



ADAPTATION FUND

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## DRAFT REPORT

### ADAPTATION FUND PROJECT: (AFB/PPRC.22-23/10)

### ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) FOR THE ADAPTATION FUND PROJECT: IMPROVED RESILIENCE FOR COASTAL COMMUNITIES IN GHANA



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Innovation

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## FINAL REPORT

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# ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK FOR THE ADAPTATION FUND PROJECT: IMPROVED RESILIENCE FOR COASTAL COMMUNITIES IN GHANA

DECEMBER 2020

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## GENERAL INFORMATION

Information Required	Company Details
Name of the proposed adaptation intervention.	Improved Resilience of Coastal Communities in Cote d' Ivoire and Ghana
AF Project ID:	AFR/MIE/DRR/2017/1
Intervention description and needs assessment	Environmental and Social Impact Assessment
Funding Agencies/Implementing Entity:	Adaptation Fund - United Nations Human Settlements Programme (UN-Habitat)
Thematic Focal Area:	Disaster risk reduction and early warning systems
Executing Entities	Government of Ghana: Leading Ministry of Local Government and Rural Development Supporting Ministry of Environment, Science, Technology and Innovation (MESTI); and Local planning departments
Safeguard Consultants	Samuel E. K. Anku
Start Date	Expected mid 2021
Completion Date	Expected mid 2025
Target settlements	<p><b>Ada West District Assembly:</b></p> <ul style="list-style-type: none"> <li>• Akplabanya,</li> <li>• Goi,</li> <li>• Wokumagbe;</li> </ul> <p><b>Ada East District Assembly:</b></p> <ul style="list-style-type: none"> <li>• Kewunor - Azizanya,</li> </ul> <p><b>Keta Municipal Assembly:</b></p> <ul style="list-style-type: none"> <li>• Agorkedzi/Atiteti,</li> <li>• Agbledomi,</li> <li>• Dzita,</li> <li>• Vodza,</li> <li>• Tegbi,</li> <li>• Woe,</li> <li>• Lagbati</li> <li>• Whuti</li> </ul>

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## TABLE OF CONTENT

<b>EXECUTIVE SUMMARY</b> .....	<b>xviii</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
1.1 PROJECT BACKGROUND .....	1
1.2 PROJECT OBJECTIVES.....	1
1.3 PROJECT COMPONENTS .....	2
1.4 SCOPE OF STUDY .....	3
1.5 PURPOSE OF THE ESIA/ESMF .....	3
1.6 TERMS OF REFERENCE FOR THE PROJECT .....	4
1.7 PROJECT JUSTIFICATION .....	4
1.8 APPROACH AND METHODOLOGY .....	5
1.8.1 The 15 AF principles.....	5
1.8.2 Ghana Environmental Impact Assessment Regulation LI 1652, (1999), .....	5
1.8.3 Registration .....	7
1.8.4 Feasibility Sheets and Sub-Projects Screening Sheets.....	7
1.8.5 Sub-Projects Screening Sheets and Scoping studies .....	7
1.8.6 Stakeholder Identification and Consultations .....	7
1.8.7 Baseline Data Collation and Analysis .....	8
1.8.8 Reporting.....	8
1.9 STRUCTURE OF THE REPORT .....	8
<b>2 ENVIRONMENTAL, LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS</b> .....	<b>10</b>
2.1 POLICY FRAMEWORKS.....	10
2.1.1 National Environmental Policy (NEP), 2014.....	10
2.1.2 Ghana National Climate Change Policy (NCCP), 2013.....	11
2.1.3 National Climate Change Adaptation Strategy – 2010 -2020 .....	11
2.1.4 Ghana Fisheries and Aquaculture Policy , 2012 .....	11
2.1.5 Forest and Wild life Policy, 2012.....	12
2.1.6 National Wetlands Conservation Strategy, 2007 .....	13
2.1.7 National Water Policy (NPW), 2007 .....	13
2.1.8 National Gender Policy, 2015 .....	13
2.1.9 Health Sector Gender Policy, 2009.....	14
2.1.10 Occupational Safety and Health Policy of Ghana (OSHP), 2011 .....	14
2.2 ADMINISTRATIVE AND INSTITUTIONAL FRAMEWORKS .....	14
2.2.1 Ministry of Environment Science, Technology and Innovation (MESTI) .....	14
2.2.2 Ministry of Fisheries and Aquaculture Development .....	15
2.2.3 Ministry of Local Government and Rural Development (MLGRD); .....	15
2.2.4 Ministry of Lands and Natural Resources (MLNR) .....	15
2.2.5 Fisheries Commission .....	15
2.2.6 Water Resources Commission .....	16

2.2.7	Forestry Commission.....	16
2.2.8	Environmental Protection Agency (EPA).....	16
2.2.9	Lands Commission .....	16
2.2.10	District/Municipal Assembly .....	17
2.3	<b>RELEVANT LAWS AND REGULATIONS OF THE SECTOR .....</b>	<b>17</b>
2.3.1	Environmental Protection Agency Act 490 of 1994 .....	17
2.3.2	Environmental Assessment Regulations, 1999 (LI. 1652).....	18
2.3.3	National Environmental Quality Standards (NEQS) .....	19
2.3.4	Fees and Charges Amendment Instrument, 2019 (LI 2386).....	19
2.3.5	Fisheries Act (Act 625 of 2002).....	19
2.3.6	Wetland Management (RAMSAR sites) Regulation, 1999 .....	19
2.3.7	Pesticides Control and Management Act (1996) Act 528 .....	20
2.3.8	Fire Precaution, (Premises) Regulations, 2003 (LI 1724).....	20
2.3.9	Water Resources Commission Act 1996, Act 522.....	20
2.3.10	National Disaster Management Organisation Act, 2016 (Act, 927).....	20
2.3.11	Labour Act, 2003 (Act 651) .....	21
2.3.12	Local Governance Act of 2016, Act 936.....	21
2.3.13	Public Health Act, 2012 Act 851.....	21
2.3.14	Land Use and Spatial Planning Act, 2016 Act (925) .....	22
2.3.15	District Assembly bye-laws on Sanitation.....	22
2.3.16	Children’s Act of 1998 (Act 560) .....	22
2.3.17	Workmen’s Compensation Law, 1987; .....	22
2.3.18	Persons with Disability Act 2006, Act 715 .....	23
2.4	<b>INTERNATIONAL CONVENTIONS .....</b>	<b>23</b>
2.4.1	Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa, 1999 .....	24
2.4.2	RAMSAR Convention on Wetlands of International Importance, Especially as Waterfowls Habitats.....	24
2.4.3	Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region.....	25
2.4.4	Gulf of Guinea Large Marine Ecosystem Projects.....	25
2.4.5	Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration (ILO No. 148) 1977 26	
2.4.6	UN Framework Convention on Climate Change, 1992.....	26
2.4.7	UN Framework Convention on Biodiversity, 1993.....	27
2.4.8	Basel Convention, 2003.....	28
<b>3</b>	<b>PROJECT INTERVENTIONS DESCRIPTION AND PROPOSED LOCATIONS.....</b>	<b>29</b>
3.1	PROJECT LOCATION AND TARGET AREAS .....	29
3.2	PROJECT COMPONENTS .....	30

3.2.1	Mangrove Restoration Intervention .....	30
3.2.2	Mangrove Restoration Sub Project Benefits .....	34
3.2.3	Indirect Beneficiaries and Benefits .....	34
3.2.4	Lagoon Restoration Intervention .....	35
3.2.5	Pen Culture Intervention .....	42
3.2.6	Salt Resilient Crop and Water Infiltration Intervention .....	49
3.2.7	Salt Resilient Crops Activities .....	55
3.3	PROJECT ALTERNATIVES .....	56
3.3.1	Location/Site Alternatives .....	56
3.3.2	No Project, Avoid or Postpone Alternative .....	57
3.3.3	Proceeding with the Project .....	58
3.3.4	Technology and Project Design Alternatives .....	59
3.4	PROPOSED PROJECT IMPLEMENTATION WORK .....	60
<b>4</b>	<b>DESCRIPTION OF THE EXISTING ENVIRONMENT.....</b>	<b>63</b>
4.1	CLIMATE .....	63
4.1.1	Temperature .....	63
4.1.2	Precipitation .....	64
4.1.1	Relative Humidity .....	64
4.1.2	Sunshine .....	64
4.1.1	General Ambient Air Quality .....	65
4.1.2	Wind .....	65
4.2	NOISE .....	66
4.3	GEOLOGY .....	67
4.4	SOILS .....	67
4.4.1	Lagoon Soil Sediments Analysis .....	68
4.5	WATER RESOURCES .....	69
4.5.1	Surface Water .....	69
4.5.2	Water Quality Monitoring .....	70
4.5.3	Polycyclic-Aromatic Hydrocarbons (PAH) Analysis .....	74
4.5.4	Ground Water .....	78
4.5.5	Flood Risk and Sea Level Rise Sensitivity Assessment .....	78
4.6	VEGETATION .....	79
4.7	FAUNA .....	80
4.7.1	Water Birds .....	80
4.7.2	Fishery .....	81
4.7.3	Marine Turtles .....	81
4.8	SOCIO-ECONOMIC/CULTURAL ENVIRONMENT .....	81
4.8.1	Ada West District Location and Population Dynamics .....	82
4.8.2	Ada East District Location and Population Dynamics .....	83

4.8.3	Keta Municipal Location and Population Dynamics.....	84
4.9	GENDER AND YOUTH ANALYSIS .....	85
4.9.1	Methodology .....	85
	HEAD (INSTITUTE FOR ENVIRONMENT AND SANITATION STUDIES) .....	86
4.9.2	Initial Gender Assessment.....	86
4.9.3	Differentiated Climate Change Impacts On Men And Women.....	88
4.9.4	Capacity Gaps affecting GP Compliance .....	88
4.9.5	Opportunities for promoting a ‘women’ and ‘youth’ as agents of change.....	89
4.9.6	Economic Activities.....	90
<b>5</b>	<b>STAKEHOLDER CONSULTATIONS .....</b>	<b>91</b>
5.1	INTRODUCTION .....	91
5.2	CONSULTATION APPROACH.....	91
5.2.1	Stakeholder Mapping.....	91
5.2.2	Stakeholder Engagement Tools.....	92
5.2.3	Community Entry .....	92
5.2.4	Site Observations .....	92
5.3	SUMMARY OF STAKEHOLDERS’ KEY CONCERNS.....	94
<b>6</b>	<b>RISKS ANALYSIS AND POTENTIAL IMPACT ASSESSMENT .....</b>	<b>101</b>
6.1	PROJECT AREA OF INFLUENCE .....	101
6.1.1	Geographical Area of Influence .....	101
6.1.2	Environmental Media to be Influenced.....	101
6.1.3	Socio-economic Influence.....	101
6.1.4	Institutional and Organizational Influence .....	101
6.1	SCREENING AND CATEGORIZATION .....	101
6.1.1	Categorization .....	101
6.2	OVERVIEW / SUMMARY OF SUB PROJECT RISKS MANAGEMENT APPROACH 104	
6.3	ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT .....	128
<b>7</b>	<b>ADAPTATION AND MITIGATION MEASURES.....</b>	<b>131</b>
<b>8</b>	<b>ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN .....</b>	<b>136</b>
8.1	OBJECTIVES .....	136
8.2	PROJECT IMPLEMENTATION ARRANGEMENTS.....	136
8.2.1	Regional level: .....	139
8.2.2	National level: .....	139
8.2.3	Local level: .....	139
8.3	LEGAL AND FINANCIAL ARRANGEMENTS .....	141
8.4	ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL AND SOCIAL RISKS MANAGEMENT / AF ESP AND GP COMPLIANCE .....	141
8.4.1	Launch of the project .....	142
8.5	SUMMARY OF ARRANGEMENTS TO MANAGE AND IMPLEMENT ESMP .....	142



<b>9</b>	<b>GRIEVANCE REDRESS MECHANISM (GRM)</b> .....	<b>147</b>
9.1	INTRODUCTION .....	147
9.2	GRIEVANCE REDRESS PROCESS .....	147
9.3	INSTITUTIONAL ARRANGEMENTS FOR GRIEVANCE RESOLUTION.....	147
9.3.1	Three Member Local Mediation Group .....	147
9.3.2	Grievance Mediation Committee (GRC):.....	148
9.3.3	Court of Law .....	148
<b>10</b>	<b>ENVIRONMENTAL MONITORING PLAN</b> .....	<b>150</b>
10.1	RISKS MONITORING SYSTEM / INDICATORS .....	150
10.2	MONITORING BUDGET.....	150
	<b>REFERENCES</b> .....	<b>152</b>
	<b>ANNEXES</b> .....	<b>153</b>

