone areas in sections.

7.10 Fire Prevention and Control Measures

The following measures would be instituted to prevent and control fire outbreaks:

Off-site fire

- Support and organised and early burning of grassland vegetation (in November) around the site;
- Create awareness and educate locals on dangers associated with bushfire and bushfire prevention;
- Provide support to the GNFS to train fire volunteers in local communities to help fight fires;

On-site fire

- Post caution signs like 'No Smoking', 'Switch Engines' and 'Mobile Phones Off', 'Emergency Hotlines', etc. conspicuously at the fuel storage and fuelling areas;
- Provide firefighting equipment such as fire beaters, extinguishers, foam concentrates, hose reels, dry chemical powder and CO_2 fire extinguishers at fuel storage and generator set areas;
- Restrict cooking and smoking to designated areas;
- Conduct weekly toolbox meetings on fire safety;
- Provide fire emergency exits and assembly points; and
- Prompt cleaning of accidental spills.
- Install smoke detectors and heat alarms at various offices and facilities; and
- Conduct annual firefighting drills and search-and-rescue operations to check the efficiency of emergency response and preparedness plan.

7.11 Health and Safety Measures

The Project will require all contractors to implement an Environmental, Health and Safety (EHS) plan which will outline procedures for avoiding health and safety incidents and for emergency medical treatment. This will be achieved by making it a component of contractual agreement. Contractors will be required to recruit an ISO 45001:2018 or equivalent certified Health and Safety Specialist and also provide and enforce the use of suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves and life vests as appropriate in accordance with the EHS plan. All construction and other workers will be sufficiently trained in the safe methods pertaining to their area of work to avoid injuries.

The EHS Plan will include measures for general community awareness and sensitization programmes.

7.11.1 Noise and Vibration Reduction Measures

The mitigation principles to minimize noise and vibration impacts on workers and the public will include the following:

- Workers on-site will be provided with and required to use ear plugs;
- Operators of noisy and vibratory equipment and machinery such as compactor, bulldozers, etc. would be required to operate a 4-hour scheduled shift;
- Operators of machinery and vehicles will be required to switch off idling engines;
- Vehicles, machinery and equipment will be required to follow scheduled servicing regime and certified;

- Padded seats will be fitted in mobile equipment and worn-out pads promptly replaced to limit the effect of vibration transmission to drivers;
- Vibration reduction gloves will also be provided for operators of compactor, pile driver, roller and concrete mixer;
- Worn out equipment and machinery will be replaced; and
- Construction activities take place during day time hours to minimize noise impacts on nearby communities.

7.11.2 Dust and other Emission Reduction Measures

The following measures will be put in place to minimize the generation of dust and other emissions on workers and the general public:

- Construction workers would be provided with and required to use nose masks and eye goggles;
- Nose masks will be replaced daily and eye goggles will be replaced quarterly;
- Precautionary signs showing speed limit of 30km/h will be posted at vantage points in communities and on site the speed limit will be 20 km/h;
- Haulage trucks will be required to reduce speed to 30km/h when approaching untarred sections of road and at the construction site speed limits will be 20 km/h;
- Haulage trucks and other heavy construction machineries would be serviced regularly to reduce exhaust emissions; and
- Haulage trucks conveying excavated spoil and aggregates would be covered with tarpaulins to prevent fly offs and blow-ups.
- Contractors will be required to regularly douse the ground with water to reduce dust emissions.

7.11.3 Health and Safety

The following mitigation principles will be used to minimize health and safety risks at both the construction and operation phases:

Snake Bites -

- Anti-snake venom will be made available at the health clinic in the construction camp, with other basic medicines, first aid, a qualified nurse and an ambulance to help address cases of snake bites of workers.
- Workers will be supplied with appropriate foot wear e.g. Wellington boots.

Drowning

- Warning signs prohibiting swimming would be posted at vantage points along canals;
- Foot crossings would be provided at vantage points on the irrigation canal to aid crossing;

PPE and Safety Practices and Training

- Provision and use of high visible clothing during construction to mark out workers to truck drivers;
- Helmets, safety boots and gloves would be worn to prevent head injuries and cuts;
- Trucks will be equipped with reverse alarms to alert workers when trucks are backing up and be guided by a flag woman or flag man;
- Painters, construction workers, mechanics, etc. will be taken through orientation to make them aware of dangers of exposure and also to prepare them adequately for the job;
- Nose masks would be provided for painters, and construction workers involved in concrete works would be provided with boiler suits to reduce their exposure to wet cement;
- First Aid Kits in all project cars will be provided to cater for injured workers before they are sent to the nearest Hospital, depending on the level of injury;
- Qualified First Aid Personnel will be employed at construction and project sites to provide immediate response to all work-related injuries;

- All accidents/injury, snake bites and public concerns will be reported and recorded. Fatal and serious accidents need to be reported to the client immediately;
- Avoidance of continuous repetitive work through: use of teams to carryout manual handling; work rotation; use of mechanical means (including trolleys and wheelbarrows). will be used to reduce manual handling;

Accidents

- Travel speed of trucks will be limited to 20 km/hour on site and when approaching and 30 km/h passing through communities and populated areas; and
- Working and haulage at night will be avoided.

Appropriate notices and warning signs will be erected around working areas and public areas to warn prospective trespassers of any danger or risk

7.12 Measures to minimise spread of HIV/AIDS and other STIs

In compliance with the Prevention and Control of HIV and AIDS Act of 2007, awareness programme for workers especially long distance truck drivers and locals, will be carried out on the risks / dangers of HIV/AIDS and STI, safe sex practices, condom use and abstinence, etc. Awareness leaflets will be developed for distribution in the nearby communities and audio-visual images and real life stories of STI patients will also be employed to emphasize the reality of the disease. Condoms will be made available in washrooms to encourage staff to engage in protected sex.

A workplace policy on HIV/AIDS and STIs derived from ILO guidelines that would help maintain a safe and healthy work environment, based on the principles set out below would be implemented:

- HIV/AIDS / STI prevention clauses will be incorporated into workers' contracts;
- HIV/AIDS / STI prevention and treatment guidelines for workers will be prepared and supported;
- Relations with infected workers will be governed by the basic human rights as enshrined in the Constitution and the National Workplace HIV/AIDS Policy;
- Refusal of employment or dismissal will not be based on HIV/STI status, nevertheless testing for HIV will be encouraged to know and manage one's status;
- No discrimination or stigmatization against workers on the basis of real or perceived HIV/STI status;
- Information on HIV/STI status of workers will be handled with due care and confidentiality; and
- Prevention programmes on HIV/STI will include information provision, peer counselling, condom use promotion and distribution, as well as facilitation of voluntary testing, counselling and support for behavioural change.

7.13 Covid-19 Containment and Prevention Measures

The programme implementation (both at construction and operation phases of subcomponents) will respond appropriately to the Government directives on COVID-19 to contain infections and prevent transmission of the disease. The project would make the required budgetary allocation for implementing the COVID-19 protocols as follows:

- Entry logbook for workers and visitors;
- Space for personnel entry record taking;
- Infrared thermometer for temperature recording;
- Water storage tank for constant supply of drinking water;
- Nose masks supplies;
- Workplace physical distancing arrangement;
- Veronica bucket, liquid soap, and tissue paper supplies and hand washing area;

- Hand sanitizer stand and area;
- Poster/signage on COVID-19 protocols -
- Disposal of used tissues and hand washed water;
- Dust bins and wastewater containers; and
- Designated security personnel responsible for COVID-19 protocol.

Furthermore, awareness campaign will be continuously mounted on the following to lend support to reducing the current 0.6% COVID-19 fatality rate in Ghana:

- Dangers of COVID-19 with evidence of sick patients in a hospital;
- Risk of spreading infection to family members and socio-economic burden;
- Personal and workplace hygienic practices;
- Protection in complying with COVID-19 protocols; and
- Stigmatization.

The availability of the required equipment and logistics, and investment in COVID-19 prevention measures as well as awareness campaign on the dangers of the disease will facilitate the following at the workplace:

- Physical workplace arrangement to achieve social distancing, etc.
- Disinfecting objects and surfaces routinely at the workplace;
- Requiring workers to –
    - Cover mouth and nose when coughing or sneezing;
    - Stay at home if sick and report; and
    - Avoid crowds and contact with others if sick.

Also, any worker not complying with COVID-19 protocols would be cautioned, if this happens outside the workplace, but outright dismissal if at the workplace. Any infected worker who reports, would be entitled to a welfare relief package/support.

7.14 Labour Improvement and Gender Protection Principles

7.14.1 Labour improvement

A standalone Labour Management Procedure has been developed as part of this document (Appendix 5) to guide management of risks and issues related to labour under the implementation of the FSRP2. This procedure among others prohibit forced labour, child labour and compulsory overtime; and provides guidance on salaries, wages, allowances and deductions. A comprehensive Labour Management Plan (LMP) consistent with local and international labour standards will be required of the contractors engaged under the FSRP2. The plan will be expected to hinge on the following principles:

- Payment of fair, realistic and adequate compensation/remuneration packages to especially local staff in compliance with minimum salary standards in Ghana;
- Promotion of collective bargaining;
- Provision of safe working environment;
- Prohibition of forced labour or child labour; and
- Prohibition of excessive compulsory overtime duties.

A combination of tools will be employed to ensure effective operation of the principles. These tools will involve the following:

- Issuance of employment contract to all categories of workers including casual staff to be explained and signed by all workers who will obtain a signed copy at which the explained and signed Code of Conduct will be attached. As part of the requirement, the employer/contractor will sign to protect

the human rights and entitlements of the employees. Copies of each signed contract and signed Code of Conduct will be filed in individually kept folders to be made available for inspection periodically at the construction sites.

- Extensive education on human rights protection will be provided to the contractor's team during the kick-off meeting, while staff during operations of facilities will sign to a code of conduct incorporating human rights clauses and SEA/SH requirements. Training will be provided on the code of conduct and SEA/SH.
- Cases of all human rights abuses will be filed with the offices of the Human Resource Department of various facilities during operations.

7.14.2 Gender Safeguards

Gender equality mechanisms will be incorporated into the project implementation design to ensure that a fair representation is given to all qualified women applicants for subcomponent implementation. These mechanisms will include the following:

- Development of a quota system to employ female applicants. This will involve an allocation for 20% female employment at the construction phase and 40% female employment at the operations phase;
- Intensive education of all locals to allow female family members to avail themselves for construction activities as well as unskilled labour during operations.

Sexual intercourse, sexual harassment such a dating proposals and sexual exploitation and abuse with underage community members and gender based violence would be strictly forbidden and, in case of violation, determined actions would be taken. The procedure to be applied in such an event is the immediate suspension of involved workers. The contractor will be required to collaborate with communities through the grievance resolution mechanism to investigate issues related to sexual harassment or sexual intercourse with under aged community members, dismiss the workers at fault and report them to public authorities if accusations are indeed true. They will also be responsible for victim and community compensations through non-monetary mechanisms to be determined by common agreement. Awareness and training programmes would be organised among workers and local community members on the gender based violence and related consequences on culpability. The ultimate responsibility for women and children's safety from sexual abuse lies with the contractor.

The first sexual abuse/underage sex event (where accusations are found justified) shall result in a warning and an obligation for the contractor to prepare a remedial plan that will need to be approved by PIU. Any further event of sexual abuse/underage sex shall result in immediate suspension of all construction work and calling in MoFA to inquire and provide guidance.

During the pre-construction phase, attention would be paid to the treatment of women in the surveying of propriety/land titles and their registration. It is primordial that the project ensures women are not sidetracked from the process. This will be particularly important for the attribution of compensation packages for agricultural losses. Proper consideration of employment opportunities and land use by women in the attribution and distribution of compensation packages is recommended. To reduce this inequality, women would be provided with adequate information at all phases of the compensation process.

Other measure to ensure gender inclusion will include the following:

- Access to improved variety of seeds and seedlings as well as fertilizers and other chemicals needed to improve agricultural methods, should be enhanced by making them affordable to women farmers;
- Women farmers would be educated on new variety of crops that are being introduced as well as on other new and improved methods of farming through extension services;

- More women extension services workers would be allocated to districts and communities where women farmers predominate as this will enhance their interaction, especially in areas where married women are traditionally barred from being friendly with other men;
- Women's time constraints need to be taken into consideration when designing programmes for them, be it training or otherwise;
- More women participation in consultations and separate women-only meetings to be established. Women- suitable timing for consultations so that attendance does not clash with other priorities.

The same equality principles will be extended to the youth and PwDs.

Table 7.1 gives a summary of all the identified positive and negative impacts

Table 7. 1 Summary of Impacts

Positive Impacts
Improved regional economy;
Improved national economy;
Improved food security;
Improved land and environmental management;
Employment opportunities and improved income profiles; and
Inundation and flood control.
Adverse Impacts
Land Take
• Development of ground based data collection systems and high-end digital tools • Irrigation and storage facilities developments; • Grazing reserves development • Land, watershed and flood plain restoration • Rehabilitation of existing Agriculture Centres
Socio Cultural Impacts
Breaking of cultural norms, taboos and practices leading to potential conflicts
Impacts of Expanded Transportation of Food Produce to Deficit Regions
• Frequent breakdown of cargo vehicles in transit; • Speeding (cargo) vehicles and frequent accidents; • Inconsiderate driving on bad and pothole riddled roads with associated high vehicular accident rate and road fatalities.
• Risk of Use of Substandard Agricultural Inputs
proliferation of sub-standard seeds, fertilizers, pesticides, veterinary products by covert industries
Climate Change Impact
Enhanced agriculture productivity and attraction of more investments and people
Biodiversity Impact
Development of sub-projects requiring large land take such as irrigation and graze land reserves development with accompanying infrastructure
Handling and disposal of excavated spoil Indiscriminate disposal of wastes generated at the construction and operation phases Indiscriminate defecation and disposal of grey water Inappropriate handling and disposal of oily waste from equipment/machinery maintenance works
Impacts on Water Resources
Construction phase • Development and rehabilitation of irrigation schemes and other structures;

- Servicing of machinery and equipment on-site; and
- Leakages of fuel in storage

Operations Phase: -
- Water abstraction for irrigation;
- Farmland/plots development;

Soil Degradation

- Vegetation removal for development of infrastructure and farming
- Sand and laterite extraction from borrow pit for construction works;
- Improper agriculture practices including mono cropping and excessive use of agrochemicals; and
- Inappropriate disposal of waste oil.

Fire Risks

Smoking by workers, faulty electrical gadgets and the use of sub-standard electrical cables.

Intentional burning of bush and crop residues , which is a general practice.

Health and Safety Risks

- Health risk from agro-chemical handling, storage and disposal; and
- Risk of accidents and knockdowns from the movement of trucks/vehicles and other machinery.
- Accidents Trips, slips, falls
- Risk of manual handling and work-related musculoskeletal disorders etc
- Dust and emissions from land preparation, equipment and machinery use and cement, paint and solvents exposure;
- Noise and vibration from heavy-duty equipment and machinery use;
- Risk of drowning from open canals

HIV/AIDS Transmission Risks

- High mobility, resulting in long periods spent away from home and family, or contact with highly mobile workers;
- Isolation and working in confined environments with limited contacts;
- Male-dominated profession and a predominantly masculine environment, with the cultivation of a 'macho culture' including openness to occasional sexual relations;
- Stress due to working and living conditions; and
- Misinformation or lack of information about HIV/AIDS.

Risk of Contracting and Spreading of Coronavirus Disease

- Lack of knowledge and nonchalant attitude of people;
- Unhygienic personal habits and practices promoting infection;
- Failure of business/industry to allocate budget and to invest in the COVID-19 protocols and other prevention measures; and
- Affected workers concealing infection due to possible stigmatization.

Labour and Gender Issues

- Risk of child abuse;
- Risk of sexual abuse by workers;
- Women being side-tracked from the compensation and decision making processes;
- Disturbance of women's subsistence activities;
- Marginalisation of women during the employment; and
- Marginalisation of vulnerable groups.

8.0 ESMF IMPLEMENTATION PLAN

The successful implementation of the environmental and social safeguards will depend on the commitment of MoFA and various stakeholder including the EPA, GIDA, WRC and other key stakeholders playing their expected roles. This section addresses the following key areas of the ESMF implementation:

- Institutional roles and responsibility;
- Capacity building;
- Environmental and social monitoring and reporting;
- Sub-project screening and approval; and
- ESMF estimated budget.

8.1 Institutional Roles and Responsibility

The West Africa Food Systems Resilience Programme (FSRP2) is a regional programme being funded by the World Bank and the Government of Ghana (GoG). The ESMF provides the environmental and social safeguards institutional arrangements, whose successful implementation will depend largely on the support of key stakeholder agencies. This will ensure that the sub-components are undertaken with due regard for the integrity of the resources to be affected by the project development activities.

The Ministry of Food and Agriculture (MoFA) is the lead institution mandated to manage the programme. Under this arrangement, the programme will work closely with relevant regional bodies and institutions such as ECOWAS, CORAF, CILSS, AGRHYMET and UEMOA.

At the regional level, it is expected that the programme management would be coordinated by ECOWAS, which would delegate technical work to the relevant mandated organizations (principally AGRHYMET and CORAF). ECOWAS will coordinate by delegating technical services to AGRHYMET for component 1, CORAF for component 2, based on well-defined mandates agreed by the Regional Steering Committee (RSC) based on Annual Work Plan and Budget (AWPB). CORAF will be responsible for coordinating and monitoring the activities of all the seven (7) participating countries (first phase) at the regional level, whilst maintaining and strengthening the scaling up of technologies and innovations. It will also ensure the creation of an enabling environment at regional level for technology flows and increased trade. Furthermore, small regional coordination units will be created at ECOWAS, CORAF and CILSS to ensure coordination across the programme's main components.

In Ghana the Ministry of Food and Agriculture (MoFA) will be the lead Ministry at the highest level. It will be responsible for oversight of the Programme. The coordination, monitoring evaluation of the programme will be entrusted to the PIU established by MoFA to coordinate, implement and manage programme's activities in strong collaboration with PPMED and other key implementing agencies comprising MoFA Directorates, Departments of Agriculture (DOA) at the district level, the National Agricultural Research Institutes (NARS) and other MMDAs such as MoTI, GMA, EPA, ACFTAR etc. The PIU would include an experienced and qualified Environmental Specialist (preferable to be certified ISO 45001:2018 or equivalent) and an experienced and qualified Social Specialist.

With technology transfer at the heart of FSRP2, the programme will collaborate with research institutions and Universities such as CSIR-CRI, CSIR-FRI, CSIR-SRI, CSIR- INSTI, CSIR-WRI and the University of Energy and Natural Resources to develop and upgrade proven technologies in related fields; crops, value addition, soil health, digital technology, water and natural resource management respectively for uptake and adoption by value chain actors.

The appropriateness of these technologies for dissemination will be determined by DCS and APD to ensure sustainable development of the crop and livestock sub-sectors. These technologies will be disseminated by MoFA at the field/district level by extension to farmers and other value chain actors. With regard to pesticide and fertilizer regulation and enforcement of Phytosanitary standards for the export and import of plant product, PPRSD is mandated to ensure quality standards to contribute to food security while WIAD ensures value addition to farm produce and gender equity to improve livelihoods.

MoFA will set up a National Steering Committee (NSC) chaired by the Honourable Minister of Food and Agriculture which will provide policy guidance and orientation to the national coordination and implementation units of the programme. The NSC will also ensure coherence of FSRP2 with the National Agricultural Policy Interventions and for that matter agricultural sector related policies in Ghana. It is the highest decision body to approve the programmes' Annual work plan and Budget (AWPB) and the FSRP2 Coordinator is mandated to be the Secretary of the NSC.

The EPA is responsible for ensuring compliance with laid down ESIA procedures in Ghana in accordance with the EPA Act 1994 (Act 490) and its related Environmental Assessment Regulations. The EPA oversees compliance with environmental and social assessment requirements in Ghana, and facilitates public participation and disclosure. EPA's roles in the implementation of the ESMF would be to:

- Review/approve screening guide for sub-projects;
- Categorise subprojects' environmental and social risks and impacts;
- Review and approve terms of reference for the preparation of ESIAs for subprojects
- Review and approve ESIAs for subprojects;
- Issue Environmental Approval (permit) for sub-projects;
- Facilitate E&S safeguards training;
- Monitor and enforce environmental compliance; and
- Receive and review Annual Environmental Reports (AER), ESMPs for the renewal of Environmental Permit.

Water Resources Commission (WRC) is responsible for granting licenses for any water use activity and the procedures as laid down in the WRC Act 1998 (Act 526) will be followed. All irrigation development project activities will receive assistance from the WRC and the Commission will provide adequate guidance to ensure that the proper procedures are followed.

The Land Valuation Division (LVD) of the Lands Commission is the statutory body with the mandate of ensuring that land required for projects are properly acquired following transparent procedures; and also fair and adequate compensation is paid. Though private firms may be invited to participate in the process, in case of disputes, the LVD would assist to ensure prompt settlement. The Lands Commission will advise on issues relating to land acquisition and compensation.

8.2 Capacity Building

The responsibility for ensuring environmental soundness and social acceptability of the FSRP2 and its sub-component would primarily lie with the Environmental and Social Safeguards Unit (ESSU) of the PIU. Competence of key stakeholders to carry out their respective design, planning, approval, permitting, monitoring and implementation roles will, to a large extent, determine the success and sustainability or otherwise of the Programme.

The objectives and provisions of this ESMF therefore cannot be achieved in the absence of relevant competencies on environmental and social management within MoFA, GIDA and other stakeholders as well

as the proposed scheme management entities. The following sections provide recommendations on capacity building to support the program's environmental and social management objectives.

Identification of Capacity Building Needs

Ghana Irrigation Development Authority

The Environmental and social Safeguards Unit of GIDA, when well-equipped and operational, will oversee the environmental and social sustainability of all functional irrigation schemes including the rehabilitated and modernized schemes. This includes compliance with EPA permit conditions, associated with water abstraction and other applicable environmental regulations. MoFA will support staff of GIDA to undertake courses in the following areas which are in line with GIDA's Strategic Plan:

- Sustainable Environmental and Social Management;
- Pollution Management;
- Grievance Mechanism;
- Alternative Dispute Resolution (ADR);
- Resettlement and Compensation Issues;
- Water Resources Management;
- Occupational Health and Safety; and
- EPA permitting process, ESIA/ESMP procedures, annual environmental reporting etc.

Agricultural Extension Department of MoFA

MoFA will build capacity of the Agricultural Extension Agents (AEAs) of MoFA in the following areas:

- Preparation and implementation of Environmental and Social Management Plan (ESMP);
- Annual Environmental Reports (AER); and
- Completion of agrochemical usage and management log books.

The AEAs are expected to provide assistance to farmers during routine visits. Since the AEAs are constantly being transferred, the project will continuously organize refresher trainings for them including these additional areas:

- Occupational health and safety
- Emergency responses
- Integrated Pest and Disease Management etc.
- Environmental monitoring

Private Scheme Management Entities and Water Users Associations

The capacities of Private Scheme Management Entities (PSME) and Water Users Associations (WUAs) will be built. Given that the rehabilitated and modernized irrigation schemes will be operated and managed by private scheme managers, they will be responsible for renewing EPA permits, water abstraction/use permit and also update safeguards instruments including the ESIA and ESMP when the need arises. The project will build capacity of the scheme managers and WUAs in the following areas:

- Environmental and Social Screening Checklist
- Completion of EA and Water Abstraction Registration Forms
- EPA permitting process
- Preparation of Terms of Reference for ESIA/ESMP studies
- ESIA processes/procedures
- Grievance Mechanisms etc.

Additionally, beneficiary farmers (both nucleus and out-growers) especially those on irrigation schemes will be trained in environmental and social safeguards to effectively implement their ESMP.

8.3 Sub-project Screening and Approval

This section outlines the screening, review and approval process to facilitate screening of the sub-projects applying relevant guidelines for addressing potential impacts/risk, while meeting the ESMF screening and E&S safeguards requirements. To facilitate sub-project assessment processes the ESMF contains a FSRP2-specific Screening Guide (Appendix 1), developed to serves the purpose.

The Screening process would be undertaken by the PIU for the project. The extent of environmental and social work that might be required for the projects prior to implementation will depend on the outcome of the screening process. This process should include screening for possible resettlement impacts.

8.3.1 ESIA Procedure to be followed for Sub-projects

The World Bank ESS 1 provides guidance on the environmental assessment procedures for World Bank funded projects. The Ghana EIA procedures (EPA, 1995) have also established a process to screen and evaluate all developments, undertakings, projects and programmes which have the potential to give rise to significant environmental impacts. The two processes are largely similar and the Ghanaian procedures are therefore given in the following sections. The PIU will ensure that sub-project activities fall within the provisions under the World Bank policies that have been triggered by the project whilst ensuring that the Ghana EPA regulations and guidelines relevant for the sub-activity are complied with.

Sub-projects which require licensing will only be developed after securing an Environmental Permit from the EPA. The Agency has provided the list of projects for which ESIA is mandatory. The following steps will be followed by MoFA, the implementing ministry, to ensure environmental and social compliance of sub-projects.

Step 1: Environmental Registration of sub-projects

The Environmental and Social Safeguards Specialists of the PIU will provide safeguards supervision over all associated sub-projects. The specialists will be directly responsible for the registration of sub-projects with the EPA as required by law. The Environmental Assessment Registration Forms are available at all EPA offices to register every project/development that may have an impact on the environment.

A sample copy of the EA1 Form is provided (Appendix 1B) and the mitigation measures suggested in this ESMF as well as the checklist (Appendix 1A) to be used in screening exercises should assist to complete this Form. For projects for which EIA are mandatory, the Environmental Safeguards Specialist will register using Form EA2. This is a requirement under the Environmental Assessment Regulations, 1999 (LI 1652).

Step 2: Screening

This activity, according with the Environmental Assessment Regulation, 1999 (LI1652) is the responsibility of the EPA. The Agency, within 25 days of receiving the Registration Form take a decision by placing the project at the appropriate level of environmental assessment. The results will be communicated to the implementing agency with reasons, which could be any of the following:

- Objection to the project
- No objection to the project (equivalent to World Bank Category C Project)
- Preliminary Environmental Assessment (PEA) will be required
- Environmental and Social Impact Assessment (ESIA)

For projects receiving the 'no objection' from the EPA equivalent to “Low” risk projects and therefore pose only minor environmental and social risks, the implementing agency may move to implement in accordance with pre-approved standards or codes of practices or preapproved guidelines for environmental and social management.

Step 3: Conduct environmental and social assessment studies

For sub-projects for which the decision is to conduct a Preliminary Environmental Assessment (PEA) or Environmental and Social Impact Assessment (ESIA), a Preliminary Environmental Report (PER) or an Environmental Impact Statement (EIS) will be prepared respectively. As a requirement of the World Bank, a standalone Environmental and Social Management Plan (ESMP) will be prepared regardless of the level of assessment i.e. whether EIA or PEA.

The Environmental and Social Safeguards Specialist will prepare the Terms of Reference (ToR) for the PER and ESIA studies, consult with stakeholders and seek the World Bank’s No Objection on the ToR. After the Bank clears the ToR, the Specialist will work with the project’s procurement unit to recruit a suitable consultant(s) for the ESIA studies following the procurement rules. The ToR may be prepared using issues identified during the screening exercise and also the registration of the project with the EPA. Also, the impact mitigation measures provided in this ESMF may provide some basis for the design of the ToR.

The ESIA will identify and evaluate potential environmental and social risks and impacts for the proposed activities, evaluate alternatives, and design mitigation measures. It will also analyze any cumulative impacts, where applicable. The preparation of the ESIA will be done in consultation with stakeholders, including people who may be affected. Public consultations are critical in preparing a proposal for the activities of the projects likely to have impacts on the environment and population. The public consultations would identify key issues and determine how the concerns of all parties will be addressed in the ESIA. When an ESIA is necessary, the administrative process enacted by the EPA will be followed and executed.

Procedures for projects requiring an ESIA

First stage: Preparation of Terms of Reference
The results of identification, and extent of the ESIA (scoping), the terms of reference will be prepared by the Environmental and Social Safeguards Specialist.

Second stage: Selection of consultant

Third stage: Preparation of the ESIA with public consultation (Scoping Report to be disclosed during the initial stages of the ESIA process)

The report will follow the following format:

- Executive Summary
- Introduction
- Institutional Frameworks Related to ESIA Preparation (policy, legal and administrative frameworks)
- ESIA Methodology
- Description of Project (including components / interventions / activities)
- Analysis of Alternative Project Approaches
- Cumulative Impacts
- Environmental and Social Baseline Information
- Stakeholder Consultations

- Assessment of Potential Environmental and Social Impacts (identification, prediction and evaluation of significance)
- As part of the ESMP:
- Mitigation Program
- Monitoring Plan
- Institutional Arrangement for implementation of the ESMP
- Costed Environmental and Social Management Plan
- Bibliography
- Appendices

Step 4: Review and approval of the ESIA for the sub-project; Publication / Dissemination of ESIA

The Environmental Specialist will submit the draft ESIA to EPA. The report will be reviewed by a cross-sectoral National Environmental and Social Impact Assessment Technical Review Committee (ESIA/TRC) which is expected to:

1. Assist the Agency in screening/reviewing all Environmental Assessment Applications and Reports (Environmental Impact Statements, Annual Environmental Reports, Environmental Management Plans and other related reports)
2. Make recommendations to the Executive Director of the EPA for final decision-making
3. Provide technical advice on conduct of assessments and related studies on undertakings and the reports submitted on them;
4. Make recommendations on the adequacy of the assessment and any observed gap;
5. Advice on the seriousness of such gaps and the risks or otherwise to decisions required to be made recommend whether the undertakings as proposed must be accepted and under what conditions, or not to be accepted and the reasons, as well provide guidance on how any outstanding issue/ areas may be satisfactorily addressed.

Copies of the ESIA will be placed at vantage points including the EPA Library, relevant District Assembly, EPA Regional Offices and MoFA head office and regional offices of project areas. EPA serves a 21-day public notice in the national and local newspapers about the ESIA publication and its availability for public comments. Additionally, the PIU will disclose the ESIA and ESMP cleared by the WB and EPA in the media, on their website, project communities and other suitable locations. Once the PIU discloses the document, the WB will disclose the ESIA/ESMP on their external website.

Step 5: Public Hearing and Environmental Permitting Decision (EPD)

Regulation 17 of the LI 1652 specifies three conditions that must trigger the holding of a public hearing on a project by the Agency. These are:

1. Where notice issued under regulation 16 results in great public reaction to the commencement of the proposed undertaking;
2. Where the undertaking will involve the dislocation, relocation or resettlement of communities; and
3. Where the Agency considers that the undertaking could have extensive and far reaching effects on the environment.

Where a public hearing is held, the processing of an application may extend beyond the prescribed timelines required for EPA's actions and decision-making.

Environmental Permitting Decision (EPD)

Where the draft ESIA is found acceptable, MoFA will be notified to finalise the reports and submit hard copies and an electronic copy. Following submission to EPA, the implementing agency shall be issued an

Environmental Permit within 15 working days and issue gazette notices. Where the undertaking is approved, MoFA shall pay processing and permitting fees prior to collection of the permit. The fees are determined based on the Fees and Charges (Amendment) Instrument, 2015 (LI 2228).

Responsibilities for the Implementation of the Screening Process

The ESMF will be implemented by MoFA that would establish a team of Environmental and Social Specialists as well as an ISO 45001:2018 or equivalent certified Health and Safety Specialist, who will collaborate with the EPA and the World Bank safeguards team to ensure effective execution. Table 8.1 provides a summary of the stages and institutional responsibilities for the screening, preparation, assessment, approval and implementation of the sub-project activities.

Table 8. 1 Summary of Environmental and Social Screening Processes and Responsibility

No.	Stage	Institutional responsibility	Implementation responsibility
1.	Screening of sub-projects to assist in determining level of environmental and social assessment required	MoFA	Environmental and Social Specialists
2	Statutory Registration of projects with EPA	MoFA	Environmental and Social Specialists
3.	Determination of appropriate environmental and social assessment level/ category	EPA/ MoFA	Environmental and Social Specialists
4	E&S Risks categorization and validation	World Bank	Environmental and Social Specialists
5.	If ESIA is necessary		
5.1	Preparation of Terms of Reference (TOR)	MoFA	Environmental and Social Specialists and Health and Safety Specialist
5.2	Selection of Consultant Review and Clearance of TOR by the World Bank	MoFA/GCAP Procurement Unit	Procurement Specialist, Environmental and Social Specialists and Health and Safety Specialist
5.3	Realization of the ESIA, Public consultation and participation, Integration of environmental and social issues and mitigations into project designs, and in tendering/bidding documents	Consultancy firm/ Contractor	Environmental and Social Specialists, Procurement Specialists and Health and Safety Specialist
6.	Review and Approval	EPA/ World Bank	-
7.	Participatory public consultation and disclosure	MoFA/EPA	Environmental and Social Specialists, ESIA Consultant
8.	Implementation of environmental and social assessment and management plan	Sub-project beneficiaries	Environmental and Social Specialists and Health and Safety Specialist
9.	Development of participatory monitoring indicators	MoFA	Environmental and Social Specialists, and Health and Safety Specialist, M&E Specialist, ESIA Consultant
10.	Surveillance and participatory monitoring	MoFA//EPA/ World Bank	Environmental and Social Specialists, and Health and Safety Specialist M&E Specialist

Other relevant World Bank provisions

The national provisions for the management of resettlement related issues are not fully developed and therefore do not comply fully with the World Bank ESS 5. Thus, it is expected that the ESS 5 will be mostly applied if any of the sub-projects triggers resettlement or displacement. In this case, a Resettlement Action Plan (RAP) or its Abbreviated version (ARAP) will be prepared as a standalone report to guide the management and implementation of resettlement/displacement issues.

The FSRP2 will most likely triggered most of the ESSs. While the programme is not expected to affect natural habitats, ESIAs prepared during implementation will address any impacts to natural habitats. The sub-project will avoid adverse impacts on natural habitats and, where necessary, appropriate plans will be prepared and/ or offsets established to mitigate any impacts. Similarly, for forests, the project may involve some forestation activities. Management plans will be prepared as and when necessary. Labor and working conditions of workers undertaking FSRP2 activities will be addressed comprehensively. The Community health and safety issues in project selected areas will be incorporated in all contracts. The ESS3 has also been triggered by the programme, hence, an Integrated Pest Management Plan (PMP) has been prepared as a standalone report

ESS8, relevant to this program requires the PIU, contractors and all partners involved in project implementation to follow standard chance find procedures as described below:

Chance Find Procedures for Tangible Cultural Heritage

Should the sub-project encounter a cultural, historic or archaeological property or cultural resources in the form of historic and archaeological relics or if any cultural resources are found, the following principles and procedures will be followed:

- Execution of work will stop as soon as cultural sites are found;
- Important cultural sites will be marked and fenced during construction period;
- MoFA will collaborate with the Ghana Museums and Monuments Board in determining and avoiding damage to cultural sites and resources and also determine appropriate place to relocate as well as means of relocation;
- Cultural resources uncovered during the project construction works will be handed over to the Ghana Museums and Monuments Board for preservation or preservation of the site;
- Salvage excavation and relocation of artifacts or ruins from a cultural site will be undertaken in consultation with Ghana Museums and Monuments Board; and
- The Program will also ensure that intangible cultural heritage will be protected.

Notwithstanding the above; the following Clauses are proposed to be added in contractors' contract:

Protection of archaeological and historical sites

- Upon discovery of ancient heritage, relics or anything that might be or is believed to be of archaeological or historical importance during the execution of works, immediately suspend activity and report such findings to the Site Engineer so that the National Museums and Monuments Board may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.
- The contractors shall take the necessary measures to prevent any person or equipment that may damage the article or things and shall provide barricades, fences, and signals and, if necessary, protect against atmospheric agents, as directed by the engineer, also guard service may be required by the engineer.
- The supervising engineer shall take the following measures to:
    - Notify the Ghana Museums and Monuments Board.
    - Request that a representative make a site inspection.
    - Cessation of work in the vicinity of the find until the visit of the representative.

The decision by the National Museums and Monuments Board on possible salvage or excavation shall be undertaken within 48 - 72 hours of notification.

The project requires compliance with ESS4: Annex 1 - Safety of Dams. The World Bank distinguishes between small and large dams for application of this standard, as follows:

- Small dams are normally less than 15 meters in height. This category includes, for example, farm ponds, local silt retention dams, and low embankment tanks.
- Large dams are 15 meters or more in height. Dams that are between 10 and 15 meters in height are treated as large dams if they present special design complexities. Example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials. Dams under 10 meters in height are treated as large dams if they are expected to become large dams during the operation of the facility.

The Programme proposes to rehabilitate and modernize 8 small irrigation schemes and 2 relatively large dams / schemes. Some dams have already been constructed but the irrigable areas have not yet been developed. For such areas, detailed studies will be conducted.

MoFA will carry out feasibility studies for the selected small irrigation schemes at different location of the country. MoFA will ensure that the necessary safeguards documents including dam safety assessment, ESIA and ESMP are prepared and disclosed for these facilities in compliance with national regulations and World Bank safeguards policies.

OP/BP 7.50 - Policy on Projects on International Waterways – is relevant to this programme. The Government of Ghana (GoG), through the Volta Basin Authority (VBA) will submit a Notification Letter to all the riparian countries informing them of the proposed project activities and the anticipated impacts on water extraction and use, seeking a No-Objection. The exception to this requirement will be in respect of all the existing irrigation schemes to be rehabilitated by the programme.

ESS6 is also relevant to this programme. Should there be potential risks and impacts on forestry and/or critical habitat, MoFA will write to the Wildlife Division of the Forestry Commission with a map of the sub-project to ascertain that the area in question is not a protected area or an area of Global Significant Biodiversity Area. These issues will be captured in the ESIAs to be prepared for sub-projects.

8.3.2 Technical Specifications and Standards

Technical specifications

MoFA with technical support from its department and agencies, will be responsible for the development and presentation of clear guidelines for the design and provision of technical specifications and standards to assist the private sector to plan for sub-projects. These will ensure the streamlining of approaches and activities for sound implementation of sub-projects. These will include adequate reference to sector norms and prescribed national codes of practice. The private sector will be well aware of applicable technical provisions and fit their projects into these accordingly.

8.3.3 Environmental Standards

The EPA with the Ghana Standards Authority is responsible for setting environmental standards and has in place both general and sector specific guideline values. These standards and in some cases guidelines are provided for the management of pollutant emissions. In situations where standards have legal backing then these must be followed. Where standards show a large difference from the World Bank General EHS

Guidelines, the most stringent standard will be applied. In most cases, these are practically similar. The Ghana Atomic Energy Commission (GAEC) also sets standards on environmental radiations.

8.4 Environmental and Social Monitoring and Reporting

Monitoring would be a key component of the ESMF during project implementation. Monitoring would be undertaken at the sub-project implementation phase to verify the effectiveness of impact management, including the extent to which mitigation measures are successfully implemented. Monitoring would involve three areas namely:

- Compliance monitoring;
- Impact monitoring; and
- Cumulative impact monitoring.

The aim of monitoring of the sub-projects during the implementation phase would be to:

- Improve environmental and social management practices;
- Check the efficiency and quality of the EA processes;
- Establish the scientific reliability and credibility of the EA for the project; and
- Provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation.

8.4.1 Compliance Monitoring

This is to verify that the required mitigation measures, which are the environmental and social commitments agreed in the ESMF and sub-project EAs are implemented. Compliance monitoring would include inspections during construction of project components to verify the extent to which permit conditions are adhered to. The operational/decommissioning activities of sites will also be monitored. Compliance monitoring will be done by the EPA, though the PIU will also carry out its limited compliance monitoring on contractors' E&S safeguards obligations.

Daily compliance monitoring of construction activities would be conducted by the Supervising Engineer to be recruited by the PIU. The Supervising Engineer will be required to recruit an experienced and qualified Environmental Specialist (certified ISO 45001:2018 or equivalent) and qualified Social Specialist. These two specialists would be full-time at the construction sites during working hours. These requirements would be part of the Bidding Documents and Contracts.

8.4.2 Impacts Monitoring

Monitoring of impacts of sub-projects and mitigation measures would be the duty of the E&S Specialists of the PIU. The E&S safeguards requirements given to the contractor in the contract specifications would be monitored to ensure that works are conducted in accordance with the laid down mitigation measures. The MoFA through the E&S Specialists of the PIU would ensure contractors submit reports on work progress and challenges in observing the E&S safeguards requirements. The monitoring results would form a major part of the reports to be submitted to the EPA, MoFA and World Bank

The Contractor will be responsible for the preparation and implementation of the Contractor ESMP and the Contractor Health and Safety Plan, which would include Community Health and Safety. For this purpose, the Contractor would be required to recruit an experienced and qualified Environmental Specialist (certified ISO 45001:2018 or equivalent), as well as an experienced and qualified Social Specialist. These 2 specialists would be full-time at the construction sites during working hours. These requirements would be part of the Bidding Documents and Contracts.

8.4.3 Cumulative Impact Monitoring

The cumulative impacts from the programme implementation on environmental and social resources within the programmes area of influence would be monitored with considerations of other existing or proposed development. There would be collaboration between MoFA and other proponents to compare E&S safeguards guiding the sub-projects implementation to ensure comprehensive management of cumulative impacts.

8.5 ESMF Implementation Budget

The estimated budget for the ESMF implementation covers the cost of training for PIU, GIDA, WRC, LVD, AEAs of MoFA and WUAs in order to effectively execute their roles outlined in the ESMF. The estimated cost of training is USD 936,000 as captured in Table 8.2. The cost for the Environmental Assessment for Individual sub-project will be determined through a competitive bidding where the lowest cost proposal is awarded the contract.

Table 8. 2 ESMF Implementation Budget

No	Organization	Activity	Rate ($)	Estimated Cost ($)
1	PIU	• Recruitment of Environmental and Social Specialists • Training on sub-project screening and registration	6,000 each for 5 years 1training at 1,000 1 refresher training at 1,000	914,000.00
		• Training to carry out E&S responsibilities • Monitoring of E&S Safeguards compliance	12,000	
		• Preparation of individual Project Environmental Assessment and RAP	180,000	
2	GIDA	• Training on preliminary assessment of resettlement issues	1training at 1,000 1 refresher training at 1,000	2,000
	LVD	• Training on preliminary assessment of resettlement issues	1training at 1,000 1 refresher training at 1,000	2000
3	WRC	• Training in Project EIAs	1training at 1,000 1 refresher training at 1,000	2,000
	AEAs	• Training to carry out E&S responsibilities • Inspection and Monitoring of E&S compliance on small holder farms	1training at 1,000 1 refresher training at 1,000 10,000	12,000
	WUAs/ PSME	• Training to carry out E&S responsibilities	1training at 1,000 1 refresher training at 1,000	2,000
	PIU/GIDA LVD/WRC/ AEAs/PSME	Development of training materials	2,000	2,000
	Total			**936,000.00**

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APPENDIX 1A ENVIRONMENTAL & SOCIAL SCREENING CHECKLIST

Type of Projects	Environmentally Sensitive Criteria and Project Thresholds	Screening Outcome
1) Construction of Ground Stations 2) Construction of Weather Stations 3) Digitization services involving electronic devices	• Non-environmentally sensitive site • Impacts generally localized, short-term and reversible	Environmental and Social Management Plan
4) Food Waste Disposal (in transit) 5) Setting up Seed Production Farms 6) Rehabilitation of Agriculture Centres 7) Upgrading of Agriculture Stations	• Non-environmentally sensitive site • Impacts generally localized, short-term and reversible • Mitigation measures known and easy to implement	Environmental and Social Management Plan
	Within/Bordering < 100m from • Water source / Water body • Houses or residential areas • Affecting more than 20 persons or 10 families	Preliminary Environmental Assessment
8) Fertilizer Production Industries 9) Setting up Pesticides Industries 10) Setting up Veterinary Products Industries	• Non-environmentally sensitive site • Impacts generally localized, short-term and reversible. • Mitigation measures easy to design and implement • Not requiring much primary data • Proposed location in designated Industrial Area	Preliminary Environmental Assessment
	Within/Bordering < 100m from • Water source / Water body • Medical of health facility • Educational facility • Houses or residential areas • Affecting more than 20 persons or 10 families	Environmental Impact Assessment
11) Integrated Farms (livestock/crops) 12) Mixed Agriculture/Aquaculture 13) Poultry Production	• Non-environmentally sensitive site • Impacts generally localized, short-term and reversible. • Mitigation measures easy to design and implement • Not requiring much primary data	Preliminary Environmental Assessment
	Within/Bordering < 100m from • Water source / Water body • Medical or health facility • Educational facility • Houses or residential areas • Affecting more than 20 persons or 10 families • Covering 40ha of land or more	Environmental Impact Assessment
14) Watershed/Floodplain Restoration 15) Irrigation Scheme Development 16) Rehabilitation of Irrigation Dams 17) Reclamation of Irrigation Scheme	• Non-environmentally sensitive location • Impacts generally localized, short-term and reversible. • Mitigation measures easy to design and implement	Preliminary Environmental Assessment

	• Not requiring much primary data	
	Within/Bordering < 100m • Affecting more than 20 persons or 10 families • Covering 40ha of land or more	Environmental Impact Assessment
18) Development of Grazing Reserves/Corridors	• Non-environmentally sensitive site • Impacts generally localized and short-term. • Mitigation measures easy to design and implement • Not requiring much primary data • Covering less than 40ha of land • Reserve corridor less than 5km	Preliminary Environmental Assessment
	Within/Bordering < 100m • Affecting more than 20 persons or 10 families • Covering 1000ha of land or more • Reserve corridor more than 5km	Environmental Impact Assessment

ENVIRONMENTALLY SENSITIVE AREAS, as defined by *SCHEDULE 5 (Regulation 30 (2)) of the ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999 (LI 1652)*

1. All areas declared by law as forest reserves, national parks, watershed reserves, wildlife reserves and sanctuaries including sacred groves.
2. Areas with potential tourist value.
3. Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
4. Areas of unique historic, archaeological or scientific interests.
5. Areas which are traditionally occupied by cultural communities.
6. Areas prone to natural disasters (geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity etc.).
7. Areas prone to bushfires.
8. Hilly areas with critical slopes.
9. Areas classified as prime agricultural lands.
10. Recharge areas of aquifers.
11. Water bodies characterized by one or any combination of the following conditions:
    a) water tapped for domestic purposes;
    b) water within the controlled and/or protected areas; c. water which support wildlife and fishery activities.
12. Mangrove area characterised by one or any combination of the following conditions
    a) areas with primary pristine and dense growth;
    b) areas adjoining mouth of major river system;
    c) areas near or adjacent to traditional fishing grounds;
    d) areas which act as natural buffers against shore erosion, strong winds or storm floods.

APPENDIX 1B EPA FORM EA1

ENVIRONMENTAL PROTECTION AGENCY, GHANA

ENVIRONMENTAL ASSESSMENT REGISTRATION FORM

(To be completed in Duplicate)

FEE: ₵50,000

Serial No.

FORM EA1

PROPONENT:

Address for correspondence:

Contact person: Position:

Phone No.: Fax No.:

Email:

ASSESSMENT NO:		**FILE NO:**	

Environmental Protection Agency
P.O. Box M 326
Accra, Ghana

Tel: 664697/8, 664223, 662465
Fax: 662690
Email: support@epagghana.org
Web-site: www.epa.gov.gh

*This form shall be submitted to the relevant EPA Regional Office. It is important that you read carefully the guide for completing the form before starting.

1. PROPOSED UNDERTAKING / DEVELOPMENT

Title of proposal (General Classification of undertaking)
……

Description of Proposal (nature of undertaking, unit processes [flow diagram], raw materials, list of chemicals (source, types and quantities), storage facilities, wastes/ by-products (solid, liquid and gaseous)

Scope of Proposal (size of labour force, equipment and machinery, installed/production capacity, product type, area covered by facility/proposal, market)

2. PROPOSED SITE

Location (attach a site plan/map)

Plot/House No. Street/Area Name

Town District/Region

Major Landmarks (if any)

Current zoning

Distance to nearest residential and/or other facilities

Adjacent land uses (existing & proposed)
……..