## **LIST OF FIGURES**

Figure 1.1: Report Methodology/Approach (Consultant's Construct).....	6
Figure 3.1: Map showing the Project area.....	29
Figure 3.2: Sample of Mangrove Nursery.....	32
Figure 3.3: Young Mangrove seedlings.....	32
Figure 3.4: Mangrove Restoration Project site at Agorkedzi/Atiteti .....	32
Figure 3.5: Mangrove Restoration Project site at Agbledomi.....	33
Figure 3.6: Mangrove Restoration Project site at Dzita .....	33
Figure 3.7: Mangrove Restoration Project site at Whuti .....	34
Figure 3.8: Lagoon Restoration Project site at Akplabanyai .....	36
Figure 3.9: Lagoon Restoration Project site at Wokumagbe .....	36
Figure 3.10: Lagoon Restoration Project site at Goi.....	37
Figure 3.11: Lagoon Restoration Project site at Kewunor .....	37
Figure 3.12: Lagoon Restoration Project site at Agorkedzi/Atiteti .....	38
Figure 3.13: Lagoon Restoration Project site at Agbledomi.....	38
Figure 3.14: Lagoon Restoration Project site at Dzita .....	39
Figure 3.15: Proposed Lagoon to be dredged at Goi .....	41
Figure 3.16: Proposed Lagoon to be dredged at Workumagbe .....	41
Figure 3.17: Pen Culture Project site at Akplabanya .....	43
Figure 3.18: Pen Culture Project site at Wokumagbe.....	44
Figure 3.19: Pen Culture Project site at Goi.....	44
Figure 3.20: Pen Culture Project site at Kewunor.....	45
Figure 3.21 Pen Culture Project site at Agorkedzi/Atiteti .....	45
Figure 3.22: Pen Culture Restoration Project site at Agbledomi.....	46
Figure 3.23: Pen Culture Restoration Project site at Dzita .....	46
Figure 3.24: Pen Culture Project site at Vodza .....	47
Figure 3.25: View of typical Pen Culture .....	47
Figure 3.26: Fishing in the lagoon.....	47
Figure 3.27: Farmlands affected by high salinity at Anloga/Lagbati.....	50
Figure 3.28: Farmlands affected by high salinity at Woe .....	50
Figure 3.29: Salt Resilient Crop location sites at Tegbi .....	50
Figure 3.30: Salt Resilient Crop location sites at Woe.....	51
Figure 3.31: Salt Resilient Crop location sites at Lagbati .....	51
Figure 3.32: Salt Resilient Crop location sites at Whuti .....	52
Figure 3.33: Water Infiltration Location sites at Tegbe .....	52
Figure 3.34: Water Infiltration Location sites at Woe .....	53

Figure 3.35: Water Infiltration Location sites at Iagbati .....	53
Figure 3.36: Water Infiltration Location sites at Whuti .....	54
Figure 3.37: Potential Target District Assemblies and Communities in Ghana .....	57
Figure 4.1: Rainfall and Temperature for Srogbe/Whuti, Ghana.....	64
Figure 4.2: Particulate Matter results compared with EPA standards in red bar .....	65
Figure 4.3: Gas level results compared with EPA standard levels in red bars .....	65
Figure 4.4: Wind rose diagram of Ghana .....	66
Figure 4.5: Day time Ambient Noise Monitoring Results compared with EPA standards in red bar .....	66
Figure 4.6: Night time Ambient Noise Monitoring Results compared with EPA standards in red bar .....	66
Figure 4.7: Geologic Map of the Project Area .....	67
Figure 4.8: Sediment Results from Some Selected Lagoons .....	69
Figure 4.9: The Volta River Estuary at Ada .....	70
Figure 4.10: Some mangrove vegetation along the Keta Lagoons .....	70
Figure 4.11: Inspecting a well .....	70
Figure 4.12: Water sampling Agbledomi .....	70
Figure 4.13: Water Quality Results from Selected Lagoons .....	72
Figure 4.14: Selected Water Sampling Point along the coast at Agorkodzi .....	72
Figure 4.15: Selected Water Sampling Point along the coast at Dzita.....	73
Figure 4.16: Selected Water Sampling Point along the coast at Goi .....	73
Figure 4.17: Selected Water Sampling Point along the coast at Wokumagbe .....	74
Figure 4.18: Flood Risk Assessment of Keta (Source: Vaughan, 2008). .....	79
Figure 4.19: View of flora species in the project area .....	79
Figure 4.20: Indication of land cover of the Volta delta, areas indicated as grassland and marshes.....	80
Figure 4.21: <i>Calidris ferruginea</i> ,.....	80
Figure 4.22: <i>Himantopus himantopus</i> , .....	80
Figure 4.23: <i>Dermochelys coriacea</i> .....	81
Figure 4.24: Ada West District Boundary Google Map .....	82
Figure 4.25: Ada East District Boundary Google Map .....	83
Figure 4.26: Map showing the Keta Municipal Areas .....	84
Figure 4.27: Male and Female Disaggregation in Project Intervention Areas .....	87
Figure 4.28: Children, Youth and Elderly in Project Intervention Areas .....	87
Figure 4.29: Focus Group Discussions with Women in Agbledomi.....	88
Figure 5.1: View of Lagoon at Dzita .....	93

Figure 5.2: Dried up and silted lagoon at Goi .....	93
Figure 5.3: Farming method at Agbledomi .....	93
Figure 5.4: Mangrove Deforested area at Agorkedzi/Atiteti .....	93
Figure 5.5: Poor waste management at Akplabanya .....	93
Figure 5.6: State of wetland areas at Agbledomi .....	93
Figure 5.7: State of Mangroves at Agbledomi .....	94
Figure 5.8: Fishing dug-out canoes at Dzita .....	94
Figure 5.9: View of lagoon area at Atiteti .....	94
Figure 5.10: Coastal Erosion at Vodza .....	94
Figure 7.1: Lagoon Restoration in the Keta Lagoon Basin (Picture Courtesy: the naturecollective.com) .....	131
Figure 7.2: Mangrove Restoration Activities .....	131
Figure 8.1: Proposed Project Management Structure .....	137
Figure 8.2: Summary of ESMP for Significant Adverse Impacts .....	143
Figure 9.1: GRM Process and Procedures .....	149
Figure 10.1: Indicative Budget for ESMP Implementation .....	151

## **LIST OF TABLES**

Table 3.1: Overview Of Interventions Per Community.....	30
Table 3.2: Detailed Estimated Budget For Mangrove Restoration Project.....	31
Table 3.3: Mangrove Restoration Sub Project Direct Benefits.....	34
Table 3.4: Mangrove Restoration Sub Project Indirect Benefits .....	35
Table 3.5: Total Area Coverage/Catchment Areas For Lagoon Restoration.....	39
Table 3.6: Total Area Coverage For Replanting Of Mangroves And Sea Grass.....	40
Table 3.7: Detailed Estimated Budget For Lagoon Restoration.....	42
Table 3.8: Detailed Estimated Budget For Pen Culture .....	49
Table 3.9: Water Infiltration Activities .....	55
Table 3.10: Detailed Estimated Budget For Resilient Crop And Water Infiltration.....	56
Table 3.11: Project Location/Site Alternatives.....	57
Table 3.12: Technological And Project Design Alternatives .....	59
Table 3.13: Proposed Project Implementation Work .....	61
Table 4.1: Rainfall And Temperature For Srogbe/Whuti.....	63
Table 4.2: Lagoon Sediment Analysis Results .....	68
Table 4.3: Summary Of Water Monitoring Results .....	71
Table 4.4: Polycyclic-Aromatic Hydrocarbons (Pah) Analysis In Soils.....	76
Table 4.5: Polycyclic-Aromatic Hydrocarbons (Pah) Analysis In Water .....	77
Table 4.6: Population Of Selected Project Communities By Sex.....	84
Table 4.7: List Of Project Preparatory Institutional Consultees.....	85
Table 4.8: Data Baseline – Women And Youth .....	86
Table 4.9: Differentiated Climate Change Impacts On Men And Women .....	88
Table 4.10: Capacity Of Potential Executing Entities To Carry-Out Gender Responsive Activities. ....	89
Table 5.1: Summary Of Stakeholders’ Issue - Response Matrix .....	95
Table 5.2: Summary Of Stakeholders’ Issue - Response Matrix Cont’ .....	96
Table 5.3: National Fish Processor And Traders (Nafpta) Keta Municipal Assembly - Deka Worwor Co-Op Fish Processors And Marketing Association-Dzita.....	97
Table 5.4: Summary Of Stakeholders’ Issue - Response Matrix Cont’ .....	98
Table 6.1: Esia/Esmf Legal Framework, Applicability And Steps In Ghana .....	102
Table 6.2: Environmental And Social Safeguards Categories For Af-Funded Projects/Programmes. ....	103
Table 6.3: Mangrove Restoration - Environmental And Social Risks.....	104
Table 6.4: Lagoon Restoration – Environment And Social Risks.....	110
Table 6.6: Pen Culture - Environment And Social Risks.....	116

Table 6.7: Salt Resilient Crops And Water Infiltration - Environment And Social Risks .....	122
Table 6.8: Project Activities And Potential Environmental And Social Impacts/Issues/Risks .....	128
Table 7.1: Environmental And Social Mitigation Measures.....	130
Table 8.1: Key Project Organogram Stakeholders And Roles And Responsibilities .....	138
Table 8.2: Regional/International Level.....	139
Table 8.3: National And Local Level - Ghana.....	139

## **LIST OF ABBREVIATIONS**

AF	-	Adaptation Fund
ECG	-	Electricity Company of Ghana
EE	-	Executing Entity
EHS	-	Environmental Health and Safety
EIA	-	Environmental Impact Assessment
EIS	-	Environmental Impact Statement
EMC	-	Eco-Management Consult Limited
EPA	-	Environmental Protection Agency
ES	-	Environmental Statement
ESIA	-	Environmental and Social Impact Assessment
ESMF	-	Environmental and Social Management Framework
ESMP	-	Environmental and Social Management Plan
ESMS	-	Environmental and Social Management System
ESP	-	Environmental and Social Policy
ETP	-	Effluent Treatment Plant
FPS	-	Fire Protection System
GAEC	-	Ghana Atomic Energy Commission
GNADP	-	Ghana National Aquaculture Development Plan
GNFS	-	Ghana National Fire Service
GoG	-	Government of Ghana
GSA	-	Ghana Standards Authority
GWC	-	Ghana Water Company
HIV/AIDS	-	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IAP	-	Interested and Affected Parties
IE	-	Implementing Entity
ILO	-	International Labour Organization
MLGRD	-	Ministry of Local Government and Rural Development
MMDAs	-	Metropolitan Municipal District Assemblies
MWRWH	-	Ministry of Water Resources, Works and Housing
NDPC	-	National Development Planning Commission
NEP	-	National Environmental Policy
NEQG	-	National Environmental Quality Guidelines
NFPA	-	National Fire Protection Association
NGO	-	Non-Government Organisation
NIE	-	National Implementing Entity
NWP	-	National Water Policy
OSHP	-	Occupational Safety and Health Policy of Ghana
PM	-	Particulate Matter
SMTDP	-	Ministry of Fisheries and Aquaculture Development Sector Medium-Term Development Plan
STDA	-	South Tongu District Assembly
TA	-	Technical Assistance
TCPD	-	Town and Country Planning Department
TOR	-	Terms of Reference
TOR	-	Terms of Reference
UNEP	-	United Nations Environment Programme
UNESCO	-	United Nations Educational, Scientific and Cultural Organisation
WHO	-	World Health Organisation
WMD	-	Waste Management Department

## **LIST OF ANNEXES**

Annex A:	Project Pre-Concept Stage	127
Annex B:	Letter from the EPA	129
Annex C:	Terms of Reference for the ESIA/ESMF.	130
Annex D:	Water Quality Analysis Results	140
Annex E:	Recommended Guidelines for Sediment Quality- USA	144
Annex F:	PAH Monitoring Analysis Results	145
Annex G:	List of Consultees	164
Annex H:	Field Consultation Questionnaire	199
Annex I	Grievance Redress Form	205
Annex J:	AF Principles	206
Annex K:	Letter of Content – Dredge Material Disposal Sites	208
Annex L	Letter of Content FROM Community Leaders	209



## **EXECUTIVE SUMMARY**

### **INTRODUCTION**

The Government of Ghana (GoG) through the Ministry of Local Government Rural Development (MLGRD) and the Ministry of Environment, Science and Technology and Innovation (MESTI) has requested the United Nations Human Settlements Program (UN-Habitat) with support from the Adaptation Fund to plan and implement spatial climate adaptation strategies to address the challenges posed by natural hazards (erosion, floods and sea level rise), in selected unplanned and inadequate coastal urban expansion areas that lack infrastructure and service provision in the country.

In line with the Adaptation Fund's ESP and GP and UN-Habitat's Environmental and Social Safeguard Policy (ESSP) as well as the Ghana Environmental Assessment requirements, UN-Habitat and partners are required to categorize the risk of the project as a whole and to manage potential risks and impacts. It is against this background that this Environmental and Social Management Framework (ESMF) study has been undertaken.

### **Project Objectives**

The overall objective of the project is to increase the resilience of coastal communities and settlements in Ghana. The sub-objectives of the project, which are in line with the project component below and AF outcomes, are:

1. Promote climate change resilient coastal development through sub-regional and district-level spatial development frameworks and to strengthen institutional capacities to develop, use and update these spatial frameworks.
2. Strengthen community awareness and capacities to adapt to climate-related coastal hazard and threats through community planning.
3. Increased climate change resilience of coastal areas through increased ecosystem / natural resource resilience
4. Increased climate change resilience of coastal communities through diversified and strengthened livelihoods.
5. Strengthen institutional capacity and tools to identify and manage coastal climate change-related risks / impacts in Ghana and Cote d'Ivoire (and West Africa) and diffuse / share knowledge on innovative (building with nature) coastal climate change adaptation practices in West Africa

### **Project Components**

The project as indicated in the Pre-concept stage (Refer to Annex A) has been structured into the following five components and will be implemented in both Ghana and Cote d' Ivoire for a duration of 4 years.