Site description (immediate activities should be described)

3. INFRASTRUCTURE AND UTILITIES

Structures (buildings and other facilities proposed or existing on site)

Access to water (source, quantity)

Access to power (type, source & quantity)

Drainage provision in the project area

Nearness to water body

Access to project site:

Other major utilities proposed or existing on site (e.g. sewerage, etc)

4. ENVIRONMENTAL IMPACTS

Potential environmental effects of proposed undertaking (Both constructional and operational phases)

5. OTHER ENVIRONMENTAL ISSUES

Potential significant risks and hazards associated with the proposal (including occupational health and safety). State briefly relevant environmental studies already done and attach copies as appropriate.

6. CONSULTATIONS

Views of immediate adjourning neighbours and relevant stakeholders (provide evidence of consultation)

7. MANAGEMENT OF IMPACTS AND ENVIRONMENTAL ENHANCEMENT MEASURES

ATTACHMENTS

Tick appropriate boxes below indicating that the following required documents have been attached:

- ☐ Authentic site plan (signed by a licensed surveyor and certified by Survey Dept.)
- ☐ Block plan of the site
- ☐ Photographs of the site
- ☐ Fire report from the Ghana National Fire Service
- ☐ Zoning letter from Town & Country Planning Department

DECLARATION:

I, ……., hereby declare that the information provided on this form is true to the best of my knowledge and shall provide any additional information that shall come to my notice in the course of processing this application. I also declare that information provided is true.

_____

_____

Signature Date

* Use additional sheets where spaces provided in 3, 4 and 5 are inadequate.

APPENDIX 2 GENERIC ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The proposed ESMP outline is provided below:

1. Executive Summary

2. Introduction
   a. Background
   b. Objectives of the project
   c. Purpose of the Environmental Assessment
   d. Methodology and Approach
   e. Report organization

3. Description of project

4. Applicable legal, policy and institutional framework including World Bank Environmental and Social standards

5. Analysis of project alternatives

6. Environmental and social baseline conditions
   a. Physical environment
   b. Socio-cultural/socio economic environment
   c. Biological environment

7. Stakeholder/public consultation

8. Assessment of potential project environmental and social impacts/risks

9. Management and enhancement measures of risks and impacts

10. Environmental and social management plans
    a. Implementation plan with detailed Institutional Arrangements including the responsibilities of the Contractors and Supervising Engineers
    b. Environmental and social monitoring plan
    c. Estimated cost of the ESMP
    d. Capacity building
    e. Grievance mechanism

11. Decommissioning

12. References

13. Appendices
    a. Correspondence
    b. Minutes of engagement
    c. Environmental and social clauses

Table below is a matrix to be considered and filled out for applicable subprojects that will require a separate Environmental and Social Management Plan (ESMP) according to the impact level.

Subproject Activity	Potential Environmental or Social Impacts	Proposed Mitigation Measures	Responsibility (including enforcement and coordination)	Monitoring Requirements (including supervision)	Time Frame or Schedule	Cost Estimate

NB: The key aspects of the ESMP have been detailed out in the next section, using an irrigation facility as an example.

1.0 INTRODUCTION

The introductory chapter is expected to cover the following sections:

a. Background (brief description of the subprojects in the context of FSRP2 and establishing relevant linkages);
b. Objectives of the project (clearly defined outcomes or outputs of the undertaking);
c. Purpose of preparation of the Environmental and Social Management Plan (ESMP);
d. Methodology and Approach; and
e. Report organization.

2.0 PROJECT DESCRIPTION

A detailed description of the relevant subprojects or interventions must be provided in this chapter. Generally, subprojects requiring the preparation of ESMPs must be defined under the FSRP2, which has five components as follows:

Component 1: Digital Advisory Services for Agriculture and Food Crisis Prevention & Management
Sub-Component 1.1 Upgrading Food Crisis Prevention and Monitoring Systems
Sub-Component 1.2 Strengthening Creation and Provision of Digital Advisory Services for Farmers
Component 2: Sustainability & Adaptive Capacity of the Food System's Productive Base
Sub-Component 2.1: Adapting and adopting Innovations and Technologies for Resilient Food Systems
Sub-Component 2.2: Strengthen food security through sustainable practices in targeted areas
Component 3: Market Integration & Trade
Sub-component 3.1: Facilitate Trade Across Key Corridors and Consolidate Food Reserve System
Sub-component 3.2: Support to Development of Strategic Value chains
Component 4: Contingent Emergency Response Component
Component 5: Project management

Sub-component 1.2: Strengthening Creation and Provision of Digital Advisory Services for Farmers. This sub-component aims to increase access to and use of location-specific information relevant to food security by decision makers and farmers via national extension systems through capacity building and institutional strengthening activities for hydromet and agromet service providers (public and private). This will largely rely on international and national technical specialists' i.e. individual consultants or firms). The exact number of permanent and contract workers over the life of the program for specific sub-projects must be established in this chapter.

Sub-Component 2.2: Strengthen food security through sustainable practices in targeted areas. This activity is also expected to engage consultants and contractors in the construction aspect of the project as well as the provision of capacity building of beneficiaries for the operation and maintenance and coordination of the facilities. This sub-component is likely to involve direct workers and contract workers including a small number of labourers and technicians to support the construction site preparation and for the upgrading of the agricultural stations – these may be from the local workforce which will specify the exact number of workers to be engaged. – it's not yet known. Additionally, international and national technical specialists / consultants and workers from consultancies (firms). The exact number of direct workers, contracted workers and primary supply workers over the life of the project for this specific sub-component is not yet known, but a rough estimate is 100 -150 workers at one time including technical consultants during the construction phase, and falling significantly after commissioning of the facilities.

Sub-component 3.1: Facilitate Trade Across Key Corridors and Consolidate Food Reserve System. The objective of this subcomponent is to support the preparation and implementation of sound regional regulations and policies to strengthen the enabling environment for an expansion of regional agricultural output and input markets. This will be achieved through support to institutions and activities that would lead to the alignment of cross border trade policies to ease trade restrictions to provide farmers and buyers access to national and regional markets. This is expected to create a number of jobs for the private sector.

Sub-component 3.2: Support to Development of Strategic Value Chains. This sub-component aims at identifying, validating, establishing and developing value chains of priority commodities/crops to ensure their integration within country and regional value chains to promote trade. Specific activities under this component will include: (i) mapping of value chain actors along selected priority commodities; (ii) nurture existing and/or support the development of operational and strategic (including local authorities) innovation platforms along selected commodity value chains to promote trade within the country and across the sub-region. This will largely involve consultants and contractors to carry out the mapping activities and development of platforms along the commodity value chains.

Component 4: Contingent Emergency Response Component. The objective of this component is to make available resource to strengthen the response capacity of the Government of Ghana (GOG) in case of emergency. This will involve the establishment of a technical committee consisting of relevant government agencies responsible for emergency crises to response to emergency cases.

Component 5: Project management. This component will provide support at implementation to MoFA in accordance with the World Bank's guidelines, including engagement of technical advisers to provide technical expertise on project performance monitoring and planning. Implementation of this component will largely rely on civil servants within the relevant Ministries, as well as international and national technical specialists/consultants (individuals and firms).

3.0 APPLICABLE LEGISLATIONS, POLICIES AND REGULATORY FRAMEWORKS

This chapter must discuss relevant national sector policies and plans, legal and institutional frameworks/arrangements, international conventions and the World Bank safeguard policies, as well as the national environmental quality standards to guide the sustainable implementation of the various subprojects.

Depending on the subproject, the following national policies, regulations and institutional frameworks may be relevant:

Table 3.1 Applicable National Policies, Regulations and Institutional Frameworks

National and Sector Policies and Plans	
Ghana Shared Growth and Development Agenda, 2010-2013	National Environmental Policy, 2013
National Land Policy, 1999	National Water Policy, June 2007
Forest and Wildlife Policy, 2012	National Climate Change Policy, 2013
National Gender Policy, 2015	Riparian Buffer Zone Policy, 2014
National Irrigation Policy, June 2010	Food and Agriculture Sector Development Policy, (FASDEP II) - MOFA
National Environmental Action Plan/Policy, 1994	National Employment Policy, 2012
National Museums Act, 387 (1969)	
Relevant Laws and Regulations	
The State Lands Act, 1963 (Act 125)	The Constitution of the Republic of Ghana, 1992
Ghana Investment Promotion Centre Act, 1994 (Act 478)	Lands Commission Act, 2008 (Act 767)
Environmental Assessment Regulations, 1999 (LI 1652)	Environmental Protection Agency Act, 1994 (Act 490)
Fees and Charges (Amendment) Instrument 2019 (L.I. 2386)	The Water Use Regulations, 2001 (LI 1692)
Plants and Fertilizer Act, 2010 (Act 803)	Water Resources Commission Act, 1996 (Act 522)
Town and Country Planning Ordinance, 1945 (CAP 84)	Irrigation Development Authority (Irrigation Water Users Association) Regulations, 2016 (LI 2230)
Ghana National Fire Service Act, 1997	Local Governance Act, 2016 (Act 936)
Control and Prevention of Bush Fires Act, 1990	Ghana Building Code – GS 1207:2018
Factories, Offices and Shops Act, 1970 (Act 328)	The Fire Precaution (Premises) Regulations 2003 (LI 1724)
Workmen's Compensation Law, 1987 (PNDCL 187)	Control of Bush Fires Law of 1983 (PNDCL 46)
Ghana Meteorological Agency Act, 2004 (Act 687)	The Labour Act, 2003 (Act 651)
Alternative Dispute Resolution Act, 2010 (Act 798)	The Children's Act, 1998 (Act 560)
National Guidelines for Healthcare Waste Management in Ghana, 2017	National Healthcare Waste Management Policy, 2017
Institutional Framework	
Ghana Irrigation Development Authority	Ministry of Food and Agriculture
Water Resources Commission	Irrigation Company of Upper Region Limited (ICOUR)
Environmental Protection Agency	Lands Commission
Traditional Authorities	Metropolitan, Municipal and District Assemblies (MMDAs)

Among many others, the following international conventions would be relevant:

- United Nations Convention on Biological Diversity;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- United Nations Framework Convention on Climate Change (UNFCCC); and
- Stockholm Convention on Persistent Organic Pollutants (POPs).

Additionally, this chapter will identify and discuss the relevant Environmental and Social Standards (ESSs) of the World Bank. The relevant approvals required for the implementation of the subprojects are summarized below:

Table 3.2 Key Regulatory Approvals applicable to Subprojects under FSRP2

Regulatory body	Permits/licenses and certificates	Applicable	Project Phase	Remarks /Status
Environmental Protection Agency	Environmental Permit	Yes	Prior to Construction Phase	After acceptance of final EIS by the EPA.
	Environmental Certificate	Yes	Within 24 months of commencement of Operations	After preparation of first ESMP; Renewable every 3 years
	Environmental and Social Management Plan	Yes	Submission to the EPA after 18 months of subproject commencement	The substantive ESMP replaces the Provisional ESMP that is submitted as part of the EIS
EPA - CCMC	Registration / licensing of commercial dealers in agro chemicals	Yes	Operations phase	The CCMC licences the products as well as the importers and distributors
Water Resources Commission	Water Use Permit	Yes	Prior to commencement of applicable subproject works	After obtaining Environmental Permit; renewable every three years
Lands Commission	Land acquisition	Yes	Planning, during acquisition of land	Are there any physical or socioeconomic encumbrances with the site
Ghana National Fire Service	Fire Permit/ Certificate	Yes	Construction of office buildings / public facilities	Renewable on annual basis
Metropolitan / Municipal / District Assembly	Development and building approvals	Yes	Prior to construction of project facilities and infrastructure	Permit is issued for office buildings and related facilities upon compliance with EPA and other statutory processes
Department of Factories Inspectorate	Certificate of Registration	Yes	Construction and Operation phase.	Renewable on annual basis

4.0 ENVIRONMENTAL AND SOCIAL MITIGATION PLAN

This chapter presents a brief discussion on the key risks and impacts that may be associated with activities under irrigation dam rehabilitation, as these represent the single most significant risk sources under the FSRP2.

4.1 Evaluation of Potential Adverse Impacts

These risks and impacts are discussed broadly under 3 main categories:

- Preparatory and planning phase impacts;
- Rehabilitation and constructional phase impacts; and
- Operational and maintenance phase impacts.

4.1.1 Preparatory and Planning Phase Impacts

Uncertainty of the project schedule and scope could result in some level of unrest and anxiety among farmers in the scheme for fear of loss of their livelihood during the construction and rehabilitation phase of the proposed project. Feasibility studies and stakeholder consultations for the proposed subprojects will seek to allay these concerns.

4.1.2 Rehabilitation and Constructional Phase Impacts

Loss of vegetation and impacts on flora and fauna*:* The rehabilitation works would involve clearing several hectares of vegetation (aquatic weeds, shrubs, grass, trees) from the canals and drains prior to the commencement of the civil works and earthworks. The proposed site may be an existing irrigation scheme where vegetation in the project site may be heavily modified as a result of agriculture and human settlements. From previous terrestrial studies carried out, there are usually no species of conservation concern in heavily modified project sites.

Disruption of livelihoods of farmers and reduced food production: The rehabilitation and modernisation of existing irrigation schemes may necessitate the temporary closure of portions and/or the whole of the scheme, which could result in significant interruption of farming activities and livelihoods of the farmers. This could also strain the relationship between the project implementers and the local communities, and potentially affect project cohesion.

Soil impacts and sediment transport: Construction and clearance activities could result in considerable disturbance to soil, through vegetation clearance, earthworks, site grading and vehicle/worker movements. There could be soil erosion and sediment release to land and water, soil mixing, compaction, topsoil loss, increased risk of contamination from fuels, oils and waste. Desilting and excavation of the canals and laterals, as well as poor management of excavated spoil or dredge material could significantly increase suspended solids and turbidity of targeted resources such as the Tono River and Kpong River.

Generation and disposal of solid waste: Vegetative material and excavated soils will form the bulk of waste generated. Other wastes would include metal scraps, worn-out tyres and spent lubricating oil, empty lubricant containers, rubber seals, concrete debris, etc. which must be disposed of properly to avoid adverse impacts on the environment.

Occupational Health and Safety Issues: Workers would be exposed to noise, vibrations and dust. Additionally, there is considerable risk of accidents and injuries from the use of equipment and machinery and from working along access roads. Workers are also at risk of falling into the canals or the reservoir.

Road Traffic Impacts: The transportation of construction materials, waste generated and the movement of heavy equipment to the project site may pose a risk to inhabitants along the project routes. It is expected that, in the worst case scenario where all estimated volumes of materials required for filling are obtained from the quarries and borrow pits, the construction phase would require the deployment of a significant truckloads of materials per day (both inbound and out-bound) for a stipulated duration. The increased traffic, though significant is not expected to hinder or alter existing road traffic situation on the affected roads.

Public/Community health impacts*:* Identified public health impacts include spread of Covid-19, HIV/AIDS and other sexually transmitted diseases (STDs) as a result of irresponsible sexual behavior by migrant workers. Open defecation may also be promoted if adequate toilet facilities are not provided during construction for workers and food vendors who may patronize the site. Poor sanitation conditions may result in pollution of River bodies such as the Tono and drains exiting the site. Improperly covered trenches may result in stagnant

water and breed mosquitoes. Unsecured excavations may compromise the safety of farmers who ply the affected area, as well as their families.

Change in socio-cultural characteristics: The proposed project is expected induce an influx of migrants into the nearby communities. The influx of migrants to the area will greatly influence the security of the affected communities. The migrants may not conform to the societal norms and cultural practices and may upset the social structure of these communities. The increased population will also put stress on the available resources such as drinking water.

Work Camp and Labour Issues: It is expected that the Contractor will provide an accommodation for some of its employees within a fenced compound or identify suitable locations within the scheme area to construct camps and yards, if needed. The camp will include workers' accommodation, potable water facilities, kitchen, clinic and sanitation facilities and comply with the provisions IFC''s Worker's Accommodation: Processes and standards. The yard will include fuel storage area, cement warehouse, concrete batching plant, parking area for machinery, general workshop, maintenance workshop, areas for storing chippings and sanitation facilities.

Such work camps and yards, if not well managed, can lead to a wide range of adverse impacts. It is estimated that about 600 workers could be engaged throughout the construction period and an estimated number of 150 workers will be engaged during the peak construction period. A number of the workers are envisaged to be foreign nationals while the rest will be sourced locally. All the foreign nationals and key local workers will be accommodated at the work camp. The rest of the local workers will commute from their local communities to work.

Potential adverse impacts associated with work camps and labour influx include:

a) Risk of social conflicts;
b) Increased risk of illicit behaviour and crime;
c) Increased risk of communicable diseases and burden on local health facilities;
d) Gender-based violence;
e) Local inflation of prices;
f) Poor sanitation condition;
g) Proliferation of illicit sexual behaviors, etc.

While this ESMP offers mitigation measures against these adverse impacts, the contractor even before construction works start is expected to prepare and submit for approval, an Environment, Social, Health and Safety Management Plan (ESHS-MP) or Contractor's ESMP (C-ESMP) based on the findings and mitigation measures in the ESIA and ESMP. Additionally, the contractor will prepare a code of conduct which will be signed by all workers and enforced by the contractor, as well a Labor Management Plan. At the bidding stage, all bidders will be required to demonstrate their appreciation of ESHS issues by submitting an ESHS Management Strategy as part of their proposal or bid, including CVs from qualified Environmental and Social Specialists, as well as an ISO 45001: 2018 or equivalent certified Health and Safety Specialist.

The contractor's ESHS-MP or C-ESMP will incorporate all the following plans as a single report or each may be submitted as a standalone report:

- Waste Management Plan;
- Traffic Management Plan;
- Emergency Preparedness Plan;
- Pollution Management Plan;
- Biodiversity Management Plan (if required)
- Health and Safety Plan;

- Labour Influx Management Plan;
- Labour Management Plan
- Code of Conduct
- Gender Based Violence Management Plan
- Grievance Mechanism;
- Community Engagement and Communication Plan;
- Social and Cultural Orientation Plan
- COVID-19 Management Plan

The contractor's Code of Conduct at a minimum will address the following issues:

- Compliance with applicable laws, rules, and regulations of Ghana and applicable World Bank requirements;
- Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment);
- The use of illegal substances;
- Non-Discrimination (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction);
- Interactions with community members (for example to convey an attitude of respect and non-discrimination);
- Sexual harassment (for example to prohibit use of language or behavior, in particular towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate);
- Gender Based Violence or sexual exploitation or abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading or exploitative behaviour);
- Protection of children (including child labour, prohibitions against abuse, defilement, or otherwise unacceptable behaviour with children, limiting interactions with children, and ensuring their safety in project areas);
- Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
- Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favours, are not provided to any person with whom there is a financial, family, or personal connection);
- Respecting reasonable work instructions (including regarding environmental and social norms, such as no hunting or cutting natural vegetation);
- Protection and proper use of property (for example, to prohibit theft, carelessness or waste);
- Duty to report violations of the Code;
- Non-retaliation against workers who report violations of the Code, if that report is made in good faith.
- Punitive actions for violations of the Code including caution, demotion, suspension, summarily dismissal, criminal prosecution etc.

4.1.3 Operational and Maintenance Phase Impacts

The identified significant adverse impacts during the operational and maintenance phase of the proposed project are as follows:

Soil degradation: Poor farming practices such as poor crop cover after land preparation, lack of soil conservation structures, continuous tilling of the soil, insufficient or inappropriate use of agrochemicals and

inorganic fertilizers and continuous cropping could adversely affect soil physical, chemical and biological quality.

Impact from water abstraction: Uncontrolled abstraction of water for irrigation may affect the water level in the irrigation dams and groundwater wells, affecting aquatic life in the reservoir. This may be worse during prolonged periods of drought.

Impact on Public health and safety**:** Poor management of the irrigation dams and blockage in the main canals could lead to the proliferation of aquatic weeds such as Pistia, Vossia spp. Ceratophyllum that house large populations of Bulinus snails - the vector of Schistosomiasis, as well as provide breeding sites for malaria mosquitoes. The weeds also provide favourable habitats for many disease vectors, notably the vector of urinary and intestinal bilharzia, malaria and that of yellow fever. The presence of uncovered water bodies (dams, drains, NSRs and canals) and the absence of access restrictions poses the danger of drowning, especially children who are unattended

Water quality deterioration: Erosion may result in the transport of soil sediments into rivers downstream of the dams and the scheme areas. This, coupled with the high nutrient content of the wastewater from the farms, could lead to the proliferation of weeds in the river and affect water use downstream of the scheme. Other possible sources of pollution of the river is the transport of agrochemicals, specially pesticides, in drainage, runoff water and waste water. Groundwater resources could also be contaminated from the percolation of agrochemicals and nutrients through the soil and could pose a public health risk, especially for children.

Conflicts from Water management: Conflicts may arise from unreliable water supply at some sections of the scheme due to blocked/destroyed sections of the canals. Also, most farmers within the scheme crop at different times within the season hence, farmers require water on their fields at different times of the season. This affects farmers who may not require water at a particular time of the season. Conflict from water management will be managed by the Water User Association that would be formed.

Pest Management: Disease infestation and pest/rodent infestation may result in loss of adversely affect crop productivity and reduce the quantity and quality of produce. This may adversely affect revenue generation and consequently result in high investment losses. Sound Integrated Pest Management Practices will be implemented to limit this economic damage.

Waste management and sanitation issues: Waste to be generated during the operational phase include crop residue and agrochemical containers. Other waste to be generated include pack house waste (mainly fruit and vegetable culls) and office waste (paper, drinking water sachets, etc.).

Occupational health and safety: Machine operators will be exposed to noise, dust and vibrations especially without the use of appropriate PPEs. There is a risk of accidents and injury from the use of machinery and equipment, as well as from snake, insect, rodent etc., if safety procedures are not followed. There is also a high risk of exposure to agrochemicals through storage, handling, application and disposal.

Post-harvest losses: Pest/rodent infestation and contamination of produce as well as disease infestation and improper storage conditions might result in critical loss of property and investment by farmers.

Emergency situation and sustainability of the irrigation scheme: Factors that may affect the sustainability of the targeted irrigation schemes include inadequate funding, poor capacity building within PIU-MOFA and the Water Users Association (WUA) for the management of the scheme and emergency situations such as fire, dam collapse and flooding.

4.2 Mitigation Measures for Significant Potential Adverse Impacts

Mitigation impacts have been proposed in **Table 4.1** below for the potential significant environmental and social impacts of the proposed subprojects, especially with respect to the irrigation subprojects.

5.0 Environmental and Social Monitoring Plan

Environmental and social monitoring is an essential component of a continuous project review process following approval of an Environmental and Social Assessment. The monitoring of tangible and measurable environmental and social parameters will also help to confirm any predicted impact or otherwise and address the effectiveness of the implementation of the mitigation measures.

A comprehensive monitoring plan has been developed in **Table 5.1** to guide the implementation of the mitigation measures recommended for the identified adverse environmental and social impacts. The monitoring plan includes the proposed responsible institutions or persons and estimated budget/cost requirements. Detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements.

Table 4.1 Mitigation Measures for the Identified Significant Impacts

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
Planning Phase Impacts				
Anxiety from potential loss of livelihoods	Farmers, Local communities and Cattle Headsmen	• As part of its awareness creation efforts, PIU-MOFA will ensure that potentially affected individuals are adequately informed, in advance, of the scope, magnitude and schedule of the proposed project, its implications for their continued farming over the construction period. These measures will minimise the problem of confrontation and conflicts and will reduce this impact significantly. • PIU-MOFA will also ensure that farmers are informed of any changes in the project design that may affect their status as affected persons. • PIU-MOFA will ensure all grievances/concerns by local communities, traditional authorities, livestock owners and cattle herders are resolved prior to construction works.	PIU-MOFA	As part of regular operations
Construction Phase Impacts				
Loss of vegetation and impacts on flora and fauna	Flora, fauna, soil	• The Contractor shall limit the vegetation clearance to the exact land acreage required for construction works, as indicated on the project drawings or approved by the Supervising Engineer. • Where possible, complete felling of trees that have grown within the scheme area will not be done during vegetation clearance. The Engineer may order certain trees to be left standing; • PIU-MOFA will contractually prohibit contractor and workforce from hunting wildlife for game or any other purpose, as well as cutting of natural vegetation.	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's Bills of Quantities (BoQ)
Disruption of livelihood of farmers and reduced food production	Farmers	• PIU-MOFA and the project developer will ensure that the contractor carries out the rehabilitation work in sections such that the scheme will not be closed at once for rehabilitation. In this case some farmers may be able to farm during the rehabilitation and construction period.	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• PIU-MOFA and the project engineer will ensure construction will be scheduled such that majority of farmers will be allowed to harvest prior to commencement of activities. • PIU-MOFA and the project engineer will ensure the contractor(s) provides safe temporary access routes for utilisation to enable them continue their business or economic activities, in case access to communities are affected during the construction period. • Contractor to consider, if financially feasible, covering the existing dilapidated lining of the lateral unit system with concrete canvas, which is durable and quicker technology (although 20% more expensive than lining with geomembrane protected partly by in-situ concrete on the bed and precast slabs on the side slopes) to reduce the period of inactivity by farmers and facilitate the completion of the assignment.		
Impacts on water Quality	Water , fisheries	• The contractor will implement standard erosion and sediment control best management practices • The contractor will ensure soils removed during construction are stockpiled for reuse where possible. • The contractor will ensure that dredging of weeds and silt in canals and reservoirs are conducted in phases to ensure sediment control	Contractor/ Supervising Engineer	Included in Contractor's BoQ
Soil impacts and sediment transport	Soil, water bodies, air	• Tree felling in the larger river bed and river course will be achieved at heights of 0.30m above the ground maintaining the roots in the ground to ensure anchorage of soil particles that tend to erode when the river is discharging. • To minimize erosion and sediment transport as a result of removal of vegetation, the necessary works to be carried out in the cleared locations will be done promptly. • The period of exposure of excavated soils to weather conditions will be limited to minimize the possibility of sediment transport as a result of storm water/runoff. Heaps of excavated soils suitable	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		for reuse will be utilized in the shortest possible time to minimise exposure. Materials found to be unsuitable for backfilling will also be disposed of promptly.		
Generation and disposal of solid waste	Land, water bodies	• The contractor(s) will allow the neighbouring communities to collect the tree and shrub stems for use as poles, fuelwood and fencing material. As much as possible, the twigs and leaves will be spread and ploughed into soil or allowed to decompose. • ensure efficient use of construction materials and re-use of excavated material to minimize the waste to be generated from the rehabilitation of the canal system. Excavated soil material will be re-used in construction of the canal dykes as much as possible. • ensure that, prior to the commencement of construction, the supervising engineer identifies borrow pits with adequate capacities within the Project districts, where material found to be unsuitable for backfilling, will be disposed. The contractor will be required to utilise the identified disposal sites. The supervising engineer will also consult the Assemblies for advice on the potential sites that require reclamation by backfilling before and during the construction period. • Excavated material and cleared vegetation which cannot be re-used will be collected and disposed at identified borrow pits and spoil tips • PIU-MOFA will ensure the contractor(s) provide bins at work camp, yard and construction site for collection and disposal of plastic waste and polythene materials such as lubricant containers, drinking water sachets and carrier bags which will be regularly emptied at approved dump sites.	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ
Occupational Health and Safety Issues	Workers	<u>Adoption of Health and Safety Policies/ESHS Plan</u> • The contractor(s) will be required to adopt a Health & Safety Policy to guide the rehabilitation and construction activities. The adoption of the health and safety policy at site will serve as a	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		precautionary measure to prevent/minimise the possibility of accidents and reduce health associated risks. • Workers will therefore be required to follow the health and safety policy of the contractor. A health and safety officer will be appointed by the Contractor to ensure compliance with the Health and Safety Policy. • The contractor will be required to prepare and implement an ESHS-MP or C-ESMP which will be regularly updated to respond to emerging risks and impacts. <u>Provision and Use of Personal Protective Equipment (PPE)</u> • Ensure the contractor provides and enforces the use of appropriate personal protective equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks. Sanctions will be implemented where workers do not use the PPEs provided. <u>Use of Road Worthy Vehicles and safe construction machines</u> • Require the contractor to use equipment in good working condition including regular maintenance and service of its bulldozers, excavators and tractors to ensure they are in good condition. Good conditioned and well-maintained equipment will reduce accidents, frequent breakdowns, noise nuisance and smoke emissions which could affect the operator's and other workers' health and safety. <u>Use of Qualified Personnel</u> • Ensure that the contractor employs only qualified machine operators with requisite skills and experience to operate the machines.		

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• Ensure the contractor carries out regular training on standard operational procedures and health & safety for machine operators and workers. <u>First Aid</u> • Ensure the contractor provides first aid training for its workers and provide first aid kits at the project site during land preparation and construction activities to treat minor ailments. Every project car would be provided with a First Aid kit • The Contractors would establish a clinic in the camp equipped with basic medicines, a qualified nurse and an ambulance. • However, major cases will be referred to the nearest hospital or health post.		
Traffic Impacts	Public	<u>Announcement and Notification of Work</u> • Notify the relevant Assemblies at least seven days before start of work • The public will be informed of the proposed works through local FM stations • Warning signs shall be provided at the main road especially at the junction to the Irrigation Scheme area to caution road users; • The contractor will develop a traffic management plan as part of its ESHS-MP. <u>Transport of Equipment and Materials</u> • Transport of materials will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic • The contractor shall ensure that all the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver's license as prescribed by the Drivers and Vehicles Licensing Authority (DVLA).	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		<u>Public Safety</u> Some adequate measures and conditions to be instituted by the contractor in the transport of materials include the following: • All temporary traffic controls will be done in consultation with the Department of Urban Roads (DUR) and the Police Motor Transport and Traffic Division (MTTD); • Haulage of materials including quarry products to the site will be limited to off-peak hours; • Trucks transporting quarry products and other friable materials to the site will be covered; • Very experienced drivers will be engaged; • Traffic wardens will monitor dump truck movements and ensure public and traffic safety; and • Speed limits of 20 km/h would be mandated at the construction sites. Speeds within communities and inhabited areas be 30 km/h and on large roads 80 km/h • • In an unfortunate incident of any truck failure, such trucks will be towed within 24 hours		
Public health impacts	Land, water bodies, workers, public	<u>HIV/AIDS and STDs</u> • The Contractor will be required to organise, in collaboration with the Municipal Health Directorates, awareness creation seminars and educational programmes for all workers and the surrounding communities on the behavioural changes required to prevent the spread of HIV/AIDS and other STDs. <u>Sanitation Issues</u> • Ensure that the contractor covers all trenches or excavations, other than the canals/laterals/sub-laterals made for the	Contractor/ Supervising Engineer/ PIU-MOFA	6,000.00 (awareness creation seminar) Remainder included in contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		construction of the canal to prevent accidents and collection of stagnant water which could breed mosquitoes. • Ensure the contractor provides adequate waste bins at the project site for use to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by the workers. These bins will be frequently transported and emptied at approved dump sites. This will prevent the littering of the project site with cans and bottles which could collect water and breed mosquitoes. • Ensure the contractor provides temporary toilet facilities at the project site for use by the construction workers. The workers will be educated against "free range" defecation.		
Change in sociocultural characteristics	Workers Communities	• Ensure the contractor(s), together with opinion leaders such as the Assembly member and traditional leaders, sensitise migrant workers on societal norms, taboos and other cultural practices in the area. • The Contractor shall be required to submit for approval of the Engineer a social and cultural orientation plan for all his staff.	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ
Increased pressure on accommodation and rents	Workers Communities	• When the local community supply of accommodation is limited, the project should establish workers' camp facilities with sufficient capacity for workers— including sub-contractors—and associated support staff.	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ
Child labor and school drop out	Community	• Ensuring that children and minors are not employed directly or indirectly on the project. • Communication on hiring criteria, minimum age, and applicable laws. • Enforcement of legislation on child labor.	Contractor/ Supervising Engineer/ PIU-MOFA	
Increased communicable diseases (including	Workers Communities	• Vaccinating workers against common and locally prevalent diseases. • Ensure adherence to COVID-19 Protocols and Sanitary Conditions • Implementation of HIV/AIDS education program;	Contractor/ Supervising Engineer/ PIU-MOFA	Included in Contractor's BoQ

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
STDs, HIV/AIDS and COVID-19		• Information campaigns on STDs among the workers and local community in collaboration with GHS and local authorities. • Provision of condoms. • Upgrade of health facilities at construction sites. • Monitoring of local population health data, for transmissible diseases, malaria, intestinal and urinary bilharzia and onchocerciases (river blindness).		
Gender-based violence, including sexual harassment, child abuse and exploitation	Workers Communities	• Mandatory and regular training for workers on required lawful conduct in the project site and legal consequences for failure to comply with laws; • Capacity building for PIU on SEA/SH requirements and how to act on SEA/SH complaints; • Information and awareness raising campaigns for community members, specifically women and girls on SEA/SH issues and how to report workers' misconduct through the SEA/SH GM; • Provision of information and training of workers on GBV, GRM and the contractor's policies and Worker Code of Conduct. • Provision of opportunities for workers to regularly return to their families; • Provision of opportunities for workers to take advantage of entertainment opportunities away from rural host communities.	Contractor/ Supervising Engineer/ PIU-MOFA Specialists engaged by the PIU	Included in Contractor's BoQ except the PIU capacity building which should be part of project management.
Land acquisition for project	Communities	• Ensure complete adherence to the Resettlement Action Plan developed in consistence with the project RPF	PIU-MOFA /Contractor /Supervising Engineer	
All disputes	Workers Communities	• Follow the site specific GM and Workers GM	PIU-MOFA /Contractor /Supervising Engineer	
Irrigation Scheme Operations and Maintenance Phase Impacts				

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
Soil degradation	Soil, fauna	<u>Physical Degradation</u> • Encourage farmers to adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and also hard pan formation associated with continuous ploughing at the same depth. • After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, cobs and bran of cereals) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content. • Encourage farmers to utilise cover crops at erosion prone areas. • Advise and train on selective pesticides with low environmental impact quotient (EIQ) where appropriate, rather than broad-spectrum products, to minimize impacts on non-target species. • Training on Integrated Pest Management would be undertaken • Embankment slopes will be stabilized by growing Vetiver to trap silts and other soil particles thus preventing entry into the reservoir, canals and laterals. <u>Biological degradation</u> Encourage the use of organic fertilizer e.g. compost to replenish soil nutrients in order to avoid the deleterious effects of chemical fertilizers on soil fauna. <u>Chemical degradation</u> • Adopt integrated weed and pest management practices for weed and pest control such as use of certified and disease tolerant seed varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding, suitable water management practices and the use of agrochemicals where necessary. This will minimize the rate of agrochemical use.	Scheme Management Entity (SME) Farmers	20,000

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• Encourage the use of diammonium phosphate fertilizer (DAP) as a nitrogen source to slow down acidification caused by N fertilizers such as ammonium sulphate • Ensure that farmers purchase EPA approved agrochemicals from licensed agrochemical shops for use at the recommended application rates. SME will educate the input providers and farmers to consult EPA's current register of approved and banned agrochemicals as well as Annexes A and B of the Stockholm Convention prior to the selection and purchase of agrochemicals for use.		
Impacts of water abstraction	Water, aquatic life, public	• Employ personnel with adequate skills to manage the Scheme Operation Centre (SOC) and Master Control Centre (MCC). • Ensure adequate security and maintenance is provided for electronic monitoring equipment on the dam to guarantee continuous monitoring of dam safety, water level and discharge from the dam. • Water users' associations (WUA) will be required to ensure the maintenance of water control and monitoring equipment installed on the canals, laterals and drains, as well as ensure the judicious use of water within the scheme to reduce the demand for water • Encourage the use of upland rice varieties produced by CSIR-CRI which require less water. These include NERICA 4, NERICA 14, Digang, Jasmin 85, CRI-Mmo tea, CRI-Otoo mmo. Late maturing varieties like Nagobu, Katanga, GR 18 from SARI must be avoided for upland areas. • Ensure that planting complies with the prescribed cropping patterns for the upland and lowland areas of the scheme in order to limit the demand for water and minimize waste.	SME WUA PIU-MOFA Lateral leaders	2,000.00
Conflicts from water use management	Scheme Farmers	• Ensure rice is restricted to the lowland areas while the upland areas are used to grow upland crop varieties that need less water than rice	SME WUA PIU-MOFA	

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• Ensure synchronization of farming activities within the scheme. • Consider providing potable water within the scheme areas for project beneficiaries	Lateral leaders	
Impact on Public health and Safety	Land, air, water, workers, farmers, public	• Control the proliferation of aquatic weeds, which harbour disease vectors in the dam, irrigation canals and night storage reservoirs, by mechanical cutting and also explore the possibility of biological control of the weeds. • Ensure free flows in the canals and laterals, as well as prevent flooding in the fields through careful stewardship of water flows. • Provide and enforce the use of separate labelled bins for the collection and disposal of used agrochemical containers (after they are triple-washed and punctured). • Collaborate with NGOs in the area such ACDI/VOCA and IFDC, as well as the District Department of Agriculture to carry out periodic awareness creation activities to educate farmers on the perils of reuse of agrochemical containers as well as train them in the proper disposal methods for these. Punitive measures will be put in place for offenders. • Illustrative warning signage and indicators will be provided to warn about proximity to dam, fishing ponds, NSRs and canals Security personnel will ensure that immediate periphery of the dam, fishing ponds, NSRs and canals are out of bounds for all workers and especially children entering the scheme area. • As much as possible, farmers will be required to carry out rescue services along the canal and the dam, in the event the preventive measures are unable to avert drowning.	SME WUA PIU-MOFA Lateral leaders	20,000.00
Water Quality deterioration	Surface and underground water	• The use of agrochemicals including inorganic fertilizers, weedicides and pesticides will be reduced as much as possible on farms within the scheme. Where possible, mechanical weed control will be considered instead of the use of weedicides.	SME WUA Farmers Lateral leaders	10,000.00

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• The farmers will adopt efficient use of fertilizers, weedicides and pesticides to reduce release of chemicals in the fields and surface and ground water. • Management of the scheme will adopt erosion control measures such as ploughing along the contour of the land and minimum tillage to minimize erosion and sediment transport from the fields. • The provision of bunds around the plots will hold water in the plots and reduce transport of soil sediments through erosion by runoff (contour farming). • The SME and WUAs will regularly maintain the wastewater drains through de-silting and weed clearance to allow free flow of the waste water. In the lower reaches of the scheme, some meanders will be straightened and widened to accelerate the flow. • The farmers will utilize pesticide application technologies and practices designed to minimize off-site movement or runoff (e.g., low-drift nozzles, using the largest droplet size and lowest pressure that are suitable for the product). • The farmers will ensure any unused dilute pesticide that cannot be applied to the crop—along with rinse water, and out of-date or no-longer approved pesticides—would be disposed of as a hazardous waste, as per FAO International Code of Conduct on Pesticides Management.		
Waste management and sanitation issues	Land, water bodies, public	• The SME will assist farmers to explore utilizing crop residue comprising process residue (straw, husks, skins, trimmings, cobs and bran of cereals) and field residue (stalks and stubble/stems, leaves of crops) to be generated from harvesting. Potential uses to be explored include using for thatch, composting, mulching, bedding material for livestock, animal fodder, fuel for brick kilns and power generation, packaging material, etc. • Farmers will be educated on effective composting i.e. leaving some amount of crop residue in fields to be tilled into the soil and	SME/ WUAs/ Lateral leaders	6,000.00

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		recycle nutrients stored in them. Excess crop residue will be gathered, collected and temporarily heaped by the fields and may be made available to the communities for collection and use. • Farmers will be sensitized and educated against open defecation and associated public health and sanitation issues. • The various uses of rice straw will be promoted to encourage farmers and community members find alternative uses for the rice straw which could also lead to generation of additional income. • Solid waste desilted from the drains, during maintenance, will be dumped at approved dumpsites. • SME and farmers will provide adequate bins on the farm for the collection of plastic and polythene material such as drinking water sachets used by farmers and workers for proper disposal at approved dump sites. • SME and farmers will provide separate labelled bins on site for collection of agrochemical containers, foil seals, lids and fertilizer sacks for return to the suppliers for recycling/proper disposal, as per FAO International Code of Conduct on Pesticides Management. Empty agrochemical bottles / containers will be triple-washed and punctured prior to being stored in the separate labelled bins for returning to the suppliers. This will ensure they cannot be reused. • SME will ensure bins containing used agrochemical containers are stored safely and are secured under cover prior to their safe disposal; they will not be used for other purposes. • The SME will be contractually required to prepare a pesticide waste disposal plan before it commences operations on the scheme.		

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		<u>Toilet facilities</u> • GCAP/GIDA and the SME will ensure the provision and maintenance of toilet facilities at strategic locations to serve farmers within the scheme and help avoid the incidence of open defecation and urination in the fields.		
Occupational health and safety	Farmers and workers	• The SME will educate the farmers to ensure that any pesticides used are handled, stored, disposed of, and applied according to the FAO's International Code of Conduct on Pesticide Management. • The SME and farmers will ensure that pesticides that fall under the World Health Organization's (WHO) Recommended Classification of Pesticides by Hazard Classes 1a (extremely hazardous) and 1b (highly hazardous), or Annexes A and B of the Stockholm Convention are not purchased, stored or used. • The SME will ensure all pesticides listed in WHO Hazard Class II (moderately hazardous), will be avoided unless appropriate controls established with respect to the manufacture, procurement, or distribution and/or use of these chemicals are in place. These chemicals would not be accessible to personnel without proper training, equipment, and facilities in which to handle, store, apply, and dispose of these products properly. • The SME and farmers will ensure all staff and farmers are trained on appropriate use and handling of agrochemicals. • The SME will provide selected staff and farmers with first aid training, including on accidents associated with agrochemical use, to administer first aid health care in the event of any accidents. • The SME will provide appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. for its staff. Farmers will also be required to acquire and use PPEs. The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides or the application of fertilizers.	SME/ WUAs/ Lateral leaders/ farmers	10,000.00

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• The SME either directly or through a service provider will train farmers and/or WUAs on safety procedures, particularly with the operation of machines. • Farm stores at different sections of the scheme should be built to encourage farmers purchase approved chemicals and PPEs		
Pest Management	Farmers	• The SME will review and follow labelling for pesticide handling, personal protection equipment (PPE) requirements, storage, and disposal guidelines. • The SME will ensure training of farmers on EPA approved agrochemicals • The SME will adopt and implement the GCAP Pest Management Plan	SME	5,000.00
Post-harvest losses	Farmers	<u>Pest/rodent infestation and contamination of produce</u> The SME and warehouse manager(s) will ensure the adaptation of an integrated insect and rodent management system to control insects and rodent infestation. This will include: • Good housekeeping practices such as regular cleaning inside warehouses / storage rooms and proper packing of produce for ease of inspection; • Keeping the surroundings of warehouses/storage rooms clean and free from weeds; • Preventing insects and rodents from entering warehouses/storage rooms by regularly inspecting all doors, walls, windows and roof for any openings and repairing them; • Use of biological control, such as cats, to keep mice and other rodents from the warehouses/storage rooms; • Use of rodent traps; and • Chemical control/fumigation through the use of EPA approved agrochemicals to control pests and rodents.	SME/ WUAs/ Lateral leaders/ Warehouse Managers	4,000.00

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		Disease infestation and improper storage conditions • The SME and farmers will ensure harvested rice is properly dried to about 13 - 14% moisture content to make them suitable for storage. • The warehouse managers will provide proper ventilation at the warehouses and regularly inspect the roof to ensure there are no openings for leakages. This is to prevent damp conditions and rain water from getting into the warehouse. • The warehouse managers will ensure the warehouse and the surrounding environment is always kept clean and free from weeds. • Bags of rice will be properly arranged on pallets and in rows with adequate spacing to ensure ease of cleaning the warehouse and inspection of produce for rodents and insects. • New farm produce will not be mixed in storage with old produce. Both will be stored in different sections of the warehouse. • The warehouse managers will adopt "first in first out" practices to ensure that old produces are always sold first. • Any infested produce will be immediately removed from storage and destroyed to prevent infestation of other produce.		
Emergency Situation and Sustainability of the Irrigation Scheme	Land, water, workers, public	Funding • The SME will put in place adequate mechanisms to ensure the efficient collection of the irrigation service charges. • The SME will ensure that farmers are provided with improved and certified seed varieties to enhance productivity • The SME through a service provider will ensure that adequate machinery and inputs are available for farming so as to keep to their cropping pattern/plan and implementation schedules. • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue Capacity Building	SME/ WUAs/ Lateral leaders	35,000.00

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• Well trained and experienced personnel will be employed by SME to oversee the operations and maintenance of the irrigation project. • The SME either directly or through a service provider will train farmers on efficient use of resources (e.g. water) to minimize economic losses. • The SME and farmers/Water Users Associations will ensure regular maintenance of the canals to ensure the scheme always provides water at its maximum potential • The SME will ensure regular maintenance of equipment for higher efficiency. • Training will be regularly provided by the SME for farmers on improved agronomic practices. The Municipal/District Department of Agriculture and the Crop Research Institute of the Council for Scientific and Industrial Research (CSIR-CRI) will be regularly consulted by the SME and farmers for technical and agronomic advice. <u>Emergency situations</u> Fire • The SME will educate all farmers and workers on potential causes of fire at the farm such as smoking, cooking, burning, etc. • The SME, in consultation with the Ghana National Fire Service (GNFS), will ensure that all premises have fire permits (offices, warehouses and mills) and adequate fire prevention and control measure are put in place. • All farmers and workers will be trained on fire prevention and control. This will be done in collaboration with the Ghana National Fire Service (GNFS). • The SME will ensure selected farmers and workers are trained by the GNFS as fire volunteers to manage minor fires.		

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• Prepare and implement and fire emergency response plan, in collaboration with the GNFS. <u>Vandalism and Breakdown of Control Systems</u> • Water Users Association and lateral leaders will be made responsible for supervising and ensuring the equipment are not tampered with. <u>Water Availability and Dam Collapse</u> • The SME will collaborate with the WRC and the Assemblies to put in place and monitor catchment management measures on the Tono reservoir to reduce inflow of sediment as result of erosion on the banks of the river. • Lateral leaders will be mandated to close farm inlet structures in case a farmer group or WUA does not fulfil certain obligations such as cleaning and other maintenance activities, abide by regulations of their bylaws, or pay their irrigation service charges (ISCs). • The SME will collaborate with the WRC and the Assemblies to ensure the maintenance of the reservoir buffer zone. Awareness creation on the dangers of farming within the buffer zone of the reservoir will be employed in this regard. Shoreline erosion control or stabilization measures such as planting trees and Vetiver grass will be implemented. • The dam will be monitored regularly to ensure that all debris and sediment accumulation behind the dam will be promptly removed. The silt flushing gates will be opened regularly to flush out accumulated sediments and at the same time ensure sediment movement downstream of the dam. • The weepholes at the spillway will be opened to enable them relieve hydrostatic pressures occurring behind the concrete retaining walls.		