Component 1: Promote climate change resilience through spatial development frameworks

Component 2: Resilience building planning at the community level

Component 3: Transformative concrete ecosystem / natural resource adaptation interventions at sub-regional and district level

Component 4: Catalytic concrete climate change adaptation through diversified and strengthened livelihoods at community level

Component 5: Knowledge sharing and monitoring

The Ghana component of the proposed project for implementation covers only component 3 and 4 of the intervention. A detailed description of the four project interventions is provided in Chapter three.

### **Scope and Project Terms of Reference for the Project**

Specifically, the consultant is supposed to undertake the following:

1. Coordinate with local partners responsible for community mobilization and data collection.
2. Organize effective and relevant public consultations.
3. Visits to all selected sites to establish an updated baseline and data collection from relevant local authorities and communities.
4. Review all relevant legislation and regulations for planned interventions;
5. Describe the different project components and their content (nature and potential size of the transformative interventions).
6. Conduct an analysis of potential environmental and social risks and impacts according to the 15 safeguard areas of the AF, and in accordance with national requirements and guidelines.
7. Identify the roles and responsibilities of the various actors to implement the proposed mitigation measures in response to identified impacts;
8. Assess available capacity to implement the proposed mitigation measures, and make appropriate recommendations including training and capacity building needs and their costs.
9. Propose a framework for environmental management and monitoring.
10. Prepare a summary budget of all actions and activities proposed in the ESIA/ESMF;
11. Produce the final report of the study as well as the complementary data from the consultations carried out, including the results obtained following the data analysis.

### **Approach and Methodology**

The approach and methodology adopted was based on the review of the Project Terms of Reference and the Guideline document for UN-Habitat and partners to comply with the Fund Environmental and Social Policy (ESP) and Gender Policy (GP) as well as the Ghana EIA procedures. (Environmental Assessment Regulations, LI 1652).

To ensure compliance with the AF ESP, all proposed project activities have been screened against the 15 AF principles (i.e. safeguards) to identify potential environmental and social risks and to assess related potential impacts. Where risks have been identified, impact assessments have been conducted and where needed, measures to avoid or mitigate risks and impact, identified (+ monitoring arrangements). Project feasibility sheets and sub project sheets were compiled and used to screen the potential project environmental and social risks.

### **Policy, Legal and Institutional Frameworks**

The relevant policies and other statutory laws and regulations as well as institutional frameworks that will guide the project from the conceptualization of the proposed project to implementation and monitoring were reviewed. These include the following:

- National Environmental Policy (NEP), 2014
- National Climate Change Policy, 2013
- National Climate Change Adaptation Strategy 2010 -2020
- Ghana Fisheries and Aquaculture Policy, 2011
- Forest and Wildlife Policy, 2012
- National Wetlands Conservation Strategy, 2007
- National Water Policy (NWP), 2007
- National Gender Policy, 2015
- Health Sector Gender Policy, 2009
- Occupational Safety and Health Policy of Ghana (OSHP), 2014

Other National and Sector Legislations were also considered. These include:

- Environmental Protection Agency (EPA) Act 1994 (Act 490);
- Environmental Assessment Regulations 1999, LI 1652;
- National Environmental Quality Standards (NEQS)
- Fees and Charges (Amendment) 2019, LI 2386
- Fisheries Act (Act 625 of 2002)
- Wetland Management (RAMSAR sites) Regulation, 1999
- Pesticides Control and Management Act (1996) Act 528
- Fire Protection, (Premises) Regulations, 2003 (LI 1724);
- Water Resources Commission Act 1996, Act 522
- Public Health Act, 2012 Act 851.
- Land Use and Spatial Planning Act, 2016 Act (925)
- District Assembly bye-laws on Sanitation
- Children’s Act of 1998 (Act 560)
- Workmen’s Compensation Law 1987 (PNDC 187)
- Persons with Disability Act 2006, Act 715

## **PROJECT INTERVENTIONS DESCRIPTION AND PROPOSED LOCATIONS**

An overview of the project objectives, rationale and justification, site location, as well as the description of the proposed physical facilities and equipment of the project interventions were discussed. Three districts, two of which are in the Greater Accra Region and the third district in the Volta Region. The selected Districts and project interventions are:

<b>District</b>	<b>Community</b>	<b>Mangrove</b>	<b>Lagoon Restoration</b>	<b>Pen Culture</b>	<b>Salty Crops/ Water infiltration</b>
Ada West	Akplabanya				
	Goi				
	Wokumagbe				
Ada East	Kewunor/Azizanya				
Keta	Agorkedzi/Atiteti				

	Agbledomi				
	Dzita				
	Vodza				
	Tegbi				
	Woe				
	Lagbati/Kashibi				
	Whuti				

**DESCRIPTION OF THE EXISTING ENVIRONMENT**

The baseline data include climate, topography and relief, geology and soil, demography, health, waste management, economy, and land tenure system, road transportation. In addition, the ESMF report has scoped out the issues and provided general assessment of the impacts.

Baseline studies on the current environmental conditions and socioeconomic and cultural characteristics, including physical, as well as socio-economic and cultural settings in project area.

- Climate (Temperature, Rainfall, Wind etc)
- Geology and Soils (Lagoon Soil Sediments Analysis)
- Water Resources (Surface and Ground water, Water Quality Monitoring and Control)
- Socio-Economic/Cultural Environment (Employment Creation and Opportunities (Job security; Gender/female workers, workers welfare; Access to social services and housing; Improve the economic status of a number of people; Transportation and access (Public safety due to traffic accidents especially during construction period)
- Gender Characteristics and Assessment

**STAKEHOLDER CONSULTATIONS**

The ESMF preparation included extensive stakeholder consultations and participation in order to ensure that key interests of the public, at various levels of governance, are addressed and incorporated into the design and implementation of the project. The key stakeholders such as the Environmental Protection Agency, The Ada East, Ada West and Keta District Assemblies, the Wildlife Division of the Forestry Commission, The Development Institute (NGO) etc. were identified for engagement during the conduct of environmental and social assessments for specific sub-projects.

The broad objectives of the stakeholder consultation were to identify and notify interested and affected parties (IAPs) of the proposed development and to provide the IAPs with the opportunity to comment on the proposed activity and raise issues and concerns. Specifically, the consultation process among others sought to:

- familiarise the relevant stakeholders with the proposed site and the surroundings;
- clarify the legal requirements for the proposed study;
- present the proposed study approach and get confirmation of the regulatory institutions based on the conditions of the site observed;
- identify specialists that may be required for the project based on the observation made on site;

The Consulting Team worked with staff of the Development Institute, an NGO working in the project area. This NGO has had earlier interventions in the Communities so the people were fully aware of the project and therefore fully cooperated and assisted in the data/information collection

Major concerns expressed by the key stakeholders and PAPs include the following:

- Lagoon should be protected to prevent accidents such as children drowning unknowingly
- Foot bridges should be constructed to access the beach.
- Regulations should be put on the use of the lagoon to ensure sustainability and equal access to the resource
- Some people fish from the lagoon, how do they get fish again when the project has taken over the lagoon?
- Land owners be consulted before acquiring the land for use in the project
- Crop failure
- Destruction of agriculture
- Lagoon erosion and flooding
- Project should consider making access routes between the community and the beach in the form of small bridges.
- Dikes should be such that it prevents accidental falling into lagoon.
- Low fish yield
- Women should be engaged in decision making during project implementation
- Mangroves should be restored in the area to enhance livelihood
- Lack of capital to start business
- Introduce fishery varieties into lagoon
- Inadequate firewood for fish smoking

## **RISKS ANALYSIS AND POTENTIAL IMPACT ASSESSMENT**

The potential environmental and social impacts of the project, project screening and categorization, project risks management and an analysis of alternatives associated with the execution of the project to the sub-project were discussed.

The Consultant used the requirements of the Ghana EPA as well as the Adaptation Fund (AF 15) to screen and categorize the proposed project interventions. According to the Environmental Assessment Regulation 1999 LI 1652, the Ghana EPA within 25 days on receipt of a Registration Form will 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:

- No objection to the project (equivalent to World Bank Category C Project)
- Preliminary Environmental Assessment (PEA) will be required (equivalent to World Bank Category B2 Project)
- Environmental and Social Impact Assessment (ESIA) required (equivalent to World Bank Category B1).

A summary overview of project activities' potential risks and impact assessment result against the 15 AF principles is provided below

**Project Activities and Potential Environmental and Social Impacts/Issues/Risks**

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		Mitigation Measures
		Environment	Social	
<b>A. Mangrove Restoration</b>				
<b>Phase 1: Prepare</b>	<b>Buying materials</b> <ul style="list-style-type: none"> <li>• Site leasing and Fencing</li> <li>• Nursery bed and bag preparation, collection of soil to site,</li> <li>• Compost/manure and transportation</li> <li>• Seed collection/Wildlings/seeds</li> </ul>	<ul style="list-style-type: none"> <li>• Acquisition of land required.</li> <li>• Transportation of materials (seedlings/wildlings, manure/ compost may create minimal traffic and slight noise</li> <li>• Solid waste management</li> </ul>	<ul style="list-style-type: none"> <li>• Potential social Conflicts and tension in land claims</li> <li>• Security and safety issues</li> <li>• Protection of cultural/heritage sites in the selection of land for nursery and mangrove planting</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure green procurement measure for all materials</li> <li>• Grievance redress mechanism</li> <li>• Partnerships and benefit sharing to be streamlined by stakeholders</li> </ul>
<b>Phase 2: Implement</b>	<b>Mangrove planting</b> <ul style="list-style-type: none"> <li>• Nursery management</li> <li>• Watering, replacement, watering can (including equipment)</li> <li>• Transportation</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation losses due to site clearing and land preparation works</li> <li>• Generation and disposal of solid waste</li> <li>• Water resources and pollution</li> <li>• Use and management of agrochemicals</li> <li>• Soil disturbance and erosion</li> <li>• Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Land and compensation issues</li> <li>• Security, Health and Safety</li> <li>• Maintaining Livelihoods</li> <li>• Occupational health and Safety</li> <li>• Potential Conflicts in land claims</li> <li>• Gender, vulnerability and Livelihood concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that heaped compost /manure for nursery works is covered with tarpaulin to prevent wind and water transport of soil particles</li> <li>• Ensure adequate stakeholder engagements with potential affected persons before land acquisition</li> </ul>
<b>Phase 3: Operate</b>	<b>Coordination support</b> <ul style="list-style-type: none"> <li>• Supervision and coordination</li> <li>• Office set up</li> <li>• Experts and consultancies</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse impacts on the environment</li> <li>• Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>• Decent jobs for individuals and some private enterprises/consultancies</li> <li>• Promoting community and investor confidence</li> <li>• Local capacity building</li> </ul>	<ul style="list-style-type: none"> <li>• Clearly define roles and responsibilities for coordination and supervision</li> <li>• Establish and maintain credible Project Management procedures</li> <li>• Prepare Project Operation Plan (POP)</li> </ul>
<b>Phase 4: Maintain</b>	<b>Maintenance</b> <ul style="list-style-type: none"> <li>• Field monitoring</li> <li>• Raising awareness and capacity building (component 2)</li> <li>• Resources and livelihoods management plan (component 2)</li> <li>• Monitoring plan (component 2).</li> <li>• CREMA By-laws enacted</li> <li>• Alternative ways for smoking fish and energy efficiency stove</li> </ul>	<ul style="list-style-type: none"> <li>• Negligible noise nuisance during field maintenance activities</li> <li>• Transport and conveyance of monitoring materials/equipment</li> <li>• Generation and disposal of solid waste</li> <li>• Security and community health issues</li> <li>• Protection and management of common resource</li> </ul>	<ul style="list-style-type: none"> <li>• Decent jobs for individuals and some private</li> <li>• Corporate Social Responsibility</li> <li>• Maintenance of Cultural Heritage</li> <li>• Resource Access and Possible Restriction</li> <li>• Local capacity building</li> <li>• Maintaining Livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of local cultural identity and heritage</li> <li>• Public health and safety, and traffic issues</li> <li>• Establishment of grievance redress options</li> <li>• Consult affected property owners/users/ communities and seek their consent early in the project development process</li> </ul>

Project Activities and Potential Environmental and Social Impacts/Issues/Risks CONT'