Potential Risks / Impacts	Receptor(s)	Proposed Mitigation Measures	Responsibility	Annual Cost of Implementation (GHC)
		• GIDA, as the Scheme Supervisor will liaise with the Water Resources Commission (Dam Safety Unit) and the National Disaster Management Organisation (NADMO) to prepare a comprehensive Dam Safety and Emergency Response Plan within a year of operations. The need for a dam safety assessment will be confirmed by the feasibility studies which will precede the construction works of the irrigation schemes. <u>Flooding</u> • In the lower reaches of the scheme, some meanders in the drains will be straightened and widened to accelerate the flow of water and prevent flooding. • Drainage channels, canals and laterals will be regularly desilted and cleared of weeds to allow free flow of water. • The WUAs and lateral leaders will ensure that all gates are operational. • The Emergency Response Plan to be developed before the operation of the facility will cater for the above impacts		
GRAND TOTAL				**120,000.00**

Table 5.1 Indicative Environmental and Social Monitoring Plan

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
Preparatory Phase							
1.	Anxiety from potential loss of land/livelihood /community resources	• Establishment of Grievance Mechanism • Minutes or report of awareness creation meetings • Records of complaints/grievances resolved/ unresolved	• Communities in project area • Project/Stakeholder meetings	Record keeping and analysis	Weekly	Social Safeguards Specialist (PIU)	As part of duties of Social Safeguards Specialist
Construction Phase							
1.	Loss of vegetation and impacts on flora and fauna	• Confirmation of sectional clearance of vegetation clearing • Vegetation intact at inactive sites of project area	• Project area	Observation	Daily	Contractor / Supervising Engineer / Environmental Safeguards Specialist (PIU)	*As part of duties of Contractor and Supervising Engineer
2.	Disruption of Livelihoods/change of land use/land degradation	• Ensure comprehensive register of all affected persons • Phasing of rehabilitation and construction in place • Records on affected farmers. • Records on public complaints relating to disruption of livelihoods	• Communities in project areas • Project / Stakeholder • meetings	Record keeping and analysis	Daily	Contractor/ Supervising Engineer /Social Safeguards Specialist (PIU)	*As part of duties of Contractor, Supervising Engineer and Social Safeguards Specialist

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
3.	Soil impacts and sediment transport	• Observable change in turbidity of water in canals / drains / water bodies • Observable oil sheen canals /drains / water bodies • Observation of rills / gullies	• Construction site – Canals/drains/water bodies	Observation	Daily	Contractor/ Supervising Engineer/ Environmental Safeguards Specialist (PIU)	*As part of duties of Contractor and Supervising Engineer
4.	Generation and disposal of solid waste	• Records on tree and shrub stems collected by communities • Availability and use of bins • Records on frequency and location of waste disposal site of domestic and construction waste	• Construction site	Record keeping and analysis	Monthly	Contractor/ Supervising Engineer/ Environmental Safeguards Specialist (PIU)	*As part of duties of Contractor and Supervising Engineer
5.	Occupational health & safety	• Workers' awareness of Contractor's health and safety policy • Availability and proper use of PPEs • Availability and proper use of warning signs • Availability of first aid kit • Adherence to health and safety procedures	• Construction site	Health & Safety records, audit and review	Daily	Contractor/ Supervising Engineer/ Environmental Safeguards Specialist (PIU)	*As part of duties of Contractor and Supervising Engineer

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Records on frequency, type and source of illness/accident/injury • Records on non-compliances					
6.	Traffic Safety Issues	• Change in condition of roads to project site • Availability and use of diversion /road signs or trained persons directing traffic. • Accident occurrence involving truck drivers • Frequency of truck breakdowns along road • Records of parking at unauthorized places	• Access roads to project sites / community roads	Records of road repairs and maintenance Traffic records Audit and review	Daily	Contractor/ Supervising Engineer/ Environmental Safeguards Specialist (PIU)/ Social Safeguards Specialist (PIU)	*As part of duties of Contractor and Construction Supervisor
7.	Public health & Sanitation issues	• HIV/AIDS awareness creation seminars and educational programmes for all workers and the surrounding • Availability and use of warning signs and cautionary tapes around excavations and other dangerous areas	• Construction site • Access roads and junctions to • construction site	Health, safety and traffic records; Audit and review	Daily	Contractor/ Supervising Engineer/ Environmental Safeguards Specialist (PIU)	*As part of duties of Contractor, Supervising Engineer

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Availability of bins and record of frequency of dislodgement • Records on frequency and type of incident/accidents involving public • Availability of Masks and social distancing where applicable					
8.	Change in socio-cultural characteristics	• Records on community sensitization programmes • Records on public complaints relating to nonconformity to societal norms by workers and migrants	• Communities in the project area • Project/Stakeholder meetings • District Health Centre	Record keeping and analysis	Weekly	Contractor/ Supervising Engineer / Social Safeguards Specialist (PIU)	*As part of duties of Contractor, Supervising Engineer and Safeguards Specialist
9	SEA/SH	• Through strict implementation of the ESMP and C-ESMP	• Farms • Communities in the project areas	Record keeping and analysis	Daily	Contractor/ Supervising Engineer/ Social & Environmental Safeguards Specialists (PIU)	*As part of duties of Contractor, Supervising Engineer and Safeguards Specialists
10.	Surface water and groundwater	• Observable change in turbidity of water in canals/ drains/ NSR/ dam/ fish ponds	• Canals/drains/water bodies and boreholes	Observation Water quality monitoring	Daily Semi annually	Contractor/ Supervising Engineer/ Environmental	*As part of duties of Contractor, Supervising Engineer and

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Observable oil sheen in canals/ drains/ NSR/ dam/ fish ponds • Change in ground and surface water quality				Safeguards Specialist (PIU)	Safeguards Specialist
11.	Public complaints/ grievances	• Type and nature of complaints and concerns; Complaint records (Record of grievance and number resolved/ unresolved) • Management and Stakeholder Meetings	• Communities in the project areas • Project/ Stakeholder meetings	Record keeping and analysis	Weekly	Contractor/ Supervising Engineer/ Social Safeguards Specialist (PIU)	*As part of duties of Contractor, Supervising Engineer and Safeguards Specialist
Irrigation Scheme Operations and Maintenance Phase Impacts							
1.	Soil degradation	• Results of soil test (Texture; pH; organic carbon; total nitrogen; available phosphorus; available potassium; exchangeable cations like Ca, Mg, Na, K; CEC) • Record of effectiveness of integrated weed and pest management practices implemented • Record of type and quantity of agrochemical used	• Farms	United States Department of Agriculture (USDA) Classification)	Onset of project and subsequently biennially	Soil Scientist/ Environmental, Health, Safety & Security Officer (EHSSO)/ SS	

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
2.	Impact from water abstraction	• Record of water abstraction level • Automatic and manual gate flow control equipment operational • Upland rice varieties used for upland areas • Cropping pattern adhered to	• Project office/main canals/ laterals	Scheme Operation Centre (SOC)/ Master Control Centre (MCC)	Daily	Scheme Supervisor/ WUAs Management Committee/ Lateral leaders	*as part of job functions of EHSSO and Scheme Supervisor
3.	Impacts on Public Health and Safety	• Health records (type, frequency and causes of diseases/illnesses) • Absence of aquatic weeds from dam, canals, NSRs, drains • Record of aquatic weeds clearing • Illustrative warning signage and indicators provided to warn about proximity to dam, • fishing ponds, NSRs and canals • Security in place near water bodies	Project areas District Health Centre Project/Stakeholder meetings	Record keeping and analysis	Daily	EHSSO/SS	*as part of job functions of EHSSO and Scheme Supervisor
4.	Water quality deterioration	<u>Surface water quality</u> • Physicochemical parameters • Bacteriological parameters	• Upstream and downstream of project sites • Surrounding communities	American Water Works Association (AWWA), American Public Health Association (APHA),	Biannually (Major and minor season)	Environmental Consultant / EHSSO / SS	50,000

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Pesticide residue parameters <u>Groundwater quality</u> pH, conductivity, TDS, chloride, iron, nitrate, fecal and total coliforms, phosphate, pesticides residues, fluorides, heavy metals (lead, arsenic, manganese, cadmium, mercury, etc.), pesticide loads		Water Environment Federation (WEF) (20 Edition)			
5.	Conflicts from water management	• Schedule of farming activities • Cropping patterns • Layout of farms	Scheme area	Record Keeping and Inspection	Cropping seasons	Irrigation manager/SME	As part of job functions of the Scheme Supervisor
6.	Waste management and sanitation issues	• Availability and use of bins for collection of plastic and polythene material • Availability and use of separate labelled bins for agrochemical containers. • Records on disposal of plastic and polythene material (frequency and location of disposal site) • Records on agrochemical	Farms, offices and premises	Record keeping and analysis	Weekly	EHSSO/SS	As part of job functions of the EHSSO and the Scheme Supervisor

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		containers returned to suppliers (quantity, frequency, name of supplier) • Toilet facilities provided in the field for farmers					
7.	Occupational Health & Safety	• Farmers/Workers' awareness of health and safety policy • Availability and proper use of PPEs • Availability and proper use of warning signs • Availability of first aid kit • Adherence to health and safety procedures • Records on frequency, type and source of illness/accident /injury • Records on non-compliances • Records on training and awareness creation on health and safety	• Farms • Building premises (offices, warehouses, sheds, etc.)	Record keeping and analysis Observation/inspection	Daily	EHSSO/SS	*As part of job functions of EHSSO and Scheme Supervisor
8.	Pest Management	• Trials/Training on pest resistant crops	Scheme Area	Observation/inspection -Record	During the cropping season	Scheme Supervisor/ Agric	As part of job functions Scheme Supervisor

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Records on resistant crop varieties • Records of pesticide/insecticide applications and methods of application • Evidence of records for crop monitoring		keeping and analysis		Extension Officer/	
9.	Post-harvest losses	• Record of products stored • Record of quantities destroyed • Adequate ventilation provided at warehouses • Evidence that the products meet storage criteria	Warehouses/storage sheds	- Observation/inspection -Record keeping and analysis	Daily	Warehouse Manager/EHSO	*As part of job functions of EHSSO and Scheme Supervisor
10.	Emergency Situation and Sustainability of the Irrigation Scheme	• Farmers paid for irrigation service charge • Prescribed cropping pattern observed by farmers • Records of capacity building seminars and training held • Record of fumigation done • Evidence of fire equipment (smoke	Entire scheme area	Record keeping	Monthly	Scheme Supervisor/ Environmental, Health, Safety & Security Officer (EHSSO)	*As part of job functions of EHSSO and Scheme Supervisor

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		detectors, fire alarms and fire extinguishers) installed in offices, warehouse and other premises • Fire certificate from GNFS • Buffer for reservoir maintained • Emergency response plan prepared • Records on fire incidents/ accidents and investigation reports					
11.	Environmental compliance monitoring	• Quarterly returns of Monitoring Reports submitted to EPA (in line with LI 1652) • Annual Environmental Reports submitted to the EPA in line with LI 1652 • Preparation of Environmental and Social Management Plan (in line with LI 1652)	-	Analysis of monitoring reports/ Environmental Assessment Regulations, LI 1652	Semi-annually/ Quarterly	Scheme Supervisor/ Environmental, Health, Safety & Security Officer (EHSSO)	75,000
12.	Public complaints / grievances	• Type and nature of complaints and concerns;	-	Record keeping and analysis	Daily	Dispute Settlement Committee EHSSO/SS	As part of job functions of

No.	Environmental / Social Component	Monitoring Parameters/ Means of Verification	Monitoring Site	Method	Frequency	Responsibility	Cost Estimate/Year (GHC)
		• Complaint records (record of grievance and number resolved / unresolved) • Management and Stakeholder Meetings					Scheme Supervisor and EHSSO

APPENDIX 3 STAKEHOLDER ENGAGEMENT OUTCOMES

Appendix 3.1 Engagement Issues and Guides

Engagement Issues – MSA

Issues

1) Land required for setting up ground station or weather station acquisition
2) Who could be easily affected in the event of acquiring land for any of the stations?
3) How end-of-life EEE (e-waste) is current managed?
4) Quantities of end-of-life EEE (e-waste) generated?
5) How is the storage provision for the e-waste?
6) The Program is likely to increase the quantity (number and types) of the EEE for digital advisory services provision - what types of EEE are likely to be needed/supplied?
7) The increased EEE quantities (number and types) for the digital advisory services provision, would generation large quantities of end-of-life EEE (e-waste) – will land be required for storage of the WEEE?
8) What measure could be put in place to handle and manage the WEEE?

Engagement Issues – DAES

Issues

1) How much land on the average is required to set up the following industries?

Seeds production?
Fertilizers production?
Pesticides production?

2) How likely is proposed land for development be occupied by some existing users?
3) What are the most likely land use forms such lands will be under?
4) Are women likely to be among the affected land users?
5) How are watershed areas proposed for restoration likely to be occupied by some existing users?
6) What are the most likely land use forms such watershed areas will be under?
7) Are women likely to be among the affected watershed area users?
8) What land use types are likely to be affected by the grazing reserve/corridor development?
9) What is the estimated proportion of the land use types (e.g. farming 60%, etc.)
10) How long and wide will the grazing reserve/corridor be?
11) How many districts is the grazing reserve/corridor likely to traverse or cross?
12) What happens to the grazing reserve/corridor in the rainy season?

Engagement Issues – CERSGIS

Issues

1) Will land have to be acquired for setting up ground stations and weather stations under the digital advisory services provision and infrastructure for agro-meteorological information to farmers (using multi-modal channels…)
2) Who (land use type) could be easily affected in the event of acquiring land for any of the stations?
3) How end-of-life EEE (e-waste) is current managed?
4) Quantities of end-of-life EEE (e-waste) generated?
5) How is the storage provision for the e-waste?
6) The Program is likely to increase the quantity (number and types) of the EEE for digital advisory services provision - what types of EEE are likely to be needed/supplied?
7) The increased EEE quantities (number and types) for the digital advisory services provision, would generation large quantities of end-of-life EEE (e-waste) – will land be required for storage of the WEEE?

8) What measure could be put in place to handle and manage the WEEE?

Engagement Issues – NAFCO

Issues
1) How common are accidents involving cargo trucks in transit?
2) How frequent do cargo trucks in transit breakdown?
3) How common do food produce cargo trucks get stranded due to vehicle breakdown?
4) How common do cargo trucks in transit get involved in accidents causing damage to the food produce cargo?
5) How often do food produce cargo trucks get stranded at international borders in the sub-region?
6) How is damaged or unwholesome food produce (in transit due to delayed delivery) disposed of?
7) Would land be required/acquired for the disposal of such declared unwholesome food produce?
8) How could accidents and breakdown be avoided or minimized (during transit)?

Engagement Issues – MOFA/e-AP

Issues
1) How much land on the average is required to set up the following industries? Seeds production? Fertilizers production? Pesticides production? Veterinary products manufacture?
2) Where will such factories/industries be set up for each of them – e.g. peri-urban, remote, industrial areas, etc.)
3) Can the promotion and supply of agricultural inputs (seeds, fertilizers, pesticides, veterinary products, and technology support) with ready market for food produce and guaranteed pricing regime enhance productivity and agriculture generation to the point where people would convert – a. Forest and woodland areas into agricultural fields? b. Tree crop plantations (e.g. Cocoa, Rubber, etc.) into cash/food crop fields?
4) Would such a situation have consequences for Climate Change?
5) How could the situation be avoided to prevent Climate Change impact (if it is true)?
6) Would converting forest and woodland areas to agricultural fields involve land acquisition and displacement of other land users?

Engagement Issues – UENR

Issues
1) Will land have to be acquired for setting up ground stations and weather stations under the digital advisory services provision and infrastructure for agro-meteorological information to farmers (using multi-modal channels)
2) Who (land use type) could be easily affected in the event of acquiring land for any of the stations?
3) How end-of-life EEE (e-waste) is current managed?
4) Quantities of end-of-life EEE (e-waste) generated?
5) How is the storage provision for the e-waste?
6) The Program is likely to increase the quantity (number and types) of the EEE for digital advisory services provision - what types of EEE are likely to be needed/supplied?
7) The increased EEE quantities (number and types) for the digital advisory services provision, would generation large quantities of end-of-life EEE (e-waste) – will land be required for storage of the WEEE?
8) What measure could be put in place to handle and manage the WEEE?

Engagement Issues – GIDA

Issues
1) Average land area for each of the irrigation projects
2) What is the likely land use types in these areas?
3) Will the rehabilitation of the 8 small irrigation dams likely to displace people?
4) How many people could on the average be displaced?
5) What is the estimated land area likely to be affected on the average?
6) For the reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) are there any existing users/dependents on the scheme?
7) How many people (on the average) depend on the scheme currently?
8) What is their level of productivity on the irrigation schemes (average income)?
9) What role does the Agency play in irrigation projects?
10) Who is responsible for selecting the locations for irrigation projects?
11) Average land area for each of the irrigation projects?
12) What is the likely land use types in these areas?
13) What is the population in the area likely to be affected?
14) Will the rehabilitation of the 8 small irrigation dams likely to displace people?
15) For the reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) are there any existing users/dependents on the scheme?
16) For the reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) are there any existing users/dependents on the scheme?
17) How are electronic waste going to be handled during the operation phase?
18) Capacity to participate in environmental impact assessment

Engagement Issues – WRC

Issues
1) Average land area for each of the irrigation projects
2) What is the likely land use types in these areas?
3) Will the rehabilitation of the 8 small irrigation dams likely to displace people?
4) How many people could on the average be displaced?
5) What is the estimated land area likely to be affected on the average?
6) For the reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) are there any existing users/dependents on the scheme?
7) How many people (on the average) depend on the scheme currently?
8) What is their level of productivity on the irrigation schemes (average income)?

Engagement Issues – IESS

Issues
1) Current challenges of the Volta Basin Area
2) E&S issues associated with irrigation, aquaculture and other activities under the program
3) Mitigation/recommendation
4) Average land take by irrigations projects
5) Typical land use of areas along the Volta for irrigation

Engagement Issues – FRI

Issues
1) Main E&S issues related to our activities
2) Best practices being utilized to manage waste

Engagement Issues – WIAD

Issues
1) Possible Gender Discrimination from Introduction of New Technology
2) Gender Based Violence and other forms of Abuse Within the Value Chain
3) Remedies for Gender Based Violence and Other Forms of Abuse
4) Other Occupation Health Issues Faced by Women
5) Unfair Treatment During Land Acquisition
6) Forced Labour

Engagement Issues – NDA

Issues
1) How much land on the average is required to set up the following industries? Seeds production? Fertilizers production? Pesticides production? Veterinary products manufacture?
2) Where will such factories/industries be set up for each of them – e.g. peri-urban, remote, industrial areas, etc.)
3) How likely is proposed land for development be occupied by some existing users?
4) Are women likely to be among the affected land users?
5) How are watershed areas proposed for restoration likely to be occupied by some existing users?
6) What are the most likely land use forms such watershed areas will be under?
7) Are women likely to be among the affected watershed area users?
8) What land use types are likely to be affected by the grazing reserve/corridor development?
9) What is the estimated proportion of the land use types (e.g. farming 60%, etc.)
10) How long and wide will the grazing reserve/corridor be?
11) How many districts is the grazing reserve/corridor likely to traverse or cross?
12) What happens to the grazing reserve/corridor in the rainy season?

Engagement Issues – EPA

Issues
1) Key E&S Issues Experience in Similar Past Programmes
2) Some Interventions/ Mitigations Recommended in Past Programmes
3) Roles the EPA Has Played in Similar Programmes
4) Can the promotion and supply of agricultural inputs (seeds, fertilizers, pesticides, veterinary products, and technology support) with ready market for food produce and guaranteed pricing regime enhance productivity and agriculture generation to the point where people would convert – a. Forest and woodland areas into agricultural fields? b. Tree crop plantations (e.g. Cocoa, Rubber, etc.) into cash/food crop fields?
5) Would such a situation have consequences for Climate Change?
6) How could the situation be avoided to prevent Climate Change impact (if it is true)?
7) Would converting forest and woodland areas to agricultural fields involve land acquisition and displacement of other land users?
8) Will land have to be acquired for setting up ground stations and weather stations under the digital advisory services provision and infrastructure for agro-meteorological information to farmers (using multi-modal channels…)
9) Who (land use type) could be easily affected in the event of acquiring land for any of the stations?
10) How end-of-life EEE (e-waste) is current managed?

11) Quantities of end-of-life EEE (e-waste) generated?
12) How is the storage provision for the e-waste?
13) The Program is likely to increase the quantity (number and types) of the EEE for digital advisory services provision - what types of EEE are likely to be needed/supplied?
14) The increased EEE quantities (number and types) for the digital advisory services provision, would generation large quantities of end-of-life EEE (e-waste) – will land be required for storage of the WEEE?
15) What measure could be put in place to handle and manage the WEEE?
16) What land use types are likely to be affected by the grazing reserve/corridor development?
17) What is the estimated proportion of the land use types (e.g. farming 60%, etc.)
18) How long and wide will the grazing reserve/corridor be?
19) How many districts is the grazing reserve/corridor likely to traverse or cross?
20) Which districts are these?
21) What happens to the grazing reserve/corridor in the rainy season?
22) Average land area for each of the irrigation projects
23) What is the likely land use types in these areas?
24) What is the estimated proportion of the land use types (e.g. farming 60%, etc.)
25) What is the population in the area likely to be affected?
26) What proportion of this population is likely to be women?
27) Will the rehabilitation of the 8 small irrigation dams likely to displace people?
28) How many people could on the average be displaced?
29) What is the estimated land area likely to be affected on the average?
30) For the reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) are there any existing users/dependents on the scheme?
31) How many people (on the average) depend on the scheme currently?
32) What is their level of productivity on the irrigation schemes (average income)?

Engagement Issues – WRI

Issues
1) E&S issues related to integrated aquaculture and agriculture system
2) Negative impact of cage aquaculture
3) Recommendation/mitigations for conflict with local fishermen
4) Land-take issues in integrated aquaculture and agriculture system

Engagement Issues – APD

Issues
1) What land use types are likely to be affected by the grazing reserve/corridor development?
2) What is the estimated proportion of the land use types (e.g. farming 60%, etc.)
3) How long and wide will the grazing reserve/corridor be?
4) How many districts is the grazing reserve/corridor likely to traverse or cross?
5) Which districts are these?
6) What happens to the grazing reserve/corridor in the rainy season?

Engagement Issues – DCS

Issues
1) How much land on the average is required to set up the following industries? Seeds production?

Fertilizers production? Pesticides production?
2) Can the promotion and supply of agricultural inputs (seeds, fertilizers, pesticides, veterinary products, and technology support) with ready market for food produce and guaranteed pricing regime enhance productivity and agriculture generation to the point where people would convert – Forest and woodland areas into agricultural fields? Tree crop plantations (e.g. Cocoa, Rubber, etc.) into cash/food crop fields?
3) Would such a situation have consequences for Climate Change?
4) How could the situation be avoided to prevent Climate Change impact (if it is true)?
5) Impact of COVID on Production
6) Activities involved in Rehabilitation of Stations and Associated E&S Issues
7) Other key environmental and social issues
8) Current Environmental Management System Used
9) Some Interventions/ Mitigations Recommended

Engagement Issues – PPRSD

Issues
1) What are the environmental safeguards activities you have been involved in on previous programs?
2) What are the safeguards activities that the PPRSD would undertake under the FSRP2?
3) What are some of the threats to food production?
4) How would/ has COVID impacted your operations?

Engagement Issues – Female Rice Farmers

Issues
1) What is the waste management system in place?
2) Are there any health problems associated with irrigation activities?
3) Are there any concerns on the proposed project?
4) Why are children encouraged to help parents on farms?
5) Can the potential project cause gender-based violence?

Engagement Issues – Water Users Association

Issues
1) What is the water usage in the area?
2) Are there any suggestions?
3) What is the mandate of the association?
4) What challenges do you face?

Engagement Issues – Global Agriculture Development Company

Issues
1) What is the mandate of the association?
2) How are chemical containers disposed?

Engagement Issues – Agogo Women Plantain Producers and Exporters

Issues
1) Are there existing farmers associations?
2) What is the average farm size per farmer?
3) What is the waste management plan in place?
4) Are the services of agric officers sufficient?

5) What is the state of roads leading to farms?
6) Are there security issues while transporting produce?

Engagement Issues – NADMO

Issues
1) What is the state of food security in the northern part of Ghana?
2) What factors influence food security?
3) What are the effects of the Bagre Dam spill?

Engagement Issues – Animal Production Department, livestock Breeding Station, Pong Tamale

Issues
1) What activities are undertaken by the station?
2) How are parasites controlled?
3) What is the waste management system in place?
4) Are there any security issues?
5) What is staff strength?

Engagement Issues – Water Resource Commission

Issues
1) What is the mandate of the commission?
2) Are there any environmental challenges?
3) What are the effects of the Bagre Dam spillage?
4) Are there any irrigation systems in place?
5) Are you engaged as a stakeholder for projects?
6) Are there any social issues you face?

Engagement Issues – Ejura Sheep Breeding Station

Issues
1) What is the stations mandate?
2) How is the breeding station managed?
3) How is the health of the stock managed?
4) How is waste managed in the station?
5) Are there security issues faced?
6) What is the ratio of male to female staffing on the farm?

Appendix 3.2 Stakeholder Engagement Outcomes

1. Women in Agriculture Development (WIAD)

Engagement Tool: Voice call	**Date:** 23/03/2021	**Time:** 7:00pm
Attendance: Paulina Addy (0244422712), Director		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues		

The engagement covered the following 6 key areas:

1) Possible gender discrimination from introduction of new technology
2) Gender based violence and other forms of abuse within the value chain
3) Remedies for gender-based violence and other forms of abuse
4) Other occupation health issues faced by women
5) Unfair treatment during land acquisition
6) Forced Labour

Discussions/Suggestions and Comments

1) Possible gender discrimination from introduction of new technology

Discrimination is unlikely, both women and man are engage in the food processing activities with majority being women. Where the women are illiterates, they can sometimes be cheated by the men they work with who manage their finances or rent out machinery to them.

2) Gender based violence and other forms of abuse within the value chain

Traders experience this from drivers when vehicles breakdown on the road. These women are sometimes exploited sexually or monies are extorted from them.

3) Remedies for gender-based violence and other forms of abuse

- The use of mobile money for financial transactions to prevent theft or financial exploitation and for keeping records
- Use of mobile phones to communicate their location during transits
- Use of tracking system by some trader associations so that in the event of vehicle breakdowns an emergency team can be used to follow-up on women

4) Other occupation health issues faced by women

- Snake bites in the bush when farming
- Cutlass wounds which are usually not treated
- Exposure to heavy smoke from oil extraction process

5) Unfair treatment during land acquisition

Women who work on their husband's family land may not receive any compensation during resettlement. Provision is usually not made for the communal benefit of some economic trees that women relay on especially in Northern Ghana

6) Forced labour

This is not an issues. As part of community development projects, the women may willing offer their services for free.

2. Environmental Protection Agency (EPA)

Engagement Tool: Voice call	**Date:** 24/03/2021	**Time:** 7:00am
Attendance: Joseph Edmond (0501301396), Director		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues		

The engagement covered the following 3 key areas:

1) Key E&S issues experience in similar past programs
2) Some interventions/ mitigations recommended
3) Roles the EPA has played in similar programs

Discussions/Suggestions and Comments

1) Key E&S issues experience in similar past programs

- Mismanaged pesticides by farmers
- Disposal of chemical containers into the environment
- Excessive abstraction of water for irrigation causing a challenge on the ecosystem of an area
- Washing sprayers directly into water bodies
- Disposal challengers for asbestos from rehabilitation of old training centres
- Disposal challengers for hazardous and lab waste from laboratories that were built
- Cumulative impact of several farming operations within an area

2) Some interventions/ mitigations recommended in past programs

- Developing comprehensive waste management plans
- Performing a proper environmental assessment so all possible impacts and risks are known
- Use of an incinerator for Lab waste
- Sensitization of farmers on consequences of their actions on the environment and their health

3) Roles the EPA has played in similar programs

- Building capacity on proper use of pesticides, weedicides etc.
- Sensitization of farmers and other personnel in the value chain on effects of some negative activities on the environment
- Screening farms to determine the level of assessment required
- A specialized registration and screening system can be developed in collaboration with the EPA so that all projects under the program can be fast-tracked, so they don't go through a long process

3. Centre for Remote Sensing & Geographic Information Services (CERSGIS)

Engagement Tool: Virtual meeting	**Date:** 24/03/2021	**Time:** 10:00am
Attendance: Mr. Foster Mensah (0243352468), Executive Director	**Consultant Team:** Kojo Amoyaw-Osei	

Engagement Issues

The engagement covered the following 4 key areas:

1) Type of EEE that would be procured
2) How end-of-life EEE is currently managed
3) Land required for activities under the program
4) Quantities of end-of-life EEE generated

Discussions/Suggestions and Comments

1) Type of EEE that would be procured
1 – Printer for printing maps 5 – GPS receivers 10 – Computers (workstations)
2) How end-of-life EEE is currently managed
They are kept in a storeroom and dumped or donated to schools
3) Land required for activities under the program
Our existing facility would be used so there would be no land acquired
4) Quantities of end-of-life EEE generated
Very little e-waste is generated because of how well they are maintained

4. Directorate of Crop Services (DCS)

Engagement Tool: Voice call	**Date:** 24/03/2021	**Time:** 12:00noon
Attendance: Dr. Solomon Gyan Ansah (0208133029), Head of Seed Unit		**Consultant Team:** Kojo Amoyaw-Osei

Engagement Issues

The engagement covered the following 6 key areas:

1) Activities involved in rehabilitation of stations and associated E&S issues
2) Other Key E&S issues
3) Current environmental management system used
4) Some interventions/ mitigations recommended
5) Impact of COVID on production
6) Child labour issues

Discussions/Suggestions and Comments

1) Activities involved in rehabilitation of stations and associated E&S issues

Lands have already been acquired with all the necessary facilities procured. Nonetheless, there will be some refurbishment (painting, woodwork, changing old installations) since the facilities have not been in use for some period of time

2) Other Key E&S issues

Use of pesticides by farmers
Land preparation activities by farmers causing erosion

3) Current environmental management system used

We use only an Integrated Pest Management System (IPM) to manage and control pest since our environmental impact is limited. For the farmers on the on the other hand, pesticides use could pose a risk to nearby water bodies if pesticides are not managed properly. Waste generation is also not an issue during production, but for those involved in the processing it is a major issue.

4) Some interventions/ mitigations recommended

Training and monitoring on the use of pesticides

Training farms in land preparation activities to prevent erosion Encourage organic farming Training farmers on how to use tractors by Agricultural Engineering Services Directorate
5) Impact of COVID on production Covid affecting the implementation of the Planting for Food and Jobs during the lockdown as seeds were not able to get to the farmers on time. Some farmers were also afraid to go to their farms
6) Child labour issues Child labour is not a major issue except for cocoa growing areas, nonetheless the provision of appropriate equipment like weeders which are not too sophisticated to use can help prevent the situation of parents using their children as labour since a lot more work can be done by fewer people using these farming equipment.

5. Meteorological Services Authority (MSA)

Engagement Tool: Virtual meeting	**Date:** 25/03/2021	**Time:** 3:00 pm
Attendance: Francisca Martey (0244130093), Deputy Director, Research and Applied Meteorology		**Consultant Team:** Kwakye Kwabena Mamphey
Engagement Issues The engagement covered the following 4 key areas: 1) Land required for setting up ground station or weather station acquisition 2) Likelihood of resettlement when acquiring land for stations 3) Current management practice for end-of-life EEE 4) Quantities of end-of-life EEE generated		
Discussions/Suggestions and Comments		
1) Land required for setting up ground station or weather station acquisition Land for setting up stations are mostly acquired from chiefs.		
2) Likelihood of resettlement when acquiring land for stations These stations usually require a smaller area and will not affect anyone when the land is acquired.		
3) Current management practice for end-of-life EEE E-waste from all meteo stations is transported to the head office in Accra where they are later auctioned.		
4) Quantities of end-of-life EEE generated The equipment used are regularly maintained preventing frequent breakdown. Just a few e-waste is generated yearly.		

6. National Food Buffer Stock Company (NAFCO)

Engagement Tool: Voice call	**Date:** 24/03/2021	**Time:** 11:30am
Attendance:		**Consultant Team:**

Emmanuel J.K. Arthur (0244669709), Senior Manager – Corporate Affairs	Kojo Amoyaw-Osei

Engagement Issues

The engagement covered the following 7 key areas:

1) Land acquisition for expansion of storage facilities
2) Challenges faced by the company
3) Food haulage truck accidents
4) Measures to prevent robbery attacks
5) Breakdown of trucks in transit
6) Likelihood of food becoming unwholesome in transit
7) Disposal of expired food

Discussions/Suggestions and Comments

1) Land acquisition for expansion of storage facilities

The government, under the 1 district 1 warehouse program has promised to handover some of these warehouses so they can be used as storage facilities. We are supposed to take over the assets of Ghana Food Distribution so when that happens, we would have access to their warehouses. Some of these warehouses have been encroached by churches and other businesses so there might be a challenge getting control of all these properties. If all these are not enough then we would have to look for land and purchase especially in Kumasi where we would want to have enough storage in place to cater for the whole region.

2) Challenges faced by the company

Procurement of refrigerators and other equipment so we can store perishable goods

3) Food haulage truck accidents

These rarely happen as these truck drivers are very experienced. But there are other incidences (3 last year) like attacks from armed man. The likely areas are Northern, Savannah and Upper West.

4) Measures to prevent robbery attacks

- The use of drones to deliver food could be exploring even though I am assuming food might be a bit heavier compared to medicine.
- Strategic siting of storage facilities to reduce travel time of delivery trucks. Like the STC or commercial buses we could explore the use of armed police officer to accompany the trucks

5) Breakdown of trucks in transit

Trucks break down but this is not often. The delivery services are outsourced to third party. Trucks from other countries like Mali and Burkina Faso don't breakdown when they enter the country to pick up food because they are in very good shape. It is standard operating procedure for transport companies to arrange for vehicles that go out to pick food in certain quantities to have another vehicle on stand-by in case of a breakdown so it can be dispatched to finish the trip. We have not had a situation where food has gone bad due to a vehicular accident.

6) Likelihood of food becoming unwholesome in transit

The food is transported with the expiry date and shelf life in mind, so this does not happen. We also cover them well especially grains like rice to protect them from the weather elements

7) Disposal of expired food

These are destroyed by crushing and incineration in collaboration with the Food and Drugs Authority and the Ghana Standards Board so they cannot be used by anyone

7. Water Research Institute (WRI) of the Council for Scientific and Industrial Research (CSIR)

Engagement Tool: Virtual meeting	**Date:** 25/03/2021	**Time:** 9:30am
Attendance: Dr. Ruby Asmah (0205424161), Head of Department		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues The engagement covered the following 4 key areas: 1) E&S issues related to integrated aquaculture and agriculture system 2) Land-take issues in integrated aquaculture and agriculture system 3) Negative impact of cage aquaculture 4) Recommendation/mitigations for conflict with local fishermen		
Discussions/Suggestions and Comments		
1) E&S issues related to integrated aquaculture and agriculture system E&S issues are significantly reduced for instance, when rice farming and fish cultivation is done together the waste from the fish enrich the water and soil for the rice plant. The fish can also feed on some of the insects that can affect the rice. There is a government policy in place which directs that 5% of all irrigated land or irrigation systems should be dedicated to aquaculture but this has not been enforced. This system also improves water use since water from one system is reused in the other system. Fertilizer use is also reduced because of the nutrient rich water from the aquaculture system feed to crop farms.		
2) Land-take issues in integrated aquaculture and agriculture system Usually, additional land is not required		
3) Negative impact of cage aquaculture Conflict with existing fishermen because these fishermen may not have access to an area where they ones fished. For large commercial cage aquaculture, because of the feed put in the water, it attracts the fish from the wild who gather around the cages but fishermen in the area would not be allowed to catch. This might not apply to the program since this is meant for the community and is not for large commercial purpose		
4) Recommendation/mitigations for conflict with local fishermen The fear of the farmers is that, when fishermen are allowed close to the cages, they will throw their nets into the cages to steal their fish. This situation has been managed with controlled catch, were fishermen are given a particular time to come close to the cage to fish but under supervision.		

8. Northern Development Authority (NDA)

Engagement Tool: Voice call	**Date:** 24/03/2021	**Time:** 3:00pm
Attendance: Dr Emmanuel Abeere-Inga (0548314461), Director, Infrastructure, Land and Natural Resources		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues The engagement covered the following 3 key areas:		

1) Sensitive areas to consider under the program

2) The role the NDA will play in protecting these sites

3) Likelihood of relocation of farms or settlements

Discussions/Suggestions and Comments

1) Sensitive areas to consider under the program

We have marked out these areas in a map through a survey and would be happy to share with you

2) The role the NDA will play in protecting these sites

We will be involved in the monitoring of the sites to ensure that no development takes place there

3) Likelihood of relocation of farms or settlements

Within our area of jurisdiction, no intervention would require relocation of settlements or farms

9. Ghana Irrigation Development Authority (GIDA)

Engagement Tool: Voice Call	**Date:** 25/03/2021	**Time:** 1:30pm
Attendance: Ing. Richard Boateng (0244662243)		**Consultant Team:** Kwakye Kwabena Mamphey

Engagement Issues

The engagement covered the following 10 key areas:

1) Role of the Agency in irrigation projects
2) Responsibility for selecting the locations for irrigation projects
3) Average land area of irrigation projects
4) Likely land use for potential irrigation sites
5) Population in an area likely to be affected by irrigation project
6) Displacement of people from rehabilitation of the 8 small irrigation dams
7) Existing users/dependents of the 3 irrigation schemes
8) Effects of reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) on existing users/dependents
9) Electronic waste management during operation phase
10) Capacity to participate in environmental impact assessment

Discussions/Suggestions and Comments

1) Role of the Agency in irrigation projects

The Agency has a project development department that conducts survey and mapping for the project to design the irrigation system taking into consideration the topography and hydrology. We also model the project and give the cost the project and prepare a BOQ for the project. It also monitors and supervise construction of irrigation projects.

2) Responsibility for selecting the locations for irrigation projects

GIDA is responsible for selecting locations for irrigation projects. The selected areas are located in the Volta, Upper East, Ashanti, Savannah and Brong-Ahafo Regions. Some of these sites have been studied and the

drawings for the irrigation system has been done. Some have also been constructed but do not have the irrigable areas in place.
3) Average land area of irrigation projects The dam area varies per project. For the existing projects, the existing irrigable lands are 100 ha or more. A hectare is allocated to each farm.
4) Likely land use for potential irrigation sites Some of the lands are being used as farms. Most of the lands in the proposed areas belong to the chiefs and families. Due to the benefits the dam, the lands in Northern Region are going to be given out for free for the project.
5) Population in an area likely to be affected by irrigation project Some dams have already been constructed but the irrigable areas have not yet been developed. For such areas, detailed studies will have to be conducted to determine whether the project will affect some farms or individuals when the irrigable areas are constructed.
6) Displacement of people from rehabilitation of the 8 small irrigation dams Currently, some of the reservoirs have their irrigable systems developed and there has been not been any displacement. The reservoirs with their irrigable systems yet to be developed will require a detailed study to identify if it will cause displacement of properties or persons.
7) Effects of reclamation of the 3 irrigation schemes (Wheta, Tanoso and Techiman) on existing users/dependents The increase of the height of the dams may affect some nearby communities and farm ways due to the increase in the throw back of the reservoir. It is not yet known if the height of these dams will be increased or not.
8) ***Existing users/dependents of the 3 irrigation schemes*** Wheta, and Techiman irrigation schemes are currently in operation. Tanoso irrigation scheme is not operating fully due to some technical challenges.
9) Electronic waste management during the operation phase Electronic waste generated will be transported to the head-office storehouse where all electronic waste from all irrigation facilities is kept and later auctioned.
10) Capacity to participate in environmental impact assessment The institution partakes in environmental impact assessment for irrigation projects. It also has a department that prepare environmental management plans for irrigations projects.

10. Food Research Institute (FRI) of the Council for Scientific & Industrial research (CSIR)

Engagement Tool: Voice call	**Date:** 24/03/2021	**Time:** 4:20pm
Attendance: Prof. Charles Tortoe (0243241801), Ag. Director		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues The engagement covered the following 2 key areas: 1) Main E&S issues related to our activities 2) Best practices being utilized to manage waste		

Discussions/Suggestions and Comments
1) Main E&S issues related to our activities • Managing the waste from the processing of maize, rice and cassava • Effluent from the ethanol production from cassava and other processing activities • Waste from packaging
2) Best practices being utilized to manage waste • Milling husk and spreading on the farms as manure • Using maize husk as packaging for food e.g., kenkey • Harvest starch out of the effluent from cassava processing and recycling the left over water • Planning the procurement of packaging material so that there is no waste

11.Institute of Environment & Sanitation Studies (IESS)

Engagement Tool: Voice call	**Date:** 25/03/2021	**Time:** 8:00am
Attendance: Dr. Benjamin Ofori (0208134292), Senior Research Fellow		**Consultant Team:** Kojo Amoyaw-Osei
Engagement Issues The engagement covered the following 5 key areas: 1) Current challenges of the Volta Basin Area 2) E&S issues associated with irrigation, aquaculture and other activities under the program 3) Mitigation/recommendation 4) Average land take by irrigations projects 5) Typical land use of areas along the Volta for irrigation		
Discussions/Suggestions and Comments		
1) Current challenges of the Volta Basin Area Monitoring of the buffer zone has been difficult in the past Emergence of market centres along the lake Climate changing affecting the raining seasons		
2) E&S issues associated with irrigation, aquaculture and other activities under the program Widespread application of agrochemicals Encroachment into the Volta Lake buffer zone Siltation is also a potential issue with the increase in development along the lake		
3) Mitigation/recommendation Encourage drawing of water onto farms which will be about 50-100m away from the buffer zone so that farms don't situate their farms at the banks of the lake		
4) Average land take by irrigations projects That will be difficult to say. It will depend largely on the amount of water storage		

5) Typical land use of areas along the Volta for irrigation

Southern area – farming (pepper, onion & watermelon)
Middle belt – farming (yams, maize, beans & groundnut)
Huge portions are unused

12. Directorate of Agricultural Extension Services (DAES)

Engagement Tool: Virtual Meeting	**Date:** 25/03/2021	**Time:** 11:00am
Attendance: Mr. Paul Siameh (0244641260), Director Shaibu Muniru – M&E Officer	**Consultant Team:** Kojo Amoyaw-Osei	

Engagement Issues

The engagement covered the following 4 key areas:

1) E&S issues expansion of farms and other services under the program
2) Child labour and issues affecting women
3) Role of extension services
4) Effects of COVID on the program

Discussions/Suggestions and Comments

1) E&S issues expansion of farms and other services under the program

- For large scale poultry, effective disposal of droppings. If not disposed of properly can end up in water bodies and cause eutrophication.
- For construction of the irrigation dam, earth material or gravel maybe transported from another community and this could change the environment or topography of that area. These dug holes are not refilled, and provision is not made to revegetate those areas
- Siting of irrigation dams without proper consultations with the community
- Protection of the catchment area of an irrigation dam especially for small dams. Legally secure catchment area to prevent farmers from farming there and also to prevent siltation
- Applying agrochemical and other chemicals without using PPE

2) Child labour and issues affecting women

Child labour issues have always been prominent in the agriculture sector e.g., Use of children in animal husbandry, use of children to scare off birds in rice farms. In cassava process, women and children are exposed to sharp objects like cutlasses, those who are involved in the frying are exposed to high temperature sometimes with their babies on their backs. Children are also put in dangerous situations in the fishing industry.

3) Role of extension services

On the project level assessment, it is necessary for extension officers to be consulted since they deal directly with the farmers. Their capacity will have to be built so they are in the best place possible to deliver adequate guidance to the farmers on all the new interventions as a result of the program.

4) Effects of COVID on the program

More reliance on ICT, audio and audiovisual means to reach farmers rather than the traditional means of visiting farms so the contact time with farmers can be reduced

14. Animal Production Directorate (APD)

Engagement Tool: Virtual meeting	**Date:** 25/03/2021	**Time:** 10:00am
Attendance: Edwin Bekoe (0274747847), Director, Animal Production Franklin Yeboah, Deputy Director Dr. Abdul Razak, Deputy Director		**Consultant Team** Kojo Amoyaw-Osei
Engagement Issues The engagement covered the following 7 key areas: 1) Nature of grazing reserves and mobility corridors 2) Land acquisition for grazing reserves and mobility corridors 3) Current land use of grazing areas 4) Potential conflict with Fulani herdsmen 5) E&S issues at the grazing area 6) E&S issues for poultry production 7) Mitigation/recommendation		
Discussions/Suggestions and Comments		
1) Nature of grazing reserves and mobility corridors These will be done in the following districts: Fanteakwa (Eastern), Kintampo North (Bono East), Sekyere Afram plains and Sekyere Kumawu (Ashanti) and Adaklo (Volta) The grazing reserves vary in perimeter: • Adaklo – perimeter of 9km, 11km & 47km (15,000ha in total, can house 11000 cattle for 4 months) • Fanteakwa – perimeter of 43km (5,000ha, which can house 10,000 cattle for 4 months) • Kintampo North – perimeter of 150km (100,00ha, which can provide 1000Mg of feed for 128,000 cattle) • Sekyere – perimeter of 89km (32,000ha which can house 150,000 cattle for 4 months) Mobility corridors are 100m wide with varying lengths		
2) Land acquisition for grazing reserves and mobility corridors Feasibility studies have been conducted so these lands have been demarcated. The Chief and people have been consulted and have agreed for the project to take place. Compensation will be arranged by government when the project gets to that stage. As much as possible the corridors will be diverted from settlement so that relocation is prevented		
3) Current land use of grazing areas Some are being used as farms and some have farm settlements		
4) Potential conflict with Fulani herdsmen		

Because of conflict between crop farmers, migrating Fulani and resident Fulani, the grazing areas are being developed so it can eliminate these clashes

5) E&S issues at the grazing area

- Dropping of cattle and small ruminants can be an issue but they can be used as manure for the soil
- Pile up of dropping at sleeping areas of the animals
- Overgrazing can be an issue if the carrying capacity of the grazing reserve is not adhered to

6) E&S issues for poultry production

- Cleaning of the poultry house will produce some waste water
- Administering drugs to the poultry could result in overdose
- Droppings from poultry
- Feathers and waste from the gut can sometimes be difficult to dispose

7) Mitigation/recommendation

- Have a rendering plant so that guts and other parts can be processed
- Selling of poultry manure to crop farmers
- Capacity building on handling of E&S issues

15. Plant Protection & Regulatory Services Directorate (PPRSD)

Engagement Tool: Voice call	**Date:** 29/03/2021	**Time:** 3:00pm
Attendance Eric Dzimado (0243413991), Senior Agricultural Officer		**Consultant Team** Kojo Amoyaw-Osei

Engagement Issues

The engagement covered the following 4 key areas:

1) Environmental safeguards activities we have been involved in on previous programs
2) Safeguards activities under the FSRP2
3) Treats to food production
4) Impact of Covid

Discussions/Suggestions and Comments

1) Environmental safeguards activities we have been involved in on previous programs

- Management of pest and diseases on the farms
- Providing technical backstopping and training on Integrated Pest Management System (IPMS) and safe use of pesticide Management of empty pesticides containers
- Sensitization of farmers on all these various issues
- Developing manuals on pesticides safe use
- Creating documentaries on the safe use

2) Safeguards activities under the FSRP2

- Strengthen phyto sanitary systems across the country
- Establishing early warning system for Fall Army worm
- Strengthen the seed certification value chain (increased productivity and increased yield)
- Fertilizer quality control (ensure integrity of product/quality)

3) Treats to food production

- Fall army worms is a big treat to food production
- Indiscriminate use of pesticides and storage in inappropriate places

4) Impact of COVID

- Reduction in the labour force of the office at a particular time because of the shift system being implemented. This has impacted our delivery of service to farmers.
- With the new directives from the presidency, we will also not be able to conduct train the way we used to which was gathering everyone at a particular location.

Rashad Kadiri	Program Manager	rkadiri@croplifeghana.org; 0249689725
Issue		**Response**
1. The role/mandate of your organisation in relation to agriculture and pest management in Ghana;		Croplife Ghana is an association that has 20 member companies. These companies import and distribute pesticides. Croplife promotes safe use of agro-chemicals and as part of our stewardship we run the Container Management Programme (CMP). The CMP is the management of empty pesticide containers. This programme operates in the Eastern, Western and Volta Region and is yet to be expanded to the northern part of Ghana. Cages are positioned at vantage points to collect these containers for recycling at a recycling plant. The farmers are also trained on responsible use of pesticides and how to dispose of pesticide containers. The Spray Service Provider (SSP) program is also a program run by the organisation. A criterion is used in selecting a group of people within a farming area/community who are trained to provide spraying services within their community. The training is done in collaboration with PPRSD and EPA.
2. The organisations opinion on pest management in the country;		A lot needs to be done when it comes to pest management in the country. Farmers have to be educated on the other pest management practices and trained on the safe use of pesticides and Integrated Pest Management.
3. The major environmental and social issues in relations to agriculture and pest management; and		Most farmers lack the technical know-how (measuring, calibration of the knapsack, PPE use, and application) on the use of pesticides. This leads to misapplication of pesticides on the farm affecting the crops and the farmer.