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		Mitigation Measures
		Environment	Social	
<b>B. Lagoon Restoration</b>				
<b>Phase 1: Prepare</b>	<ul style="list-style-type: none"> <li><b>Pollution Study</b></li> <li>E.Coli, organic pollution, fish carrying capacity, plastic and heavy metals</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and Measurement of environmental media (water, soil, noise and air) and adherence to standards will enhance good environmental performance</li> <li>Unsafe disposal of hazardous chemicals and reagents</li> </ul>	<ul style="list-style-type: none"> <li>Public health and safety issues (possible use of empty chemical containers and bottles by some ignorant community members</li> <li>Decent jobs for individuals and some private sector</li> <li>Research and development</li> </ul>	<ul style="list-style-type: none"> <li>Community health and safety measures</li> <li>Use of protective gears (PPEs)</li> <li>Preparation and Implementation of Environmental Monitoring Plan</li> <li>Periodic audit and compliance enforcement regime in line with international and national standards</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li><b>Lagoons cleaning</b> - Pen (10x10x3m, net, ropes, wood etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation losses due to site clearing and land preparation works</li> <li>Generation and disposal of solid waste</li> <li>Water resources and pollution</li> <li>Soil disturbance and erosion</li> <li>Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining Livelihoods</li> <li>Occupational health and Safety</li> <li>Land acquisition and compensation issues</li> <li>Established grievance redress options</li> <li>Public Health and safety</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of local cultural identity and heritage</li> <li>Public health and safety, and traffic issues</li> <li>Preservation of lagoon ecosystem</li> <li>Flood and erosion control measures</li> </ul>
	<ul style="list-style-type: none"> <li><b>Pen culture</b> - Waste removal (including equipment and personnel.</li> </ul>			
	<ul style="list-style-type: none"> <li><b>Waste management</b> - Disposal and treatment (including equipment and personnel</li> </ul>			
	<ul style="list-style-type: none"> <li><b>Dredging</b> Equipment and personnel</li> </ul>			
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>Coordination support and Supervision</li> </ul>	<ul style="list-style-type: none"> <li>No adverse impacts on the environment</li> <li>Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>Decent jobs for individuals and some private enterprises/consultancies</li> <li>Promoting community and investor confidence</li> <li>Local capacity building</li> </ul>	<ul style="list-style-type: none"> <li>Clearly define roles and responsibilities for coordination and supervision</li> <li>Establish and maintain credible Project Management procedures</li> <li>Prepare Project Operation Plan (POP)</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li><b>Field monitoring</b> Water quality monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Unsafe disposal of hazardous chemicals and reagents</li> <li>Water sedimentation and pollution</li> </ul>	<ul style="list-style-type: none"> <li>Public health and safety issues (possible use of empty chemical containers and bottles by some ignorant community members</li> <li>Decent jobs for individuals and some private</li> </ul>	<ul style="list-style-type: none"> <li>Community health and safety measures</li> <li>Use of protective gears (PPEs)</li> <li>Preparation and Implementation of Environmental Monitoring Plan</li> <li>Research and Capacity building</li> </ul>

**Project Activities and Potential Environmental and Social Impacts/Issues/Risks CONT**

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		• Mitigation Measures
		Environment	Social	
<b>C. Pen Culture</b>				
<b>Phase 1: Prepare</b>	<b>Material</b> (Net, ropes, scoop nets, canoe, Solar lamps) <ul style="list-style-type: none"> <li>• Feed, equipment and personnel</li> <li>• Storage structure</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation of materials</li> <li>• Solid waste management</li> <li>• Safe and sound handling and storage of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Protection of cultural/heritage sites in the selection of land for</li> </ul>	<ul style="list-style-type: none"> <li>• No to Negligible Impacts. No mitigation measures required</li> <li>• Provision of PPEs</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li>• <b>Pen installation</b></li> <li>• Pen (10x10x3m, net, ropes etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Site clearing and excavation works</li> <li>• Transport of materials</li> <li>• Generation/ disposal of solid waste</li> </ul>	<ul style="list-style-type: none"> <li>• Unavailability and poor use of personal protective equipment</li> <li>• Grievance redress options</li> </ul>	<ul style="list-style-type: none"> <li>• Security and safety issues</li> <li>• Community health and safety</li> </ul>
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>• <b>Pen culture</b></li> <li>• Tilapia fingerlings and fish food</li> <li>• Transport for fish food</li> </ul>	<ul style="list-style-type: none"> <li>• Lagoon water pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Community pride and support</li> <li>• Improve health and nutritional status of people</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality monitoring</li> <li>• Community health and safety</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li>• <b>Field monitoring</b></li> <li>• Water quality monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe disposal of hazardous chemicals and reagents</li> </ul>	<ul style="list-style-type: none"> <li>• Public health and safety issues</li> </ul>	<ul style="list-style-type: none"> <li>• Community health and safety measures</li> <li>• Use of protective gears (PPEs)</li> </ul>
<b>D. Salty Crops resilient and Water Infiltration</b>				
<b>Phase 1: Prepare</b>	<ul style="list-style-type: none"> <li>• <b>Materials</b> - Pumps, Farm logistics, irrigation facility, seeds, fertilizers, etc)</li> <li>• toolkit for soil sampling</li> <li>• Plots Identification &amp; Develop layout</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation of materials</li> <li>• Solid waste management</li> <li>• Safe and sound handling and storage of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of local cultural identity and heritage</li> <li>• Land acquisition and compensation issues</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure green procurement measure for all materials</li> <li>• Grievance redress mechanism</li> <li>• Partnerships and benefit sharing to be streamlined by stakeholders</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li>• <b>Water infiltration construction</b></li> <li>• Prepare surface (Pre-sowing land clearing and preparation)</li> <li>• Farm wells construction (installation of tube wells) and Farm house construction</li> </ul>	<ul style="list-style-type: none"> <li>• Site clearing and preparation</li> <li>• Generation and disposal of solid waste</li> <li>• Water resources and pollution</li> <li>• Soil disturbance and Erosion</li> <li>• Noise and vibration</li> <li>• Post-Harvest losses (Crops diseases and agronomic practices)</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining Livelihoods</li> <li>• Occupational health and Safety</li> <li>• Established grievance redress options</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Cultural Heritage</li> <li>• Resource Access and Possible Restriction</li> <li>• Established grievance redress options</li> <li>• Water infiltration management</li> </ul>
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>• <b>Training centre for salty crops</b></li> <li>• Preparation training material</li> <li>• Farmer group training</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse environmental impacts</li> <li>• Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity building in cultivation of salty resilient crops</li> <li>• Job opportunities and improvement in livelihoods and local economy</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Agricultural Extension Works to undertake on farm trial of salty crops</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li>• <b>Water infiltration and salty crops</b></li> <li>• Saline water monitoring</li> <li>• Project monitoring and reporting</li> <li>• Landscape maintenance equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Air Pollution</li> <li>• Generation/d disposal of solid waste</li> <li>• Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Unavailability and poor use of personal protective equipment and limited/ no enforcement process</li> </ul>	<ul style="list-style-type: none"> <li>• Public health and safety, and traffic issues</li> <li>• Consult affected property owners/users/ communities and seek their consent early in the project development process</li> </ul>



## **ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

An arrangements for project management (oversight, coordination and execution) have been proposed. This include the project steering committees and Execution Partners in Ghana. Figure 8.1 in the report shows the proposed structure for the project implementation arrangements

The main institutions to implement the program and projects and to ensure sound management of the environmental and social aspects include:

- Ministry of Environment, Science, Technology and Innovation (MESTI)
- Ministry of Finance (MoF)
- Ministry of Local Government and Rural Development (MLGRD)
- Ministry of Lands and Natural Resources (MLNR)
- Ministry of Food and Agriculture (MOFA)
- Ministry of Fisheries and Aquaculture (MFAD)
- Ministry of Water Resources, Works and Housing (MWRWH)
- Government Regulatory Bodies:
  - Forestry Commission (Wildlife Division)
  - Environmental Protection Agency
  - Crop services division (MOFA)
  - Fisheries Commission
  - National Disaster Management Organisation (NADMO)
  - Districts/Municipal Assemblies (Ada East, Ada West and Keta)
  - Project Execution Entities
  - Town Development Committees
  - The Development Institute (NGO)
  - Consultative Women's Group
  - District Assembly Members

### **Grievance Redress Mechanism (GRM)**

UN-Habitat in coordination with the execution entities will implement a grievance mechanism in the target areas, which will allow an accessible, transparent, fair and effective means of communicating if there are any concerns regarding project design and implementation. Project employees, and people benefitting / affected by the project will be made aware of the grievance mechanism for any criticism or complaint of an activity.

For the purpose of this project, the general steps of the grievance process to be followed will comprise the following steps:

- Receive submitted
- Grievance assessed and logged
- Acknowledge grievance
- Response Preparation
- Implementation and communication
- Complaints Response and Follow-up
- Close grievance



## ENVIRONMENTAL MONITORING PLAN

The environmental and social risks management approach includes monitoring of potential risks and implementation of risks mitigation measures. This monitoring program commensurate with project activities and will report on the monitoring results to the Fund in the mid-term, annual, and terminal performance reports.

Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk / impact or if they need to be modified in order to achieve the intended outcome. Annual reporting will include information about the status of implementation of this ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

### Monitoring Budget

The Project has been designed to minimize impacts upon the environment and obviate the need for specific mitigation of impacts arising from the Project. However, mitigation costs and costs for implementing environmental management, including monitoring costs, have been included in the overall Project budget.

Detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements. However, provisional budget to carry out the proposed monitoring programme has been provided in Table 10.1. A total amount of about US\$..... will be required annually for the implementation of the Monitoring plan.

Indicative Budget for ESMP Implementation

#	Item	Unit	Unit Cost		Total		Source of financing
			Local ¢	US\$	Local ¢	US\$	
1	Preparation of specific ESIA/ESMF						AF Project Funds
	ESIA/ESMF						AF Project Funds
	Permit and Processing Fees						AF Project Funds
2	Training & Capacity Building						
	Awareness creation and Capacity building for project staff						AF Project Funds
	Study tours (local) for selected social and environmental champions participating in .....						AF Project Funds
3.	Mid-term audit of ES performance						
	Performance Audit						Project Funds
4	Completion audit of ES performance						
	Completion Performance Audit						Project Funds
5.	Monitoring and Evaluation						
	Safeguards component for M&E						AF Project Funds
	Total						

## CHAPTER ONE

### 1 INTRODUCTION

#### 1.1 PROJECT BACKGROUND

The Government of Ghana (GoG) through the Ministry of Local Government Rural Development (MLGRD) and the Ministry of Environment, Science and Technology and Innovation (MESTI) has requested the United Nations Human Settlements Program (UN-Habitat) with support from the Adaptation Fund to plan and implement spatial climate adaptation strategies to address the challenges posed by natural hazards (erosion, floods and sea level rise), in selected unplanned and inadequate coastal urban expansion areas that lack infrastructure and service provision in the country. The Adaptation Fund is an international fund that finances projects and programs aimed at helping developing countries to adapt to the harmful effects of climate change. It is set up under the Kyoto Protocol of the United Nations Framework Convention on Climate Change.

If the project proposal is approved, the Adaptation Fund will provide around \$14 million funding for the implementation of the project in Ghana and Cote d' Ivoire. Aiming at replicability at different scales, the interventions will be the most cost-effective and community inclusive, becoming a prototype for the sustainable management of coastal areas in West Africa. The focus of the project in Ghana will be along the Volta estuary and the Keta-Angaw lagoon areas. Generally, the Coastal communities in this area are struggling with multiple interacting problems such as severe coastal erosion, increasing flood risk both from the ocean and the lagoons, a declining fish stock, and pressure from industrial activities (aquaculture) and recreation activities (secondary houses/private estates/ ecotourism) on the common pool resources. This challenging context is exacerbated by the uncontrolled development of this coastal area, which is characterized by low density patterns and lack of planning deriving in an inefficient use of resources and the encroachment of environmental assets and risk areas.

In line with the Adaptation Fund's ESP and GP and UN-Habitat's Environmental and Social Safeguard Policy (ESSP) as well as the Ghana Environmental Assessment requirements, UN-Habitat and partners are required to categorize the risk of the project as a whole and to manage potential risks and impacts. It is against this background that this Environmental and Social Management Framework (ESMF) study has been undertaken.

#### 1.2 PROJECT OBJECTIVES

The overall objective of the project is to increase the resilience of coastal communities and settlements in Ghana. The sub-objectives of the project, which are in line with the project component below and AF outcomes, are:

1. Promote climate change resilient coastal development through sub-regional and district-level spatial development frameworks and to strengthen institutional capacities to develop, use and update these spatial frameworks.
2. Strengthen community awareness and capacities to adapt to climate-related coastal hazard and threats through community planning.
3. Increased climate change resilience of coastal areas through increased ecosystem / natural resource resilience



4. Increased climate change resilience of coastal communities through diversified and strengthened livelihoods.
5. Strengthen institutional capacity and tools to identify and manage coastal climate change-related risks / impacts in Ghana and Cote d'Ivoire (and West Africa) and diffuse / share knowledge on innovative (building with nature) coastal climate change adaptation practices in West Africa

### 1.3 PROJECT COMPONENTS

The project as indicated in the Pre-concept stage (Refer to Annex A) has been structured into the following five components and will be implemented in both Ghana and Cote d'Ivoire for a duration of 4 years.

- Component 1: Promote climate change resilience through spatial development frameworks
- Component 2: Resilience building planning at the community level
- Component 3: Transformative concrete ecosystem / natural resource adaptation interventions at sub-regional and district level
- Component 4: Catalytic concrete climate change adaptation through diversified and strengthened livelihoods at community level
- Component 5: Knowledge sharing and monitoring

The Ghana component of the proposed project for implementation covers only component 3 and 4 of the intervention:

#### **Component 3:**

Transformative concrete ecosystem / natural resource adaptation interventions at sub-regional and district level. Through restoring coastal ecosystems, sub-project under this component aim at increasing climate change resilience through flood protection and by facilitating the enabling environment where communities can develop sustainable livelihoods.

This will entail:

1. Coastal lagoons ecosystems restoration for the three districts: this includes, pollution assessment, dredging and vegetation replanting. The project will restore 10 coastal lagoons which constitute a key element of the coastal ecosystem.
2. Keta lagoon mangrove restoration: mangrove restoration is a sustainable solution for ecosystem restoration and lagoon shoreline protection. In parallel with the restoration, education and awareness programs will have to be implemented to prevent the local population from cutting the mangrove wood.