4. How the identified issues can be addressed.	More farmers and SSPs should be trained in the responsible use of pesticides.
5. Opinion on the use of technology	Technology in agriculture will help boost the agric sector in the country. A digitisation program is being run by us with over 50,000 farmers registered to receive messages and voice notes on responsible use of pesticides. The information provided includes the use of pesticides, differentiating between fake and original pesticides
6. Views about government's efforts in the area of irrigation and how this project can contribute to or sustain whatever gains have been made in this sector	The development of irrigation schemes by government is a very good initiative and the ones already developed are improving agriculture in the North. There is the need to develop more irrigation dams and the provision of necessary equipment to assist farms use these irrigation systems developed.
7. Relationship they have with both the Ministry and farmer groups, and whether they have collaborated on previous projects or assignments	Croplife works in collaboration with MoFA (PPRSD) and farmer groups for its various programs undertaken.

Apex Farmers Organisation of Ghana (APFOG)

Alhaji Nashiru	President	0243665458
Issue		**Response**
1. The role/mandate of your organisation in relation to agriculture and pest management in Ghana		• Advocate for farmer friendly policy to better the life of farmers. • Find and link members to local and international markets to get better prices for their produce. • Sensitize members on pest management
2. How many members does your organisation have?		• There are about 2000 farmers across the country registered with the organisation. • The farmers engage in various farming actives including crops and livestock in the various districts and regions of the country.
3. The organisations opinion on pest management in the country		• There should be intensive education and support in relation to integrated pest management (IPM)
4. The major environmental and social issues in relations to agriculture and pest management		• Health hazards and soil degradations • Improper use of pesticides
5. How the identified issues can be addressed.		• Proper checks on imported pesticides • Vigorous check of fake pesticides on the markets • There should be a law punishing offenders • Sensitization on safe use of pesticides to farmers
6. Opinion on the use of technology		The farmers would be very happy to use technology but more education needs to be done to enable the farmers use these technologies.

7. Views about government's efforts in the area of irrigation and how this project can contribute to or sustain whatever gains have been made in this sector	• Good work is being done in rehabilitating of old irrigation dams. • The government can look at providing ground water for communities whose dams dry up during the dry season.
8. Relationship they have with both the Ministry and farmer groups, and whether they have collaborated on previous projects or assignments	• We carry out advocacy with the involvement of the ministry
9. Comments	• The organisation would like to be part of the program

Peasant Farmers Association of Ghana (PFAG)

Charles Nyaaba	Head of Programs and Advocacy	0203035672

Issue	**Response**
1. The role/mandate of your organisation in relation to agriculture and pest management in Ghana;	• To develop beneficial programs favourable for increasing agricultural production, processing and, marketing through building and strengthening the capacities of farmers in policy advocacy and entrepreneurial skills and improve access to local, national and international markets and resources. We have about 80% of the farmers. • PFAG consists of individual farmers and farmer groups, as well as, value chain actors numbering over 1,000,055 and 1,962 farmer Based Organisations (FBOs). Membership is spread across all the ten regions of Ghana • We link up with experts to provide training for members on effective use of pesticides • Developed a manual on the use of pesticides • Support farmers with information on agronomic practices
2. The organisations opinion on pest management in the country; 3. The major environmental and social issues in relations to agriculture and pest management; and	• Because the farmers lack education, there are instances where farmers do not protect themselves with PPEs such as overall, goggles, nose mask, etc. before applying the pesticide. They end up damaging themselves. • There are instances where farmers misapply the pesticides. Vegetables like cabbage, tomatoes, pepper, etc. where they directly apply the pesticide and this is very dangerous to the health of humans. • The over application of agro-chemicals may have serious implication on our water bodies and the health of consumers and farmers. • There should be alternative means of managing pests
4. How the identified issues can be addressed.	• Conduct a nationwide training for farmers on how to apply chemicals properly. • Establishment of farmers' field schools to train farmers. There would be field where vegetables can be planted and invite farmers to observe how the chemicals are being applied properly.

	• Development of publicity materials that shows the proper application and wrong application of chemicals. It should also be broken down into infographics and make the materials available to farmers. • Use community radio stations for education on proper use of chemicals and the impacts on development, waterbodies and health • Social media such as WhatsApp can also be used in disseminating such information. • Farmers should be provided with alternative means of managing pest to reduce the impact of pesticides on the environmental and our health.
5. Opinion on the use of technology	• Using technology in farming is the way to go since the population keeps increasing requiring an increase in food production. For us to produce enough, we need to produce more food crops on the same piece of land. For us to do that we need to move away from our traditional ways of growing crops and adopting the use of technology such as proper meteo data, drones, etc. to increase crop production. • MoFA has been carrying out a program to get a data base of all farmers in the country. This program should be completed to enable MoFA in targeting the farmers to provide them with the relevant data and technology needed to improve their activities.
6. Views on government's efforts in the area of irrigation and how this project can contribute to or sustain whatever gains have been made in this sector	• Irrigation in the country is very important due to the change in rainfall pattern and the risk of having a drought is huge. Also, in the dry season, most farmers do no engage in any farming activities. • The one village one dam initiative by government was a good but most of the dams in the north dry up during the dry season. • The improvement of irrigation facilities under this Programme will be very good. • Well-constructed dams should be built this time instead of dug-outs to prevent drying up during the dry season. • The existing dams should also be desilted and proper water ways and canals must be constructed for farmer.
7. Relationship they have with both the Ministry and farmer groups, and whether they have collaborated on previous projects or assignments	• We work with MoFA on various projects. MoFA is also a partner to the association. • We are currently collaborating with MoFA to sensitive farmers on the Planting for Food and Jobs implementation for 2021. • MoFA also invites the association to partake in their activities especially during decision making
8. Comments	The reason why sustainability has always been a problem is because farmers are not involved in the implementation. Farmer associations should be involved during the implementation to be able to sensitize farms on approached being brought on board. The association will also remind farmers on things they have to do when the projects end to ensure sustainability.

	Peasant Farmers Association has regional and district focal persons who can assist the ministry in contacting the various farmers in the regions or district to enable them participate in the program.	

APPENDIX 4 CITIZEN ENGAGEMENT PLAN

Citizens, acting as individuals or groups, are important actors in development as they are the ultimate client of government, development institutions and private sector interventions in particular jurisdictions. Citizens' input and expectations for change increase accountability in public institutions and facilitate improved development outcomes. Engagement of citizens must therefore be a two-way interaction and give citizens a stake in decision-making. Consistent with the World Bank Group's Strategic Framework for Mainstreaming Citizen Engagement, the FSRP2 in engaging citizens will focus on:

- Understanding the local context;
- Mapping stakeholders;
- Making clear the engagement scope and manage expectations;
- Leveraging government support;
- Defining processes and timelines; and
- Closing the feedback loop

The FSRP2 will adhere to internationally accepted practices in engaging citizens. Particular attention will be paid to engaging communities, focus groups, CBOs and CSOs at the various locations where the program will be implemented. Regular consultations with stakeholders will be held throughout program implementation to solicit opinions from diverse groups including women, vulnerable and marginalized groups. Aided by the framework of the International Association for Public Participation, five (5) types of engagement will be carried out and it includes:

- Information – Providing the necessary details to the public to understand the goals as well as opportunities of the program.
- Consultation – Dialoguing, listening and acknowledging the expressed ideas and concerns, needs and motivations of citizens.
- Involvement – Ensuring that the ideas, concerns, motivations of citizens are directly reflected in the program activities.
- Collaboration – Using citizens to collect information, share their contributions and incorporate findings, observations, and comments into program outcomes.
- Empowerment – Providing resources, advice and assistance to citizens to improve their lot.

A tiered Grievance Mechanism and a system for documenting and reporting utilization of citizens' feedback will be instituted. Monitoring responsibilities will be assigned to communities who are empowered through simplified systems of disbursement, contracting, program documentation, and grievance handling. To promote transparency, ownership and effectiveness, the citizen engagement process will be led by competent local experts and ensure inclusion of women, vulnerable and marginalized persons, academia, Community-Based Organizations and Civil Society Organizations.

Women Engagement

In most Ghanaian communities, women play a critical role in food production and food security. However, they are rarely able to access their equal land and property rights in spite of legal provisions due to tradition and dynamics in household relations. Traditionally, land is mostly owned by males in both patrilineal and matrilineal systems. The eldest son inherits the deceased father in trust of the family thereby denying ownership of family assets by daughters. Women are mostly left with usage rights whilst the men control and make decisions on how the land should be utilized.

Society often assumes that concerns of women can be effectively addressed by their male representatives hence women are not considered as a distinct group of stakeholders. They are therefore not engaged extensively. To address this, the FSRP2 will ensure the inclusion of women in community representative bodies and gives women an opportunity to articulate their interests and preferences through a participatory process.

Grievance Mechanism (GM)

A grievance is any query, call for clarification, problems, and concerns raised by individuals or groups related to activities undertaken or processes applied by the program. Grievances can be an indication of growing stakeholder concerns and can escalate if unidentified and resolved. The management of grievances is therefore a vital component of stakeholder management in ensuring the sustainability of the program. A Grievance Mechanism (GM) is therefore a system by which queries or clarifications about an undertaking are responded to, problems that arise out of implementation are resolved and grievances are addressed efficiently and effectively. An effective and efficient GM should have multiple avenues or channels for lodging complaints, transparency, promptness and timeliness of responses and clear procedures.

A Dispute Settlement Committee will be set up to receive directly through face-to-face communication, phone calls, letters, e-mail, text messages, etc. Grievances may also be lodged through Community Liaison Officers (CLOs) and all grievances recorded in a log book (See Appendix 6 for an example of a logbook for non-SEA/SH complaints). Any grievance received from the public shall be treated confidentially and resolved in a transparent and fair manner. The process of resolving grievances shall comprise the following tiers:

1. Grievance Settlement Committee (GSC);
2. Program Manager;
3. District Assembles; and
4. Court of Law.

Many grievances are not anticipated to arise from the program implementation and any unforeseen grievances may be resolved at the second tier (Program Manager) in the worst case. The process of resolving grievances is summarized in Figure 1.

Framework to guide gender assessments and the sexual exploitation and abuse, sexual harassment (SEA/SH) Action Plan

Violent behavior towards women is rampant globally with more than one out of three women having experienced some kind of physical or sexual violence in their lives. This includes intimate partner violence such as physical, sexual and/or emotional violence. The case is no different in Ghana where an estimated 13% to 61% of every partnered women having experienced some violence from current or previous partners; strangers, teachers, schoolboys, other family members and acquaintances. Social (negative norms), economic (poor economic empowerment) and legal factors have been found to render women powerless and unable to reject inappropriate advances without facing intimidation or violence.

Risk Assessment

In appraising project-related risk of exacerbating SEA/SH, the country and/or regional context the potential risks (low, medium or high) that the project may bring should be considered carefully. Assessment must be conducted throughout project implementation by monitoring the situation, assessing the effectiveness of risk mitigation measures, and adapting them accordingly.

Projects under the FSRP2 could increase the risk of SEA/SH in different ways including:

- Influx of workers (during construction works) increasing promiscuity, sex work, human trafficking, enticement of minors, forced early marriage etc.
- Male jealousy on the part of local men on suspicion that migrant workers are receiving more attention from community women.
- Land acquisition for project purposes taking away the livelihood of women who may not necessarily receive compensation and have to depend on their male partners.

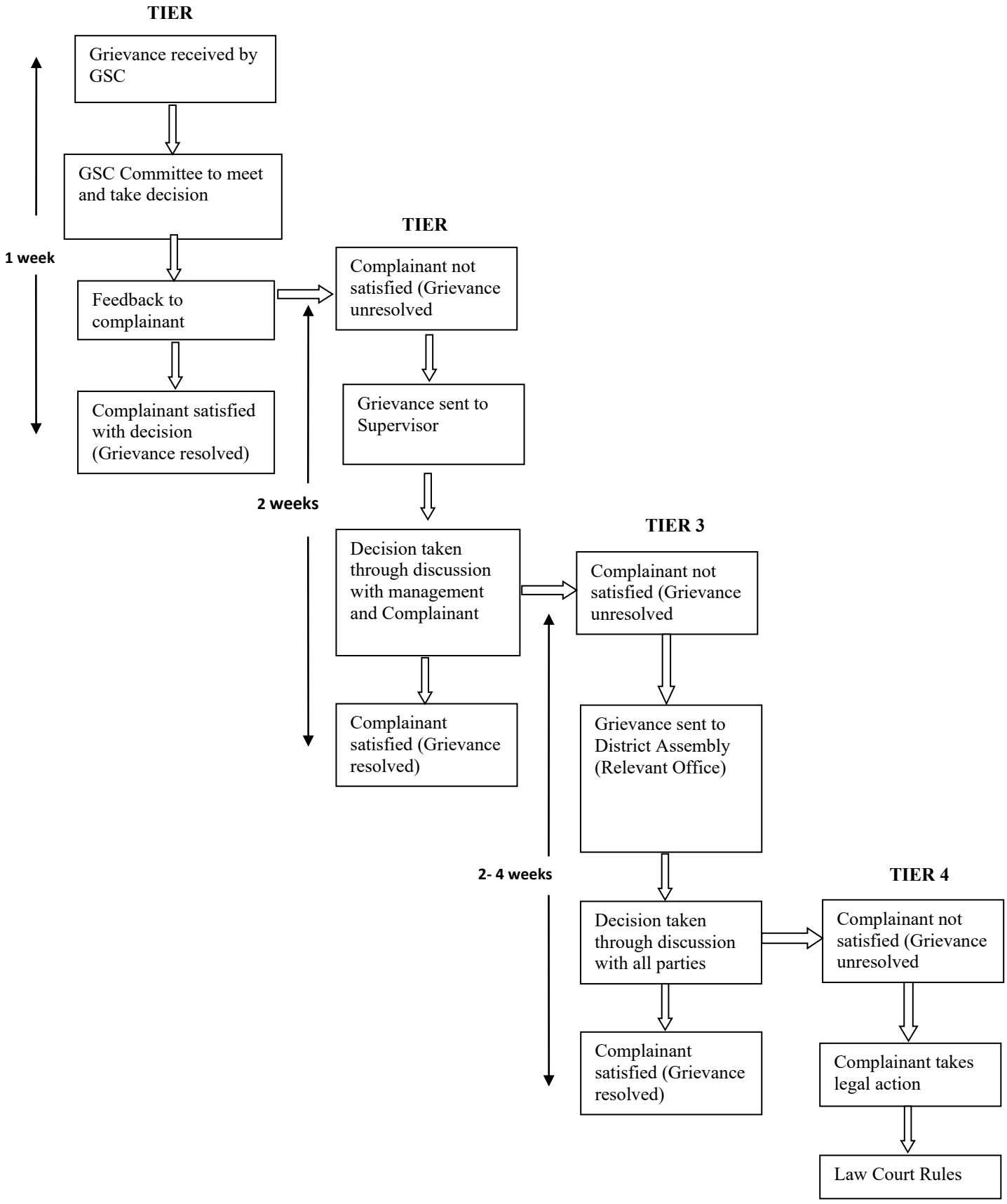

Figure 1 ***Grievance Mechanism (GM)***

Mitigation, Management and Monitoring

As prescribed by the World Bank Good Practice Note on Addressing Sexual exploitation and abuse and Sexual harassment (SEA/SH) in Investment Project Financing involving Major Civil Works (2020), mitigation measures, management and monitoring arrangements for the risks identified are presented in Table 1.

Table 1 SEA/SH Risks Management Plan

When	Action to Address SEA/SH Risks	Timing for Action	Who is Responsible for Action	Ongoing Risk Management
Identification / Appraisal	Sensitize the IA as to the importance of addressing SEA/SH on the project, and the mechanisms that will be implemented.	• Preparation. • Implementation.	• PIU.	• PIU to monitor and provide additional guidance as necessary.
	The project's social assessment to include assessment of the underlying SEA/SH risks and social situation, using the SEA/SH risk assessment tool to provide guidance and keeping to safety and ethical considerations related to GBV data collection. No prevalence data or baseline data should be collected as part of risk assessments.	• Preparation. • Implementation	• IA for social assessment and ESMP • Contractor for C-ESMP. • PIU for GBV Risk Assessment	• Ongoing review during implementation support missions. • Update project ESMP and Contractor's ESMP (C-ESMP) if risk situation changes.
	Map out GBV prevention and response actors in project adjoining communities. This should incorporate an assessment of the capabilities of the service providers to provide quality survivor centered services including SEA/SH case management, acting as a victim advocate, providing referral services to link to other services not provided by the organization itself.	• Preparation • Implementation	• IA	• Update mapping as appropriate
	Have GBV risks adequately reflected in all safeguards instruments (i.e., Project ESMP, C-ESMP)—particularly as part of the assessment in the ESA. Include the GBV mapping in these instruments.	• Preparation • Implementation (before civil works commence).	• IA for social assessment and ESMP • Contractor for C-ESMP.	• Ongoing review during implementation support missions. • Update project ESMP and Contractor's ESMP (C-ESMP) if risk situation changes.
	Develop a GBV Action plan including the Accountability and Response Framework as part of the ESMP. The contractor/consultant's response to these requirements will be required to be reflected in their C-ESMP.	• Preparation • Implementation (before civil works commence)	• IA	• Ongoing review during implementation
	Review the IA's capacity to prevent and respond to SEA/SH as part of Safeguard Preparation.	• Preparation. • Implementation.	• PIU	• Ongoing review during implementation support missions. • Update project ESMP if risk situation changes.
	As part of the project's stakeholder consultations, those affected by the project should be properly informed of GBV	• Consultations need to be	• IA	• Monitoring of implementation of Stakeholder Engagement Plan.

When	Action to Address SEA/SH Risks	Timing for Action	Who is Responsible for Action	Ongoing Risk Management
	risks and project activities to get their feedback on project design and safeguard issues. Consultations need to engage with a variety of stakeholders (political, cultural or religious leaders, health teams, local councils, social workers, women's organizations and groups working with children) and should occur at the start and continuously throughout the implementation of the project.	continuous throughout the project cycle, not just during preparation.		• Ongoing consultations, particularly when C-ESMP is updated.
	The Stakeholder Engagement Plan of the project, which will be implemented over the life of the project to keep the local communities and other stakeholders informed about the project's activities, to specifically address SEA/SH related issues.	• Consultations need to be continuous throughout the project cycle, not just during preparation.	• IA.	• Monitoring of implementation of Stakeholder Engagement Plan. • • Ongoing consultations, particularly when C-ESMP is updated.
	Make certain the availability of an effective grievance mechanism (GM) with multiple channels to initiate a complaint. It should have specific procedures for GBV including confidential reporting with safe and ethical documenting of SEA/SH cases. Parallel GM outside of the project GM may be warranted for substantial to high risk situations.	• Prior to contractor mobilizing.	• IA, but discussed and agreed upon with the PIU.	• Ongoing monitoring and reporting on GM to verify it is working as intended.
		•	•	•
	Projects which do not use loan/credit/grant proceeds to hire GBV service providers at the start of project implementation encourage Borrowers include an escalation clause in the Environmental & Social Commitment Plan (ESCP) should SEA/SH risks become apparent over the course of the project implementation.	• Preparation.	• PIU.	• PIU.
Procurement	Clearly define the GBV requirements and expectations in the bid documents.	• Procurement.	• IA.	• Review by PIU.
	Based on the project's needs, the Bank's Standard Procurement Documents (SPDs), and the IA's policies and goals, define the requirements to be included in the bidding documents for a CoC which addresses GBV.	• Procurement.	• IA.	• Review by PIU.

When	Action to Address SEA/SH Risks	Timing for Action	Who is Responsible for Action	Ongoing Risk Management
	For National Competitive Bidding (NCB) procurement, consider integrating the ICB SPD requirements for addressing GBV risks.	• Procurement.	• IA.	• IA with review by PIU.
	The procurement documents should set out clearly how adequate SEA/SH costs will be paid for in the contract. This could be, for example, by including: (i) line items in bill of quantities for clearly defined SEA/SH activities (such as preparation of relevant plans) or (ii) specified provisional sums for activities that cannot be defined in advance (such as for implementation of relevant plan/s, engaging GBV service providers, if necessary)	• Procurement.	• IA.	• Review by PIU.
	Clearly explain and define the requirements of the bidders CoC to bidders before submission of the bids.	• Procurement.	• IA.	• Review by PIU.
	Evaluate the contractor's SEA/SH response proposal in the C-ESMP and confirm prior to finalizing the contract the contractor's ability to meet the project's SEA/SH requirements	• Procurement.	• IA.	• Review by PIU.
Implementation	Review C-ESMP to verify that appropriate mitigation actions are included.	• Implementation.	• IA.	• Review by IA. • Review by PIU.
	Review that the GM receives and processes complaints to ensure that the protocols are being followed in a timely manner, referring complaints to an established mechanism to review and address SEA/SH complaints.	• Implementation.	• PIU. • IA	• Ongoing reporting. • Monitoring of complaints and their resolution.
	Codes of Conduct signed and understood Ensure requirements in CoCs are clearly understood by those signing. Have CoCs signed by all those with a physical presence at the project site. Train project-related staff on the behavior obligations under the CoCs. Disseminate CoCs (including visual illustrations) and discuss with employees and surrounding communities.	• Initiated prior to contractor mobilization and continued during implementation.	• Contractor, Consultant, IA.	• Review of SEA/SH risks during project supervision (e.g., Mid-term Review) to assess any changes in risk. • Supervision consultant reporting that CoCs are signed and that workers have been trained and understand their obligations. • Monitoring of GM for SEA/SH complaints. • Discussion at public consultations.

When	Action to Address SEA/SH Risks	Timing for Action	Who is Responsible for Action	Ongoing Risk Management
	Have project workers and local community undergo training on SEA and SH.	• Implementation.	• IA, Contractors, Consultants	• Ongoing reporting.
	Undertake regular M&E of progress on SEA/SH activities, including reassessment of risks as appropriate.	• Implementation.	• IA, Contractors, Consultants.	• Monitoring of GM. • Ongoing reporting.
	Implement appropriate project-level activities to reduce SEA/SH risks prior to civil works commencing such as: Have separate, safe and easily accessible facilities for women and men working on the site. Locker rooms and/or latrines should be located in separate areas, well-lit and include the ability to be locked from the inside. Visibly display signs around the project site (if applicable) that signal to workers and the community that the project site is an area where SEA/SH is prohibited. As appropriate, public spaces around the project grounds should be well-lit.	• Prior to works commencing.	• Contractor/ Supervision Consultant • PIU.	• Ongoing reporting. • Reviews during implementation support missions.

IA = Implementing Agency

APPENDIX 5 LABOUR MANAGEMENT PROCEDURES

This Labour Management Procedure provide an overview of the applicable national legislative and World Bank Environmental and Social Standard 2 (ESS2) provisions and how the risks and issues related to labour will be managed in the implementation of the West Africa Food Systems Resilience Programme (FSRP2). The Labour Management Plans for the individual components will in due course be prepared by the relevant contractors and will be reviewed and cleared by the Supervision consultant/PMU as appropriate.

1. OVERVIEW OF LABOUR USE ON THE PROJECT

1. The FSRP2 has five components as follows:

Component 1: Digital Advisory Services for Agriculture and Food Crisis Prevention & Management

Sub-Component 1.1 Upgrading Food Crisis Prevention & Monitoring Systems

Sub-Component 1.2 Strengthening Creation and Provision of Digital Advisory Services for Farmers

Component 2: Sustainability & Adaptive Capacity of the Food System's Productive Base

Sub-Component 2.1: Adapting and adopting Innovations and Technologies for Resilient Food Systems

Sub-Component 2.2: Strengthen food security through sustainable practices in targeted areas

Component 3: Market Integration & Trade

Sub-component 3.1: Facilitate Trade Across Key Corridors and Consolidate Food Reserve System

Sub-component 3.2: Support to Development of Strategic Value chains

Component 4: Contingent Emergency Response Component

Component 5: Project management

2. The project activities will involve three types of employment including:

(i) direct workers - the Programme Implementation Unit (PIU), who will be directly engaged on a permanent basis;
(ii) contracted workers through third parties, such as contractors for the construction and rehabilitation of sections of the KIS and KLBIP infrastructure, upgrading of three national agricultural stations as well as the rehabilitation of agricultural stations. The consultants and contractors will also employ workers related to the construction of the facilities; and
(iii) primary supply workers – who will be engaged by the construction company's primary suppliers. There will also be community workers involved in the project.

The sections below provide detailed description of the type and number to be engaged throughout the project life.

Sub-component 1.2: Strengthening Creation and Provision of Digital Advisory Services for Farmers. This sub-component aims to increase access to and use of location-specific information relevant to food security by decision makers and farmers via national extension systems through capacity building and institutional strengthening activities for hydromet and agromet service providers (public & private). This will largely rely on international and national technical specialists i.e. individual consultants or firms). However, the exact number of contracted workers over the life of the project for this specific sub-component is not yet known and is likely to fluctuate.

Sub-Component 2.2: Strengthen food security through sustainable practices in targeted areas. This activity is also expected to engage consultants and contractors in the construction aspect of the project as well as the provision of capacity building of beneficiaries for the operation and maintenance and coordination of the facilities. This sub-component is likely to involve direct workers and contracted workers including a small number of labourers and technicians to support the construction site preparation and for the upgrading of

the agricultural stations – these may be from the local workforce which will specify the exact number of workers to be engaged. – it's not yet known. Additionally, international and national technical specialists/consultants and workers from consultancies (firms). The exact number of direct workers, contracted workers and primary supply workers over the life of the project for this specific sub-component is not yet known, but a rough estimate is 100-150 workers at one time including technical consultants during the construction phase, and falling significantly after commissioning of the facilities.

Sub-component 3.1: Facilitate Trade Across Key Corridors and Consolidate Food Reserve System. The objective of this subcomponent is to support the preparation and implementation of sound regional regulations and policies to strengthen the enabling environment for an expansion of regional agricultural output and input markets. This will be achieved through support to institutions and activities that would lead to the alignment of cross border trade policies to ease trade restrictions to provide farmers and buyers access to national and regional markets. This is expected to create a number of jobs for the private sector.

Sub-component 3.2: Support to Development of Strategic Value Chains. This sub-component aims at identifying, validating, establishing and developing value chains of priority commodities/crops to ensure their integration within country and regional value chains to promote trade. Specific activities under this component will include: (i) mapping of value chain actors along selected priority commodities; (ii) nurture existing and/or support the development of operational and strategic (including local authorities) innovation platforms along selected commodity value chains to promote trade within the country and across the sub-region. This will largely involve consultants and contractors to carry out the mapping activities and development of platforms along the commodity value chains.

Component 4: Contingent Emergency Response Component. The objective of this component is to make available resource to strengthen the response capacity of the Government of Ghana (GOG) in case of emergency. This will involve the establishment of a technical committee consisting of relevant government agencies responsible for emergency crises to response to emergency cases.

Component 5: Project management. This component will provide support at implementation to MoFA in accordance with the World Bank's guidelines, including engagement of technical advisers to provide technical expertise on project performance monitoring and planning. Implementation of this component will largely rely on civil servants within the relevant Ministries, as well as international and national technical specialists/consultants (individuals and firms).

2. ASSESSMENT OF KEY POTENTIAL LABOUR RISKS

Based on project activities, the labour risks involved with the project are viewed as minimal. Most of the labour risks will be related to extended hours of work mainly of the construction and rehabilitation of facilities as well data input. The probability of the incidence of child labour or forced labour is also minimal. The project requires technical staff with skills that require experience and education, which will not be possible for children or those below the age of 18 to possess. The issues of migrant and seasonal workers, labour influx or gender-based violence do not apply. A register of all persons under the age of eighteen years employed by the project and the dates of their births will be kept in keeping with Section 60(1) of the Labour Act, 2003 of Ghana. No person under the age of eighteen years shall be employed.

The project will adopt a zero-harassment policy for all of its workers and sub-contractors. The zero-harassment policy will be part of the workers Code of Conduct developed by the project. This policy will be broadcast to all workers through various mediums and several formats. The project will provide an extra layer of supervision for young workers to ensure they are educated of their rights, the project's policies on harassment, intimidation and exploitation.

There are minimal possibilities for accidents and emergencies related to the construction. However, the project through the labour management procedures plan will ensure that all applicable occupational health and safety provisions in Section 118 of the Labour Act, 2003 and International Labour Organizations conventions are observed.

Some of the highlights specific to certain areas in in the Labour Act are listed:

Forced Labour

Section 117 interpret forced labour to means work or service that is exacted from a person under threat of a penalty and for which that person has not offered himself or herself voluntarily, but does not include

(a) labour required as a result of a sentence or order of a court;
(b) labour required of a member of a disciplined force or service as his or her duties;
(c) labour required during a period when the country is at war or in the event of an emergency or calamity that threatens life and wellbeing of the community, to the extent that the requirement of the labour is reasonably justifiable in circumstances of a situation

Section 116 highlights the prohibition of forced labour to include:

(1) A person shall not be required to perform forced labour.
(2) It is an offence for an employer to exact or cause to be exacted, or permit to be exacted, for his or her benefit forced labour from any worker.
(3) Any employer convicted of an offence under subsection (2) is liable to a fine not exceeding 250 penalty units.

Prohibition of employment of young persons in hazardous work (Section 58)

(1) A young person shall not be engaged in any type of employment or work likely to expose the person to physical or moral hazard.
(2) the Minister may, by legislative instrument, determine the type of employment that is likely to expose a young person to physical or moral hazard.
(3) An employer shall not employ a young person in an underground mine work.
(4) A person who contravenes subsection (1) or (3) commits an offence and is liable on summary conviction to a fine not exceeding 100 penalty units.

Health of young persons (Section 59)

(1) An employer shall not employ a young person on any work unless a medial practitioner has certified that the young person is in good health and is medically fit for the work.
(2) Where a person fails to comply with subsection (1) the person shall be ordered by the Minister to have the medical examination conducted.

3. BRIEF OVERVIEW OF LABOUR LEGISLATION: TERMS AND CONDITIONS

The primary law and regulations that govern employment relationships in Ghana are the Labour Act 2003 (Act 651) and the Labour Regulations. The Labour Act consolidates all laws relating to employment. The act refers to three categories of workers, namely:

- permanent workers;
- temporary workers; and
- casual workers.

Interpretation

Section 78. of the Act defines terms that are applicable in the law

- *"temporary worker" means a worker who is employed for a continuous period of not less than one month and is not a permanent worker or employed for a work that is seasonal in character;*

- *"casual worker" means a worker engaged on a work which is seasonal or intermittent and not for a continuous period of more than six months and whose remuneration is calculated on a daily basis.*

The Labour Act distinguishes between a 'contract of employment' and a 'contract for employment'. A contract of employment creates an employer-employee relationship between the parties. This affords the employer and especially the employee protection under the Labour Act. On the other hand, a contract for employment does not create an employment relationship between the parties, but rather a principal-contractor relationship. Here, the contractor is neither considered to be an employee of the principal nor entitled to benefits of employment such as social security contributions. Section 74 of the Act spell out the conditions of a contract of employment:

1. *A contract of employment of a casual worker need not be in writing.*
2. *A casual worker shall*
   (a) be given equal pay for work of equal value for each day worked in that organization;
   (b) have access to any necessary medical facility made available to the workers generally by the employer;
   (c) be entitled to be paid for overtime work by his or her employer in accordance with section 35; and
   (d) be paid full minimum remuneration for each day on which the worker attends work, whether or not the weather prevents the worker from carrying on his or her normal work and whether it is possible or not, to arrange alternative work for the worker on such a day.

On the other hand, Section 75 of the Act highlights the conditions for a temporary worker:

(1) a temporary worker who is employed by the same employer for a continuous period of six months and more shall be treated under this Part as a permanent worker.

(2) Without prejudice to the terms and conditions of employment mutually agreed to by the parties, the provisions of this Act in respect of minimum wage, hours of work, rest period, paid public holidays, night work and sick leave are applicable to a contract of employment with a temporary worker.

Salary. Wages, Allowances and Deductions

The Labour Act provides that all salary, wages and allowances are payable in cash, in addition to any non-cash remuneration.

Generally, employers are precluded from deducting any amount from the remuneration of their employees – whether it is a pecuniary penalty imposed on the employee or an interest or discount on remuneration advanced to the employee.

However, the Labour Act sets out situations in which an employer can, with the consent of the worker, legally deduct funds from their remuneration in relation to:

- provident, pension or other funds or contributions agreed to by the employee;
- a financial facility advanced by the employer to the employee or guaranteed by the employer;
- amounts paid in error or in excess of the employee's remuneration to the employee;
- membership fees or contributions to an organisation of which the employee is a member; and
- deductions for any loss suffered by the employer as a result of damage to its property under the control of the worker; however, no deduction can be made in this regard unless it is shown that the worker is fully responsible for the damage.

Family and Medical Leave

Female employees are entitled to a statutory maternity leave of 12 weeks in addition to any annual leave that they may have. This statutory leave can be enhanced by contractual agreement between the parties.

Female employees on maternity leave must be paid their full salary and other benefits while on leave. In addition, a female employee is entitled to additional leave to be determined by a medical practitioner where it is found that she has developed an ailment as a result of her pregnancy. Leave is also typically granted for bereavement in relation to close family members.

The Labour Act strictly prohibits discrimination of employees based on race colour, national extraction, social origin, religion, political opinion, sex, marital status, family responsibilities or disability. An employee also has the right, by law, to remove himself or herself from a work situation which he or she reasonably believes presents an imminent or serious danger to life or health.

4. BRIEF OVERVIEW OF LABOR LEGISLATION: OCCUPATIONAL HEALTH AND SAFETY

The Occupational Health and Safety (OHS) Policy statement (Draft, 2004) is to prevent accidents and injuries arising out of or linked with or occurring in the course of work, by minimizing as far as reasonably practicable, the cause of the hazards in the working environment and therefore the risk to which employees and the public may be exposed. The engagement of skilled and unskilled workforce at various stages of project implementation reiterates the relevance of the OSH Policy to the proposed project. The policy is derived from provisions of the International Labour Organization (ILO) Conventions 155 and 161. The policy document has specific sections on objectives, scope, strategies, activities promotion and awareness creation.

5. RESPONSIBLE STAFF

MoFA through the project manager, will be responsible for the engagement and management of all project workers. The project manager will be the direct staff responsible for the engagement of project workers, contractors and subcontractors. The project manager will be responsible for the overall management of all project workers and contractors and subcontractors, who will be supported by the Management and Technical Advisory Firm.

Occupational Health and Safety (OHS): Occupational Health and Safety (OHS) will be the responsibility of the Environmental and Social Safeguards Officer. Contractors will assign a member of staff with responsibility for matters related to health and safety. In large firms, this member of staff may be a specialist in the area of OHS, for smaller firms and sub-contractors a member of staff with training and experience in OHS can suffice. A Code of Conduct for workers is required and will be developed and implemented.

The safety representative will ensure that any complaint on health and safety are recorded reported to the project safeguard officer.

Training of Workers: The safeguards officer will liaise with the contractors' OSH representative for the necessary capacity building activities of the contractor's management staff and workers. Training of workers in environmental and social standards and OHS will be the responsibility of the project safeguards officer. Training on the Code of Conduct will be conducted by the Project Manager with assistance from the project safeguards officer.

Worker Grievances: The process for addressing workers' grievance will be the Grievance Mechanism of the project (described in section 9 of this document).

6. POLICIES AND PROCEDURES

In an effort to mitigate the environmental and social impact relating to the project, it is the intention that mitigation measures will be put in place by incorporating standardized clauses in the contract documents so that the contractors will be aware of environmental and social obligations under the project. The Ministry of Food and Agriculture (MoFA will ensure compliance by contractor/consultants with these clauses.

The project will prevent any gender discrimination on the workplace, including gender pay gap. The project OHS policy will be as follows:

Purpose

The primary purpose of this OHS Policy is the safety and health of all the project employees at work and the protection of the environment and conservation of resources associated with the project. The policy also establishes and defines the authority for the OHS and associate safety systems. The policy will be enforced on all activities of the project and contractors and sub-contractors of the project through contractual arrangements as is appropriate.

Scope

Occupational safety and health (OSH), also commonly referred to as occupational health and safety (OHS), occupational health, or workplace health and safety (WHS), is concerned with the safety, health, and welfare of people at work. Safety is defined as "the well-being of project employees whilst at work or carrying out work duties". Project Employee for the Project is defined as "anyone employed by activities of the project including employees of contractors and sub-contractors on a full-time or a part-time basis.

OSH Management System is the standards, policies, guidelines, that address project worker's safety, monitoring and evaluation of safety, worker's health, work and general environment.

Policy

The obligations of the project under the OSH policy includes the following:

- Compliance with all national associated legislation (for example health associated legislation) and international OSH legislation that are applicable to Ghana and the World Bank
- Compliance with the Environmental and Social Safeguards of the World Bank
- Compliance with International Health and Safety Standards, e.g. ILO and ISO 45001:2018 or equivalent.
- Prevention of injury and ill health of all project workers
- Establishment of safety systems, processes and performance;
- Continuous improvement of Safety Systems
- Management and mitigation of adverse environmental and social impacts
- Prevention of use of faulty equipment or sub-standard equipment
- The project will commit to safety considerations in the conduct of all of its activities and that of contractors and sub-contractors.
- The project will provide systems, processes, procedures, the necessary safety equipment and gears, and training for all project employees so that all activities are conducted in a safe environment.
- Employees will be responsible, subject to their roles, for the maintenance of a safe environment including the assessment of risks and actions to mitigate minimize and manage risks to the safety of the work environment.
- The project will develop an OHS policy and implement systems, processes, supporting policies, and services that are national and international in compliance with national and international legal requirements including industry standards and best practices in relation to safety.
- Employees at all levels have the authority to stop any activity they consider to be a danger to themselves or other workers, the public or the environment. The project is committed to non-retaliation to stop-work actions by project workers.

The Environment and Social Specialist of the project is responsible for the implementation and monitoring of the safety management systems of the project. The ESS will develop sub-policies, guidelines, procedures, instructions and training and awareness materials to support this policy.

Dissemination and Awareness

The OSH policy, developed for the project, will be disseminated to all project workers and stakeholders. The information will be dissemination in various formats including an adapted and summarized version.

7. AGE OF EMPLOYMENT

The project will be guided by the Labour Act, 2003 which states that the minimum age of employment in Ghana is eighteen (18) years old. In addition to the Employment Act, Ghana is a signatory to the following international conventions related to the minimum age of employment:

- Convention on the Rights of the Child (CRC): "Signed on the 19th April 1990 and ratified on the 9th October 1990" (UNICEF, 2015)
- Minimum Age Convention, 1973 (No.138) ((International Labor Organization , 2017)
- Forced Labour Convention, 1930 (No. 29) (International Labor Organization , 2017)
- Worst Forms of Child Labour Convention, 1999 (No. 182) (International Labor Organization , 2017)
- Medical Examination of Young Persons Convention, 1921 (No. 16) (International Labor Organization , 2017)
- UN CRC Optional Protocol on Armed Conflict (U.S. Department of Labor , 2017)

Employees over the minimum age of 18 and under the age of 21, may be employed or engaged in connection with the project only under the following specific conditions:

(a) the work is not likely to be hazardous and is not harmful to the child's health or physical, mental, spiritual, moral or social development, and will not interfere with the child's education.
(b) an appropriate risk assessment is conducted prior to the work commencing; and
(c) the Borrower conducts regular monitoring of health, working conditions, hours of work and the other requirement of ESS2: Labour and working conditions.

The following process will be followed to verify the age of project workers:

All project employees will be asked to produce identification documents (ID) that are acceptable in local laws, employment and human resources practices as "proof of age". These forms of ID will be birth certificates, national drivers' licenses and national registration cards. In the absence of one of those forms of IDs the project will apply and document an age verification process. The age verification process will consist of alternative methods including copies of academic certificates, testimony/affidavits from officials of the schools attended, a medical examination, statements from family members and parish/village officials/local authorities. In addition, all documents will be cross-referenced and subjected to a verification process to ensure the validity of the documents. In instances where the documents are thought to be falsified the project will conduct the same process to ensure their authenticity. In all of the processes the attendant care will be provided to ensure that the applicant or employee's data are protected and their right to privacy is guaranteed. All copies of the IDs and documents pertaining to the applicant's age and other supporting materials will be kept in files with the human resources personnel. Audits and controls of the process will be a requirement of the contractors and included in the contracts, in keeping with the Labour Act 2003 (Act 651).

In the event that underage workers are found working on the project the following actions will be undertaken:

- Termination of the contract and services agreement immediately as per the Labour Act of 2003 (Act 651)

- Schedule a meeting with the child and seek to determine the reasons for seeking employment
- Refer the child to other support services including social services and the Ministry of Education
- Leverage the services of Non-government and Community Based Organizations to assist the child
- Consider employing another adult member of the family if the child's family is determined to be vulnerable or in dire circumstances

The Labour Act 2003 (Act 651) will be used as a guide in the conduct of the assessment of risks associated with persons below the age of 18. The procedure for assessing the risks will be as follows:

- All persons will be asked to provide a medical certificate with the results of a medical examination.
- An assessment will be done of the tasks assigned, to ensure that persons below the age of 18 are not subjected to hazards and risks
- There will be clear policy guidelines regarding supervision of young persons to prevent exploitation and sexual harassment
- Young persons will be provided with educational and awareness information on the policies of the workplace including sexual harassment policies and labour related grievances and the grievance mechanism of the project.

8. TERMS AND CONDITIONS

The following terms and conditions will apply to project workers in accordance with the Labour Act 2003 (Act 651).

Contracts

- The project, and sub-contractor, subcontractor, and assignees of contracts shall pay rates of wages and observe hours and conditions of employment which are not less favourable than those established in the country (minimum wage).
- Contractors and sub-contractors shall be certified according to the Government Requirements for governmental contractors including that contractors are certify that the wages and conditions of employment of all those employed by the contractor in the trade or industry in which the contractor is seeking to contract with the Government are fair and reasonable.
- The contracts will be guided by the principle of collective bargaining is applicable and where there is no minimum wage or rates established in the country, the guiding principle will be of fair wages and reasonable rates commensurate with governmental minimum wage and similar established rates and conditions.
- In keeping with the Labour Act, the contractor shall keep proper wage records and time sheets for all those employed in relation to the execution of the contract, and the contractor shall produce the wage records and timesheets for the inspection of any person authorised by the project or the Labour Commission of Ghana.
- Contractors are required by law, to post conditions of work in conspicuous places informing workers of their rights and conditions of work.
- A subcontractor shall be bound to conform to the conditions of the main contract and the main contractor shall be responsible for the observance of all contract conditions.
- Contractors and subcontractors shall recognise the right of their workers to be members of the trade unions.

Minimum Wage

All project workers shall be paid a wage that is above or equal to the minimum wage as established by the Government of Ghana. Wages will be paid on a weekly, bi-weekly or monthly basis. Each employee is entitled to a statement accompanying pay that itemised the following: "(a) the employee's gross wages due at the end of that pay period; (b) the amount of every deduction from his or her wages during that pay period and

the purpose for which each deduction was made; and (c) the employee's net wages payable at the end of that pay period."

Hours of Work

The maximum number of ordinary hours of work for employees shall be eight hours a day or forty hours a week except in cases expressly provided for in the Labour Act.

Project employees are prohibited from working more than 10 hours per day inclusive of two hours for lunch and rest periods. No person under the age of eighteen years shall be employed or allowed to work. Other provisions related to hours of work will be guided by the Labour Act (Act 651) on this matter.

9. GRIEVANCE MECHANISM

The Grievance Mechanism for all Project Workers is as follows:

- Contractors and or Representatives will be the point of contact for all Grievances. In the case of project management staff, the point of contact will be the Permanent Secretary. The contractor will designate a staff member who will be responsible to receive grievances.
- Upon receipt of Grievances, the contractor staff / Permanent Secretary or Representative will notify the project manager and Environmental and Social Specialist (ESS). Grievances will be registered in a registry of complaint and all information related to the handling of the grievances will be recorded in the registry. In the case of issues with project management staff, the Project Manager may be required to exclude her or himself if the compliant directly involves him or her.
- The contractor will attempt to address grievance within established time frame of 3 weeks upon receipt. In cases of timely or urgent matters a period of a minimum of 24 hours and a maximum of 15 days will be allotted for addressing a resolving the grievance. Grievances can be made in person, telephone call or writing.
- The Grievance Mechanism of the project will be published by the Ministry of Food and Agriculture (MoFA). In addition, it will also be disseminated via public notices and billboards on sub-project sites, brochures will be distributed in communities of project activity and messages will be placed in both print and broadcast media advising of the mechanism and access points. Grievances can be made anonymously. A dedicated email and telephone number will be provided for all Grievances. For grievances made via telephone or in person, a written account will be compiled and the complainant will be asked to verify its authenticity and sign that it is an accurate account.
- The staff member assigned by the contractor will notify the Project Manager through a report of the successful resolution of any grievance. The complainant will also be informed via writing of the measures taken to address the grievance.
- If the grievance cannot be resolved by the contractor the contractor will inform the Project Manager and ESS.
- The ESS and Project Manager will meet with the project contractor and workers and attempt resolution. In the case of project management staff, the Permanent Secretary will meet directly with the staff.
- If issues cannot be resolved the issue will be referred to the Ministry of Labour for their action and pronouncement.
- The Ministry of Employment and Labour Relations' ruling would be the final tier of the grievance mechanism.
- If unresolved, either party may seek redress in the courts of the Country.
- Parties involved will be advised that they can directly contact the Project Office Ministry.
- Information about the GM will be disseminated to workers through signs at the project work site, brochures and handbills at the project website and SMS messages sent to the workers' phones.

10. CONTRACTOR MANAGEMENT

It is mandated that the contractor execute the management of the contract in a manner that is acceptable to the client and is in accordance with the World Bank rules and regulations as it relates to ESS2, specifically relating to the selection process for contractors, management of labour issues, including health and safety, procedures for managing and monitoring of performance for contractors, as well as reporting on workers under the project.

Information on Public Records: The Contractor must have in place information on corporate registers and documents relating to the violation of applicable law, including reports from labour inspectorates and other enforcement bodies.

Certification and Approval of Business and Workers: Documentation of approved business licenses, registration, permits and other approvals and workers' certification/permits and training to perform the work.

Health and Safety: Have in place labour management systems as it relates to organizational health and safety. Records of incidents and corresponding root cause analysis with a corrective mitigation plan. First aid cases, high potential near misses, and remedial and preventive activities required. Identification and establishment of safety committee and records of meetings.

Workers Payroll Records: Documentation of the number of hours work and pay received inclusive of all payments made on their behalf, for example payment made to the National Insurance Scheme and other entitlements regardless of the workers being engaged on a short- or long-term assign mentor fulltime or part time worker.

11. COMMUNITY WORKERS

The construction aspect of the project will envisage the hiring of community workers on the work. Community workers hired by the project will be provided with contracts similar to other project staff and workers. The Grievance Mechanism of the project will also be applicable to community workers of the project.

12. PRIMARY SUPPLY WORKERS

There is no significant risk of child or forced labour or serious safety issues in relation to primary suppliers. Based on the nature of the project, there will be Primary Suppliers engaged. All contracts with Primary suppliers will follow the mechanisms laid down in the Labour Act (Act 651).

Appendix 6: Grievance Log (for non-SEA/SH complaints)

Case no.	Date Claim Received	Name of Person Receiving Complaint	Where/how the complaint was received	Name & contact details of complainant (if known)	Type of Claim Add content of the claim (include all grievances, suggestions, inquiries) *please note if the complaint was related to the project. If not, note it here and refer complainant to PIU for further processing	Was Receipt of Complaint Acknowledged to the Complainant? (Y/N – if yes, include date, method of communication & by whom)	Expected Decision Date	Decision Outcome (include names of participants and date of decision)	Was Decision communicated to complainant? Y/N If yes, state when, by whom and via what method of communication	Was the complainant satisfied with the decision? Y/N State the decision. If no, explain why and if known, will pursue appeals procedure	Any follow up action (and by whom, by what date)?