#### **Component 4:**

At community scale the project aims at making use of the restored environment from component 3 in order to increase their livelihoods opportunities. This will entail:

3. Pen aquaculture projects in 10 lagoons. Aquaculture has proven a sustainable income source for the fishing communities along the Ghanaian coast. Given the reduced fishing stock and the increasingly dangerous offshore fishing, aquaculture provides a save and more stable alternative livelihood while maintaining the local knowledge and cultural heritage.
4. Rainwater infiltration in salty agriculture soil and resilient crops farming: Keta district is characterised by being one of the most suitable areas for farming along the East coast.



Due to climate change impacts, salinization is an increasing phenomenon that is diminishing their agriculture capacities. These projects will work on rainwater harvesting and storage for infiltration, aiming at reducing the soil salinity and strengthening their cropping capacities. Moreover, salt resilient crops will be planted.

A detailed description of the four project interventions is provided in Chapter three.

#### 1.4 SCOPE OF STUDY

The proposed project interventions seek to fully align with the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP) as well as Ghana Environmental Assessment policy directives. At the full proposal development stage, the project components and activities were screened to identify potential environmental and social risks and impacts using the 15 Adaptation Fund Principles. With the information available at that stage, the project is classified to fall into **Medium Risk Category B**. In line with the AF ESP and GP, an Environmental and Social Impact Assessment (ESIA) report has been prepared.

The ESIA identifies and evaluates potential environmental risks and impacts for the proposed activities, evaluate alternatives, and design mitigation measures. It also analyzes any cumulative impacts, where applicable. The preparation of the ESIA has been 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 aim to identify key issues and determine how the concerns of all parties will be addressed in the ESIA.

The Ghana EPA statutorily requires an EIA for projects of this nature in sensitive areas. The EPA requested for the preparation of an **Environmental and Social Management Framework (ESMF)** as per their letter attached as Annex B. The reporting has therefore been structured in a way to create synergy and compliment the two requirements to ensure that the report meet the acceptance of both AF and the Ghana EPA.

#### 1.5 PURPOSE OF THE ESIA/ESMF

The core ESIA/ESMF objectives include:

- Providing clear procedures and methodologies for the environmental and social (E&S) assessment, screening, planning, review, approval, and implementation of the sub-projects;
- Establishing appropriate roles and responsibilities of stakeholders with respect to E&S due diligence, reporting procedures, management and monitoring of E&S risks;
- Determining the training, capacity building and technical assistance needed by stakeholders to successfully implement the provisions of the Environmental and Social Management Frameworks (ESMFs) or Environmental and Social Impact Assessments (ESIAs);
- Identifying required information resources for ESMP implementation;
- Evaluating and predicting magnitude of potential impacts with proposed measures to improve positive impacts and mitigate/minimize/compensate for negative impacts;



- Outlining cost implications for implementing the ESIA/ESMF requirements; and
- Providing useful lessons for application to future programs.

## 1.6 TERMS OF REFERENCE FOR THE PROJECT

The Terms of Reference for the study has been attached as Annex C. Specifically, the consultant is supposed to undertake the following:

- Coordinate with local partners responsible for community mobilization and data collection.
- Organize effective and relevant public consultations.
- Visits to all selected sites to establish an updated baseline and data collection from relevant local authorities and communities.
- Review all relevant legislation and regulations for planned interventions;
- Describe the different project components and their content (nature and potential size of the transformative interventions).
- Conduct an analysis of potential environmental and social risks and impacts according to the 15 safeguard areas of the AF, and in accordance with national requirements and guidelines.
- Identify the roles and responsibilities of the various actors to implement the proposed mitigation measures in response to identified impacts;
- Assess available capacity to implement the proposed mitigation measures, and make appropriate recommendations including training and capacity building needs and their costs.
- Propose a framework for environmental management and monitoring.
- Prepare a summary budget of all actions and activities proposed in the ESIA/ESMF;
- Produce the final report of the study as well as the complementary data from the consultations carried out, including the results obtained following the data analysis.

## 1.7 PROJECT JUSTIFICATION

The project will promote socio-economic development, linking to the regional and national priorities to mobilize resources for implementation, but also at the municipal and community levels, by developing transformative and catalytic projects that are revenue-generating and that have the potential to act as catalysers for the creation of jobs and economic activities.

Additionally, the project will help achieving the goals of the Ghana's Intended Nationally Determined Contribution (INDC) which is based on Ghana Shared Growth Development Agenda II, the 40-year socio-economic transformational plan and the National Climate Change Policy. The project will tackle building climate resilient strategic infrastructure, which is identified as a strategic area for policy action in the INDC. More specifically, it addresses the objectives, strategies, and priority actions specified by the National Climate Change Adaptation Strategy.

The different components will focus on the areas prioritised by the National Climate Change Policy, also supporting and giving continuation to Ghana's Plan of Action on Disaster Risk



Reduction and Climate Change Adaptation (2011/2015). The components of the proposed project will support activities of the plan such as: ensuring disaster risk reduction is a national and local priority with a strong institutional basis for implementation; ensure regional, national and local coordination; identification and assessment of disaster risks; use knowledge, innovation and education to build culture of safety and resilience; and reinforcing land-use planning and other technical measures to build resilience. Ultimately, the project will leverage the achievements of the National Adaptation Planning (NAP) process established under the UNFCCC.

## **1.8 APPROACH AND METHODOLOGY**

The methodology was developed following the review of the Project Terms of Reference (see Annex C) and the Guideline document for UN-Habitat and partners to comply with the Fund Environmental and Social Policy (ESP) and Gender Policy (GP) as well as the Ghana EIA procedures. Figure 1.1 below shows the methodology/approach used for the study to meet the requirements of both the project executing agencies as well as the national regulatory agency.

### **1.8.1 The 15 AF principles**

Projects funded through the AF are required to demonstrate that they align with the 15 Principles or safeguards incorporated in the Environmental and Social Policy. These principles and safeguards are intended to ensure that unnecessary environmental and social harms do not arise as a result of projects funded through the Adaptation Fund. Managing these risks is integral to the success of the funded projects and programmes.

To ensure compliance with the AF ESP, all proposed project activities have been screened against the 15 AF principles (i.e. safeguards) to identify potential environmental and social risks and to assess related potential impacts. Where risks have been identified, impact assessments have been conducted and where needed, measures to avoid or mitigate risks and impact, identified (+ monitoring arrangements).

### **1.8.2 Ghana Environmental Impact Assessment Regulation LI 1652, (1999),**

The Environmental Assessment Regulations, LI 1652, was promulgated in 1999 to give comprehensive legal cover to the Ghana EIA procedures. These Regulations require that all developmental activities likely to impact adversely on the environment must be subject to Environmental Assessment

There is some similarities in the Ghana EIA procedures and the AF requirements. To ensure that the final report complies with the Ghana EIA Assessment Regulation LI 1652, (1999), including government approvals, there was the need to harmonise the two requirements.

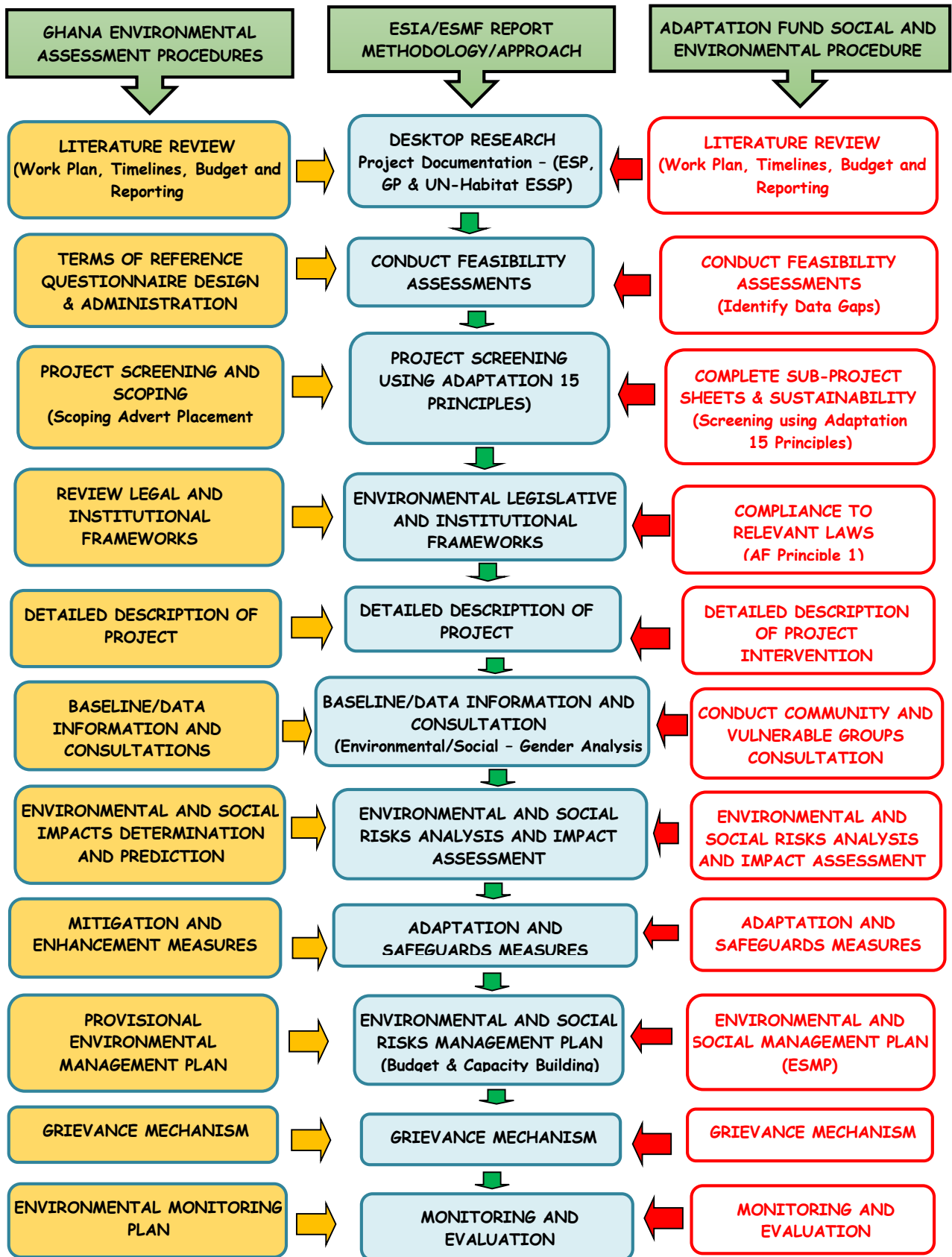


Figure 1.1: Report Methodology/Approach (Consultant's Construct)





The ESIA/ESMF methodology adopted in the figure above involves the following activities:

- Registration
- Feasibility Sheets
- Sub-Projects Screening Sheets and scoping studies
- Stakeholder identification and consultations;
- Data collation and analysis, consisting of:
  - Literature reviews;
  - Determination of potential risks and impacts;
  - Identification of impact mitigation guidelines/measures;
  - Preparation of an Environmental and Social Management Plan; and
  - Capacity building and training needs.
- Reporting.

### **1.8.3 Registration**

The first step of the EIA process was to register the undertaking/project with the EPA. This is a project that requires detailed EIA so the project was duly registered with the EPA by completing the required EA2 Form.

### **1.8.4 Feasibility Sheets and Sub-Projects Screening Sheets**

The Consultant collected information to fully assess the feasibility of the proposed adaptation measures and how the intervention would fit into the surrounding system. The objective of the feasibility study(ies) is to ensure proposed concrete adaptation measures are feasible in terms of technique, suitability in the surrounding (system), cost-effectiveness compared to alternative solutions, economic, social and environmental benefits (especially of most vulnerable communities and groups, operation and maintenance (requirements and costs), sustainability (arrangements required, also for replication and upscaling) and compliance with National technical standards / regulations.

### **1.8.5 Sub-Projects Screening Sheets and Scoping studies**

The Consultant carried out screening of sub-projects to identify potential risks early in the project cycle. The process of risk identification or screening for risks followed the 15 principles of the ESP as indicated in section 1.8.1.

### **1.8.6 Stakeholder Identification and Consultations**

Consultations have been held with the public, particularly, those who may be directly or indirectly influenced by the project. In addition, the Consultant reviewed outcome of previous engagement with key stakeholders on similar projects related to the sector. The viewpoints/inputs from the consultation and reviews were incorporated in the study.

The key stakeholders such as the Environmental Protection Agency, The Ada East, Ada West and Keta District Assemblies, the Wildlife Division of the Forestry Commission, The Development Institute (NGO) etc. were identified for engagement during the conduct of environmental and social assessments for specific sub-projects.



### 1.8.7 Baseline Data Collation and Analysis

The Consultant assembled and evaluated relevant baseline data relating to the biophysical and socio-economic environment to be influenced by the project. The baseline data include climate, topography and relief, geology and soil, demography, health, waste management, economy, and land tenure system, road transportation. In addition, the ESMF report has scoped out the issues and provided general assessment of the impacts. The major documents reviewed include:

- Project Documents (brief description of project)
- Adaptation Fund (April 2016). Manual of basic Environmental and Social Management System procedures and functions at National Implementing Entities.
- Other GoG Reference Documents
  - Environmental Protection Agency Act, 1994 (Act 490);
  - Environmental Assessment Regulations 1999 (LI 1652);
  - National Environmental Policy;
  - Ghana EIA Procedures; and
  - Relevant international conventions.

### 1.8.8 Reporting

The TOR spelt out the reporting requirements. The Consultant would submit the draft report in English version including an executive summary in English. This should be submitted electronically to the client (UN-HABITAT) for comments and possibly approval. The final version of the report, which will have taken into account the comments of the client, will be sent by the consultant in the required format to the Environmental Protection Agency for review, comments, suggestions and validation.

According to the correspondence from the EPA letter CU: 2092/01/01 dated 19<sup>th</sup> March, 2018, (Refer Annex C) requires five (5) copies of the draft EIS to be submitted to the Agency for review comments. The EPA will further review the draft EIA report and forward their comments to the client for revision and finalization. The consultant after revising the document will resubmit two (2) final copies together with a soft copy in PDF format to the EPA before issuance of Environmental permit.

## 1.9 STRUCTURE OF THE REPORT

The report has been structured into 11 chapters as follows;

- Cover Page
- Table of Contents with list of annexes;
- List of Figures, Plates
- List of Tables
- Executive Summary

### **Chapter 1 - Introduction:**

This chapter presents a general background to the preparation of an ESIA/ESMF for the proposed project. The chapter discusses the project objectives, scope of work as outlined in the TOR, justification/rationale for the implementation of the project and the methodology to be adopted in the study.

**Chapter 2 – Environmental, Legislative and Institutional Framework:**

The chapter reviews the relevant policies and other statutory laws and regulations as well as institutional frameworks that will guide implementation of the proposed project from the conceptualization stage to implementation and monitoring phase.

**Chapter 3 - Description: of Project Interventions**

This chapter provides details of the specific project interventions, touching on specific project location, Components and the description of proposed works in the project.

**Chapter 4 – Description of the Existing Environment**

The chapter provides some baseline studies on the current environmental conditions and socioeconomic and cultural characteristics, including physical, as well as socio-economic and cultural settings in project area.

**Chapter 5 – Public Consultations and Engagements:**

This chapter presents the process of undertaking consultations with the relevant stakeholders such as EPA, the respective District Assemblies as well as Project Affected Persons (PAPs) disaggregated by gender and information on vulnerable groups or persons identified

**Chapter 6 – Potential Impacts Assessment and Risks Analysis**

This chapter identifies the potential environmental and social impacts of the project, project screening and categorization, project risks management and an analysis of alternatives associated with the execution of the project to the sub-project.

**Chapter 7 – Adaptation and Mitigation Measures**

This chapter provides a summary of the mitigation and adaptation measures for the potential environmental impacts identified in chapter six.

**Chapter 8–Environmental and Social management Plan**

This chapter provides proposals for a provisional environmental management plan, which is an action plan that translates the project's goals and policy commitments into concrete actions so that environmental objectives and targets are achieved. It also provides summary of arrangements to manage and implement the ESMP

**Chapter 9–Grievance Redress Mechanism:**

This chapter captured the entire process of a grievance mechanism, detailing out a chronological process with which aggrieved PAPs can seek redress. It presented the various mediums of channeling grievances to the Local Mediation Committee (LMC).

**Chapter 10– Environmental Monitoring Plan:**

This chapter provides a summary of monitoring requirements which will assess the effectiveness of the mitigation measures implemented during the Project. The primary objective is to provide project authorities with feedback on implementation and to identify problems and successes as early as possible, to allow for timely adjustment of implementation.



## CHAPTER TWO

### 2 ENVIRONMENTAL, LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS

This chapter reviews the relevant policies and other statutory laws and regulations as well as institutional frameworks that will guide the project from the conceptualization of the proposed project to implementation and monitoring.

#### 2.1 POLICY FRAMEWORKS

1. National Environmental Policy (NEP), 2014
2. National Climate Change Policy, 2013
3. National Climate Change Adaptation Strategy 2010 -2020
4. Ghana Fisheries and Aquaculture Policy, 2011
5. Forest and Wildlife Policy, 2012
6. National Wetlands Conservation Strategy, 2007
7. National Water Policy (NWP), 2007
8. National Gender Policy, 2015
9. Health Sector Gender Policy, 2009
10. Occupational Safety and Health Policy of Ghana (OSHP), 2014

##### 2.1.1 National Environmental Policy (NEP), 2014

The NEP is based on a broad vision founded on and directed by respect for all relevant principles and themes of environment and sustainable development. According to the Policy, Ghanaians are entitled to an environment that is not harmful to their health and wellbeing and are enjoined to have the environment protected for the benefit of present and future generations through reasonable legislative and administrative measures. The Policy therefore aims at:

- Reversing the current insufficient commitment to environmental objectives, policies and interventions
- Reversing rapid population growth, economic expansion, persisting poverty, poor governance and institutional weaknesses and failures
- Improving quality and flow of information
- Creating an understanding of the nature and causes of environmental problems
- Establishing a clear definition of the national environmental agenda and its links to economic growth and poverty reduction and weak legal, regulatory, financial, technical, human and institutional capacity
- Mainstreaming international relations into the national environmental agenda
- Improving the current environmental quality control programme by which prior environmental impact assessments of all new investments that would be deemed to affect the quality of the environment are undertaken.

**Relevance:** Specific policy actions relevant to the project implementation include among others measures to control air and water pollution and policy measures to protect critical ecosystems, including the flora and fauna.



### 2.1.2 Ghana National Climate Change Policy (NCCP), 2013

The National Climate Change Policy is Ghana's integrated response to climate change within the context of national sustainable development. It provides strategic direction and clearly defines pathway for dealing with the challenges of climate change within the current socio-economic context of the country. The policy objectives seeks to ensure a climate-resilient and climate-compatible economy while achieving sustainable development through equitable low carbon economic growth for Ghana.

The three objectives of the Policy are (1) effective adaptation, (2) social development and (3) mitigation. To address the adaptation issues in Ghana, four thematic areas have been identified. These are (1) energy and infrastructure, (2) natural resources management, (3) agriculture and food security, and (4) disaster preparedness and response.

**Relevance:** The Climate Change policy is relevant to the Project since climate change impacts such as sea level rise and floods can have adverse implications on Project implementation. The developer shall conform to these provisions.

### 2.1.3 National Climate Change Adaptation Strategy – 2010 -2020

The National Climate Change Adaptation Strategy seeks to enhance Ghana's current and future development to climate change impacts by strengthening its adaptive capacity and building resilience of the society and ecosystems. The objectives are:

- Improve societal awareness and preparedness for future climate change;
- Enhance the mainstreaming of climate change into national development to reduce climate change risks;
- Increase the robustness of infrastructure development and long-term investments;
- Enhance the adaptability of vulnerable ecological and social systems by increasing the flexibility and resilience of these systems;
- Foster competitiveness and promote technological innovation

**Relevance:** The four project conventions are all in line with the Climate Change Adaptation Strategic measures that have been outlined

### 2.1.4 Ghana Fisheries and Aquaculture Policy , 2012

Ghana has enacted the Ghana Fisheries and Aquaculture Policy, which is the first comprehensive policy document on the fisheries and aquaculture sector and in which the aquaculture sub sector has been adequately highlighted. The Policy is a blueprint that provides the government's framework for the fisheries contribution to the Ghana Poverty Reduction Strategy (PRSP) II objectives. It establishes five strategic pillars on which the development and management of fisheries in Ghana will be built and the principles that will be applied to guide this process. The policy recognises the present aquaculture status in Ghana as actively growing with the central objectives of increasing fish availability, industry development, wealth creation and reduction of national fish imports.

Specifically, the policy objectives and strategies that border on aquaculture include management of fisheries, conservation of aquatic resources and protection of their natural



environment; the promotion of value addition in the fisheries sector and the improvement of livelihood in the fisheries communities; the sustainable development of aquaculture; and the improvement (and sustainability) of services provided to the sector by the Fisheries Commission and other supporting institutions. The operational objectives of the policy seeks to inter alia, ensure appropriate inputs for aquaculture operation, especially with regard to the quality of fish seeds or fingerlings and fish feed; recognize the complementary role of private and public sector at this stage of development; provide education and training; build strong partnerships among public institutions and farmers; and promote appropriate production systems in suitable locations while avoiding or minimizing conflicts on land or water use.

**Relevance:** The proposed Pen Culture sub-project component is in line with the objectives of the Ghana Fisheries and Aquaculture Policy, as the implementation of the Project will help expand the aquaculture sector in the project area, improve the livelihood of the people in and around the beneficiary communities through employment or job creation, increase fish availability and reduce fish imports.

#### 2.1.5 Forest and Wild life Policy, 2012

The Forest and Wild life Policy of Ghana aims at the conservation and sustainable development of forest and wildlife resources for the maintenance of environmental stability and continuous flow of optimum benefits from the socio-cultural and economic goods and services that the forest environment provides to the present and future generations, whilst filling Ghana's commitments under international agreements and conventions. The specific objectives of the Policy are to:

- Manage and enhance the ecological integrity of Ghana's forest, savannah, wetlands and other ecosystems for the preservation of vital soil and water resources, conservation of biological diversity, and enhancing carbon stocks for sustainable production of domestic and commercial produce
- Promote the rehabilitation and restoration of degraded landscapes through forest plantation development, enrichment planting, and community forestry informed by appropriate land-use practices to enhance environmental quality and sustain the supply of raw materials for domestic and industrial consumption and for environmental protection
- Promote the development of viable forest and wildlife-based industries and livelihoods, particularly in the value-added processing of forest and wildlife resources that satisfy domestic and international demand for competitively-priced quality products
- Promote and develop mechanisms for transparent governance, equity sharing and citizens' participation in forest and wildlife resource management.

**Relevance:** The project is located in an environmentally sensitive area. It is therefore very important to understand the policy focus and strategic actions for conserving and protecting the integrity of the forest and wildlife resources.



### 2.1.6 National Wetlands Conservation Strategy, 2007

The National Wetlands Conservation Strategy provides the formalized guidelines, recommendations and frameworks necessary to ensure the conservation of Ghana's wetlands and their associated ecosystem goods and services. The Strategy seeks to implement Government's policy on wetlands as stipulated in Ghana's National Land Policy (which seeks to promote the use of wetlands for farming, grazing, fishing, timber production and salt-winning, provided that such uses also serve to conserve the ecosystem, biodiversity and sustainable productivity of the wetlands).

The Strategy identifies the major threats to wetland systems as water loss through drainage, saltwater intrusion in coastal areas and pollution through discharge of contaminated effluent, including sewage. Through this strategy, Ghana has initiated a number of conservation projects as part of the RAMSAR Convention which recognizes environmentally important wetlands throughout the world. In order to conserve Ghana's wetlands functions the Strategy seeks to discourage:

- the physical draining of wetland water;
- draining of streams and water courses feeding the wetlands;
- human settlements and their related infrastructural developments in wetlands;
- disposal of solid waste and effluents in wetlands; and mining in wetlands.

**Relevance:** This strategic policies and measures on wetlands conservation will inform and drive the implementation process of the proposed project.

### 2.1.7 National Water Policy (NPW), 2007

The NPW of Ghana aims at providing a framework for the sustainable development and utilization of Ghana's water resources. It is targeted at all water users, water managers and practitioners, investors, decision-makers and policy makers within the central and decentralized government structures such as the district assemblies, non-governmental organizations and international agencies.

**Relevance:** The Policy outlines the various cross-sectoral issues related to water-use and the links to other sectoral policies such as relating to energy, hygiene Education and Environmental Sanitation which is relevant for project implementation.

### 2.1.8 National Gender Policy, 2015

The overarching goal of the Ghana Gender Policy is to mainstream gender equality and women's empowerment concerns into the national development process in order to improve the social, legal, civic, political, economic and cultural conditions of the people of Ghana; particularly women and men, boys and girls in an appreciable manner and as required by National and International Frameworks.

**Relevance:** The implementation of the interventions will take all necessary steps to ensure the full integration of men and women into the mainstream operations of the project



### 2.1.9 Health Sector Gender Policy, 2009

The Health Sector Gender Policy was developed by the Ministry of Health to promote gender mainstreaming in the health sector. The National Adolescent Reproductive Health Policy was also developed in 2000 to address teenage pregnancies, adolescent sexuality and early marriage. Although maternal health care has improved over the past 20 years, the maternal mortality ratio is still higher than the target set by the government.

**Relevance:** The Project shall comply with the provisions of this Policy to safeguard human life.

### 2.1.10 Occupational Safety and Health Policy of Ghana (OSHP), 2011

The policy statement of the Occupational Safety and Health Policy 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 OSHP is derived from the provisions of the International Labour Organisation (ILO) Conventions Nos. 155 and 161.

**Relevance:** This policy has specific sections on objectives, scope, strategies, activities and promotion and awareness creation on Occupational Health and safety which is relevant to the operation of the project.

## 2.2 ADMINISTRATIVE AND INSTITUTIONAL FRAMEWORKS

The administration and institutional arrangements of the proposed project is fragmented among a number of Ministries, Department, Agencies and Organisations. Key among them include:

1. Ministry of Environment Science, Technology and Innovation (MESTI);
2. Ministry of Fisheries and Aquaculture Development
3. Ministry of Local Government and Rural Development (MLGRD)
4. Ministry of Lands and Natural Resources
5. Fisheries Commission
6. Water Resources Commission
7. Forestry Commission
8. Environmental Protection Agency (EPA);
9. Lands Commission
10. District/Municipal Assembly

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

The Ministry exists to establish a strong national scientific and technological base for accelerated sustainable development of the country. The overall objective of MESTI is to ensure accelerated socio-economic development through the formulation of sound policies and a regulatory framework to promote the use of appropriate environmentally-friendly, scientific and technological practices and techniques. The Ministry also works in close coordination with the Environmental Protection Agency of Ghana.





### **2.2.2 Ministry of Fisheries and Aquaculture Development**

The Ministry of Fisheries and Aquaculture Development is the lead agency responsible for developing and executing policies and strategies for the fisheries sector within the context of a coordinated national socio-economic growth. The Ministry seeks to ensure food security and emergency preparedness, promote sustainable management of land and environment, develop science and technology application in aquaculture and improve institutional coordination.

### **2.2.3 Ministry of Local Government and Rural Development (MLGRD);**

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

### **2.2.4 Ministry of Lands and Natural Resources (MLNR)**

The Ministry of Lands and Natural Resources (MLNR) has overall responsibility for natural resources planning and policy direction and for monitoring sector programs towards the attainment of the national goals. The ministry is thus responsible for the management of Ghana's land, forests, wildlife and mineral resources. In order to achieve this goal the ministry has set out the following objectives:

- to facilitate equitable access, benefit sharing from and security to land and forest resources;
- to promote public awareness and local communities participation in sustainable management and utilization of forest, wildlife and land use management; to review, update and consolidate existing legislation and policies affecting natural resource management; and
- to develop and maintain effective institutional capacity and capability at the national, regional, district and community level for land, forest and wildlife service delivery.

### **2.2.5 Fisheries Commission**

The Fisheries Commission is the implementing agency of the Ministry of Fisheries and Aquaculture Development (MoFAD). The Commission has been constituted to be the actualizing force behind policies and regulations established by MoFAD. It is therefore responsible for all monitoring, control, surveillance, evaluation, and compliance functions in all areas of fisheries development and management in Ghana, including fish health, post-harvest activities, safety, and quality assurance.

To effectively and efficiently perform its mandate, the Commission has been organized internally into five (5) divisions and four (4) units, namely:

- Marine Fisheries Management Division (MFMD)
- Inland Fisheries Management Division (IFMD)
- Fisheries Scientific Survey Division (FSSD)
- Monitoring, Control, and Surveillance Division (MCSD)
- Operations and Administration Divisions (OAD)
- Fish Health Unit (FHU)



- Monitoring and Evaluation Unit (MEU)
- Post-Harvest Unit (PHU)

### **2.2.6 Water Resources Commission**

The Water Resources Commission (WRC) was established by an Act of Parliament (Act 522 of 1996) as the overall body responsible for water resources management in Ghana. WRC Act 522 of 1996 provides a comprehensive law to establish a separate water resources management institution in Ghana. The mandate of the Water Resources Commission is specifically to:

- Regulate and manage the utilization of water resources, and
- Co-ordinate relevant government policies in relation to them.

### **2.2.7 Forestry Commission**

The Forestry Commission of Ghana is responsible for the regulation of utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them.

### **2.2.8 Environmental Protection Agency (EPA)**

The Environmental Protection Agency is responsible for providing technical advice on environmental protection and sustainable development to the Ministry of Environment, Science, Technology and Innovation. The functions of the agency include promotion of environmental education, research, monitoring and regulation, and preparation of standards and guidelines for environmental management.

In carrying out their functions, the agency is legally backed by the Environmental Protection Act 490, and the Environmental Assessment Regulation LI 1652. The agency also operates within the framework of the National Environmental Action Plan (NEAP), and the Environmental Sanitation Policy.

The EPA has issued formal guidance on regulatory requirements. The following documents will be relevant for Project implementation. These are:

- Environmental Assessment in Ghana, a Guide to (EPA, 1996);
- Ambient Air Quality Standards;
- Sector Specific Effluent Discharge Standards
- Ambient Noise level Standards

### **2.2.9 Lands Commission**

The Lands Commission among others provides Land Services consisting of managing public and vested lands; surveying, mapping and maintaining national territorial boundaries; developing and maintaining national and geodetic reference network nationwide; registering title to land and other interests in land, registering deeds and other instruments affecting land, assessing compensation upon compulsory acquisition, assessing stamp duty & determining values of properties for letting, sale, purchase and rating. . The Lands Commission comprises of four Divisions:

- Lands Registration Division
- Land Valuation Division



- Survey and Mapping Division; and
- Public and Vested Lands Management Division

### 2.2.10 District/Municipal Assembly

The proposed project fall within three District Assemblies namely, Ada West District Assembly, Ada East District Assembly and the Keta Municipal Assembly. The district is responsible for administering the Local Government Act. The district assembly has the ultimate role to seek the necessary approvals and implement the district's development plan.

## 2.3 RELEVANT LAWS AND REGULATIONS OF THE SECTOR

The project is expected to comply with the relevant National, Regional and International legislations. Emissions and discharges are expected to meet the Ghana National Environmental Quality Guidelines Standards and related requirements as well as the Environmental Health and Safety Guidelines for Environmental Health and Safety Guidelines for aquaculture (2007) of International Finance Corporation (IFC) of the World Bank Group. The following relevant laws and regulations, standards and guidelines in the country have been discussed.

1. Environmental Protection Agency (EPA) Act 1994 (Act 490);
2. Environmental Assessment Regulations 1999, LI 1652;
3. National Environmental Quality Standards (NEQS)
4. Fees and Charges (Amendment) 2019, LI 2386
5. Fisheries Act (Act 625 of 2002)
6. Wetland Management (RAMSAR sites) Regulation, 1999
7. Pesticides Control and Management Act (1996) Act 528
8. Fire Protection, (Premises) Regulations, 2003 (LI 1724);
9. Water Resources Commission Act 1996, Act 522
10. National Disaster Management Organisation Act, 2016 (Act, 927)
11. Labour Act 2003, Act 651
12. Local Governance Act of 2016, Act 936
13. Public Health Act, 2012 Act 851.
14. Land Use and Spatial Planning Act, 2016 Act (925)
15. District Assembly bye-laws on Sanitation
16. Children's Act of 1998 (Act 560)
17. Workmen's Compensation Law 1987 (PNDC 187)
18. Persons with Disability Act 2006, Act 715

### 2.3.1 Environmental Protection Agency Act 490 of 1994

In 1994, Ghana enacted the Environmental Protection Agency Act, 1994 (Act 490). Act 490 created a corporate body called the Environmental Protection Agency (the Agency) to replace the then Environmental Protection Council (EPC). Among its functions, the Agency was mandated "to ensure compliance with any laid down environmental assessment procedures in the planning and execution of development Projects, including compliance in respect of existing Projects" Section 2(i).



Under Section 12 (1) of the Act, the Agency “may by notice in writing require any person responsible for any undertaking which in the opinion of the Agency has or is likely to have adverse impact on the environment to submit to the Agency, in respect of the undertaking, an environmental impact assessment containing such information within such period as shall be specified in the notice”. It also provides for integrated Environmental management and the protection and conservation of the environment through sustainable management and use of natural resources.

**Relevance:** This law is the primary legal basis for undertaking environmental assessment for the proposed Project. An Environmental Permit would have to be obtained from the Ghana EPA.

### 2.3.2 Environmental Assessment Regulations, 1999 (LI. 1652)

In order to meet the immediate demand imposed by Section 2(i) of Act 490, the Ghana E.I.A. Procedures were developed, published and launched in 1995. The procedures formed the basis for the Environmental Assessment Regulations 1999, LI 1652.

The regulations state that a developer shall not implement a Project for which an Environmental Impact Statement is required under the regulations, unless an Environmental Impact Assessment has been concluded in accordance with the Regulations and the EPA has issued a permit. The legislation also recognizes the following areas as environmentally sensitive areas:

- All areas declared by law as national parks, watersheds reserves, wildlife reserves and sanctuaries including sacred groves;
- Areas with potential tourism value;
- Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna);
- Areas of unique historic, archaeological or scientific interest;
- Areas which are traditionally occupied by cultural communities;
- Areas prone to natural disasters (such as geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity);
- Areas prone to bushfires;
- Areas classified as prime agricultural land;
- Recharge areas of aquifer; and
- Water bodies characterized by one or any combination of water tapped for domestic purposes, water within the controlled and/or protected areas and water which support wildlife and fisheries activities.

**Relevance:** Being a Project of this magnitude, it falls under a Project category requiring the preparation of the Environmental Impact statement or full EIA study. The Project area from the definition above also falls within an ecologically sensitive area. This report is in line with the process of obtaining the required permit from the EPA



### 2.3.3 National Environmental Quality Standards (NEQS)

The NEQS provides permissible levels for ambient air quality, noise levels and effluent quality standards for discharge into natural water bodies. The environmental standards include:

- **National Ambient Air Quality Standards (GS 1236, 2019)**

This guideline provides for permissible guideline values for a variety of air pollutants.

- **National Ambient Noise Level Standards (GS 1222, 2018)**

This guideline provides for permissible night and day noise levels for variety of settings ranging from residential areas with negligible or infrequent transportation to predominantly heavy industrial areas.

- **National Effluent Quality Discharge Standards (GS 1212, 2019)**

This provides the national effluent quality discharge guideline levels as administered by the EPA.

**Relevance:** These guidelines are relevant to the project in becoming abreast with the environmental quality standards of the Environmental Protection Agency. The project shall comply with these standards in order to safeguard the workers and to ensure sound environmental quality.

### 2.3.4 Fees and Charges Amendment Instrument, 2019 (LI 2386)

The Environmental Assessment Regulations Fees and Charges (Amendment) Instrument 2019, LI 2386 gives regulation to the fees and charges collectable by the EPA for processing and permit fees.

**Relevance:** This Act is relevant to the Project in becoming abreast of the fees and charges collectable by the Environmental Protection Agency.

### 2.3.5 Fisheries Act (Act 625 of 2002)

The Fisheries Act (Act 625 of 2002) repeals the Fisheries Commission Act (Act 457 of 1993) The Act consolidates and amends the law on fisheries. It provides for the regulation, management and development of fisheries and promotes the sustainable exploitation of fishery resources. Section 93 of the Fisheries Act stipulates that if a proponent plans to undertake an activity which is likely to have a substantial impact on the fisheries resources, the Fisheries Commission should be informed of such an activity prior to commencement. The Commission may require information from the proponent on the likely impact of the activity on the fishery resources and possible means of preventing or minimizing adverse impacts.

**Relevance:** The pen culture component of the proposed project will have to comply with this Act especially sections 88 (prohibited fishing methods) and section 92 (pollution of fishery waters)

### 2.3.6 Wetland Management (RAMSAR sites) Regulation, 1999

The regulation promulgated under the Wild Animals Preservation Act, Act 235 of 1964 establishes wetlands as 'RAMSAR sites' as per the Convention of Wetlands of International

importance and prohibits certain activities (and during certain seasons) within the designated RAMSAR site.

**Relevance:** The Project is located at the Angaw-Keta Lagoon Ramsar site. The project will ensure wise use and sustainable development of Aquaculture Project site.

### **2.3.7 Pesticides Control and Management Act (1996) Act 528**

The Act which is now part of the EPA Act 490, was enacted to ensure the control, management and regulation of chemicals and pesticides and related matters in Ghana. It provides the EPA the powers to register and classify chemicals, to determine “Restricted” and “Suspended” chemicals, license and approve chemical dealers, and to ensure enforcement and penalties. The Act states that no person shall import, export, manufacture, distribute, advertise, sell or use any chemical in Ghana unless the chemical has been registered by the EPA in accordance with this Act.

**Relevance:** Any person seeking to register any pesticide shall submit to the Agency an application for registration which shall be in such form and be accompanied with such fee, information, samples and such other material as the Agency may determine.

### **2.3.8 Fire Precaution, (Premises) Regulations, 2003 (LI 1724)**

The Fire Precaution (Premises) regulations 2003 L.I 1724 was passed to give backing to the Ghana National Fire Service (GNFS) to insist on or evaluate Fire Safety Precautions measures in premises to occupants or any person staying in that premises by ensuring that they can escape from fire safety and quickly.

**Relevance:** This regulation is important to the Project in order to ensure that fire safety measures are put in place to protect lives that will use the premises as well as the properties in the facility. Generally, the regulation requires that the developer applies to the GNFS for permit to ensure that the necessary fire safety measures are part of the drawings for the building before the developer is permitted to begin construction works. The Project shall comply with this regulation by acquiring a fire certificate certifying the adequacy of precaution measures in the building

### **2.3.9 Water Resources Commission Act 1996, Act 522**

This legislation relates to the management and development of water resources in the country. Applications of the water right for commercial use is required considering that all water, in its natural state, vests in the president who holds it on behalf of and for the benefit of Ghanaians.

**Relevance:** Granting of water right to potential users. The developer will take necessary steps as per the requirement of the Act to obtain the relevant water rights requirements if the need arises.

### **2.3.10 National Disaster Management Organisation Act, 2016 (Act, 927)**

National Disaster Management Organisation (NADMO) seeks to enhance the capacity of society to prevent and manage disasters and to improve the livelihood of the poor and



vulnerable in rural communities through effective disaster management, social mobilisation and employment generation.

“To manage disasters by co-ordinating the resources of government institutions and non-governmental agencies, and developing the capacity of communities to respond effectively to disasters and improve their livelihood through social mobilization, employment generation and poverty reduction projects

**Relevance:** The Act will help manage disaster risk especially flood related issues.

### **2.3.11 Labour Act, 2003 (Act 651)**

This Act provides a framework for the employment of persons; engagement of persons on contracts of service and to provide for the form of and enforcement of contracts of service; protection of wages of employees; and control of employment agencies.

Act 651 contains a number of specific provisions relating to an employer’s duty of care to its workers. These include providing and maintaining “at the workplace, plant and system of work that are safe and without risk to health” and taking “steps to prevent contamination of the workplaces by, and protect the workers from, toxic gases, noxious substances, vapours, dust, fumes, mists and other substances or materials likely to cause risk to safety or health”

**Relevance:** The proposed Project will put in place measures to ensure safety and well-being of workers in accordance with its regulations as well as ensuring labour, wages and other related issues are adhered to.

### **2.3.12 Local Governance Act of 2016, Act 936**

The Local Governance Act of 2016, Act 936 which Act repealed the Local Government Act 462 (1993).was passed into law on 27<sup>th</sup> October, 2016, by parliament and was assented to by the President on 20<sup>th</sup> December, 2016. The new Act give mandate to the District Assemblies among others, to promote local economic development; and provide guidance, give direction to and supervise other administrative authorities in the district as may be prescribed by law; initiate programmes for the development of basic infrastructure and provide municipal works and services in the district; as well as be responsible for the development, improvement and management of human settlements and the environment in the district;

**Relevance:** It is relevant because the Project site is under the jurisdiction of the local authority of Assembly. The Project will comply with all the relevant provisions of the Act.

### **2.3.13 Public Health Act, 2012 Act 851.**

The Act empowers an Assembly to prevent unhealthy activities. It provides for the prevention of disease and pollution dangerous to human health and to any water supply for domestic use. It also empowers the Assembly to control drainage, latrine and disposal of sewerage and treatment systems.

**Relevance:** The premises and surrounding environment of the development shall be managed based on the Public Health Act. The Project shall comply with the provisions of the Act in order to safeguard human life. The Project shall also ensure that measures to prevent pollution dangerous to human health and to any water supply are taken into account through the provision of a drainage control system.

### **2.3.14 Land Use and Spatial Planning Act, 2016 Act (925)**

The Land Use and Spatial Planning Law seeks to provide sustainable development of land and human settlements through a decentralised planning system and ensures judicious use of land. This is to improve the quality of life, promote health and safety in respect of human settlements. It further regulates national, regional, district and local spatial planning and generally provides for spatial aspects of socio-economic development and related matters.

**Relevance:** The proposed area is a drainage basin with residential/community facilities within the catchment area. The proposed interventions is thus in accord with the objectives of the Metropolitan assembly. Permit required from the Assemblies for any physical development or change of land use e.g. disposal sites

### **2.3.15 District Assembly bye-laws on Sanitation**

One of the provisions of the Local Governance Act 936 is to give powers to Metropolitan, Municipal and District Assemblies (MMDAs) to make bye-laws. In line with this provision the respective Assemblies have developed by-laws on sanitation and waste for implementation.

**Relevance:** These bye-laws are relevant to the Project since there would be the generation of waste of different kinds which would have sanitation management implications. The Project will comply with the bye-laws of the STDA since it is sited within the Assembly's jurisdiction

### **2.3.16 Children's Act of 1998 (Act 560)**

The Act defines a child as "a person below the age of eighteen years" (Section 1). Section 88 states: 1) No person shall engage a child in night work.

Part V, Sections 87 to 96 defines in detail what child work, exploitative child labour and hazardous work and provides regulations for the same. It also provides the ages at which each type of work may be performed and the minimum age for employment. It also prescribes sanctions for those who offend the provisions in the Act. The Act does not mention the concept of "Worst Forms of Child Labour" and is limited in the list of hazardous work children are prohibited from doing. This is simply because the Act was signed into law in 1998, at a time when the ILO Convention No. 182 had not been adopted by ILO.

**Relevance:** The proposed project will draw up programmes to eliminate any "Worst Forms of Child Labour". In accordance with this Act and other ILO requirements (e.g. ILO Convention 29 (1930) Forced Labour - Article 5)

### **2.3.17 Workmen's Compensation Law, 1987;**

It is to provide for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. The tenets of the law places a





large share of the burden of supporting workers injured at the workplace on the shoulders of the employers.

**Relevance:** This law will apply to this project and the safety of all workers will be the responsibility of the proponent

### 2.3.18 Persons with Disability Act 2006, Act 715

Section 6 and 7 of the Act states that the owner or occupier of a place to which the public has access shall provide appropriate facilities that make the place accessible to and available for use by a person with disability. Section 7 states that a person who provides service to the public shall put in place the necessary facilities that make the service available and accessible to a person with disability. Penalty for contravention is stated in Section 8 that a person who contravenes Section 6, or 7 commits an offence and is liable on summary conviction to a fine not exceeding fifty penalty units or to a term of imprisonment not exceeding three months or to both.

Section 26 (1) states that a District Assembly or an operator of a parking lot shall demarcate a special parking place which shall be reserved for the exclusive use of persons with disability. Section 26 (2) without limiting Subsection (1), each public place for parking vehicles shall have a clearly demarcated area for the exclusive use of persons with disability.

**Relevance:** This Act is important to this Project since persons living with disability also have the right to use the facility hence the need to make the facility disability friendly. In compliance with this Act, the Project developer shall not refuse to rent any of the facility or sell to a person because of a disability. Furthermore, there shall be reasonable accommodations allowing people with disabilities to have an equal opportunity to use and enjoy the facility including reasonable modifications such as ramps, grab bars in the bathroom, or Braille on a sign.

## 2.4 INTERNATIONAL CONVENTIONS

Ghana is a signatory to a number of international conventions, agreements and protocols aimed at addressing environmental concerns. Some of the conventions and protocols relevant to the Project are:

1. Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of The Atlantic Coast of Africa, 1999
2. RAMSAR Convention on Wetlands of International Importance, Especially as Waterfowls Habitats
3. Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention).
4. Gulf of Guinea Large Marine Ecosystem Projects
5. Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration (ILO No. 148) 1977
6. UN Framework Convention on Climate Change, 1992
7. UN Framework Convention on Biological Diversity, 1992



## 8. Basel Convention

### 2.4.1 Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa, 1999

The MOU entered into effect on 1 July 1999 under the auspices of the Convention on Migratory Species of Wild Animals (CMS), also known as the Bonn Convention. The MoU focuses on the protection of six marine turtle species that are estimated to have rapidly declined in numbers due to excessive exploitation (both direct and incidental) along the Atlantic Coast of Africa. The Signatories agree to work closely together to improve the conservation status of the marine turtles and the habitats on which they depend. To that end, they agreed to:

1. Endeavour to put in place measures for the conservation and, where necessary and appropriate, strict protection of marine turtles at all stages of their life cycle (including eggs, hatchlings, juveniles, sub-adults and adults)
2. Review and, as necessary, revise national legislation, and ratify or accede to those international conventions most relevant for the conservation of marine turtles, so as to enhance the legal protection given to these species
3. Implement in their respective countries, subject to the availability of necessary resources, the provisions of the Conservation Plan annexed to the MoU
4. Facilitate the expeditious exchange of scientific, technical and legal information needed to coordinate conservation measures; and cooperate with recognized scientists of international organizations and other range States in order to facilitate their work conducted in relation to the Conservation Plan
5. Assess the implementation of the MoU and Conservation Plan at regular meetings
6. Provide the secretariat an annual report on the implementation of the MoU and Conservation Plan

**Relevance:** This MOU is very relevant to the Project because it makes provisions for the protection of marine turtles which are prevalent along the coastal regions of the project area.

**Compliance thereof:** The developer in consultation with the Wildlife Division of the Forestry Commission shall put in place measures to ensure the conservation and protection of marine turtles in the area.

### 2.4.2 RAMSAR Convention on Wetlands of International Importance, Especially as Waterfowls Habitats

The Convention on Wetlands of International Importance, Especially as Waterfowls Habitats (1971), called the RAMSAR Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention's mission is "*the conservation and wise use of all wetlands* through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

Wetlands are vital for human survival. They are among the world's most productive environments; cradles of biological diversity that provide the water and productivity upon which countless species of plants and animals depend for survival.



Wetlands are indispensable for the countless benefits or “ecosystem services” that they provide humanity, ranging from freshwater supply, food and building materials, and biodiversity, to flood control, groundwater recharge, and climate change mitigation. Yet study after study demonstrates that wetland area and quality continue to decline in most regions of the world; 64% of the world’s wetlands have disappeared in the last century. As a result, the ecosystem services that wetlands provide to people are compromised.

**Relevance:** This convention is relevant for the protection of marine endangered flora and fauna species in the Project area.

**Compliance thereof:** Project activities will need to be planned and designed to minimize impacts on this ecosystem.

#### **2.4.3 Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region**

The Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention in short), provides an overarching legal framework for all marine-related programmes in West, Central and Southern Africa.

Under its articles, the Convention lists the sources of pollution that require control as: ships, dumping, land-based activities, exploration and exploitation of the seabed, and atmospheric pollution. It also identifies environmental management issues from which cooperative efforts are meadows, wetlands, barriers and lagoons. These highly productive and diverse ecosystems support fisheries, coastal tourism, industries, minerals such as limestone and sand, busy ports and oil extraction. However, the region’s rapid modernization has led to the unsustainable use of natural resources and to extensive pollution. As a result, crucial habitats are disappearing.

**Relevance:** This Convention is very relevant to the Project because it makes provisions for the protection of the marine and coastal environment.

**Compliance thereof:** The developer in consultation with the EPA and the Tongu District Assembly shall put in place measures to ensure the safe and sound management of the project area.

#### **2.4.4 Gulf of Guinea Large Marine Ecosystem Projects**

The Gulf of Guinea Large Marine Ecosystem is part of the global Large Marine Ecosystems (LMEs). LMEs are regions of the world’s oceans, encompassing coastal areas from river basins and estuaries to the seaward boundaries of continental shelves and the outer margins of the major ocean current systems. The system of LMEs has been developed by the US National Oceanic and Atmospheric Administration (NOAA) to identify areas of the oceans for conservation purposes. The objective is to use the LME concept as a tool for enabling ecosystem-based management to provide a collaborative approach to management of resources within ecologically-bounded transnational areas.

The Gulf of Guinea Large Marine Ecosystem (LME) lies between the Bijagos Islands (Guinea-Bissau) and Cape Lopez (Gabon). It is generally defined as the area influenced by the flow of



the Guinea Current. The coastal area is characteristically low lying and interspersed with marshes, lagoons and mangrove swamps. The region has a monsoon climate with high precipitation and almost constant monthly temperatures. Many rivers flow into the Gulf of Guinea, giving warm, low salinity coastal waters, except during the upwelling seasons in the central part of the Gulf. Mangroves are found around the major river mouths in the Gulf of Guinea, especially in the Niger Delta. Some corals are present in coastal and offshore areas, but true reefs are absent. Turtles, marine mammals and seabirds are also present. A number of fish communities are present in coastal and offshore waters.

The Gulf of Guinea is the most densely settled coastal area in Africa and is highly impacted by human activities. Mangroves, which constitute an important resource for coastal populations, are damaged by over-exploitation and pollution of water bodies from urban runoff. Forest clearance in rural areas is another major problem, causing topsoil erosion. Artisanal and industrial fisheries and aquaculture are an important source of employment and food in the region and shallow coastal waters appear fully or over exploited. Other anthropogenic activities include onshore and offshore oil production, damming of major rivers, port development and landfill. Such activities have serious effects on marine and coastal environments and can contribute to coastal erosion. A number of protected areas now exist and some environmental legislation is in place. However, enforcement is difficult, mainly due to constraints on financial, physical and human resources.

**Relevance:** Policies, programmes and research projects implemented by the Ghana Gulf of Guinea Large Marine Ecosystem Project will be relevant to the Project since some of their recommendations will enhance project implementation.

**Compliance thereof:** The developer will study such reports and ensure implementation of relevant recommendations.

#### **2.4.5 Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration (ILO No. 148) 1977**

According to this convention, national laws or regulations shall prescribe that measures be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise and vibration. Provisions concerning the practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods.

**Relevance:** This convention is relevant to the Project since employees would be engaged in the construction of the Project

**Compliance thereof:** The developer shall conform to these provisions

#### **2.4.6 UN Framework Convention on Climate Change, 1992**

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992, then entered into force on 21 March 1994. The UNFCCC objective is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The framework set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. Instead, the



framework outlines how specific international treaties (called "protocols" or "Agreements") may be negotiated to set binding limits on greenhouse gases.

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change

**Relevance:** The Convention on Climate Change is relevant to the Project since climate change impacts such as sea level rise and floods can have adverse implications on Project implementation.

**Compliance there of:** The developer shall conform to these provisions

#### 2.4.7 UN Framework Convention on Biodiversity, 1993

The Convention on Biological Diversity (CBD) entered into force on 29 December 1993. It has 3 main objectives:

1. The conservation of biological diversity
2. The sustainable use of the components of biological diversity
3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources

Some of the many issues dealt with under the convention include:

- Measures the incentives for the conservation and sustainable use of biological diversity.
- Regulated access to genetic resources and traditional knowledge, including Prior Informed Consent of the party providing resources.
- Sharing, in a fair and equitable way, the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources (governments and/or local communities that provided the traditional knowledge or biodiversity resources utilized).
- Access to and transfer of technology, including biotechnology, to the governments and/or local communities that provided traditional knowledge and/or biodiversity resources.
- Technical and scientific cooperation.
- Coordination of a global directory of taxonomic expertise (Global Taxonomy Initiative).
- Impact assessment.
- Education and public awareness.
- Provision of financial resources.



- National reporting on efforts to implement treaty commitments.

**Relevance:** This Convention is relevant to the company since it intends to conserve and protect the biological resources of the project area.

**Compliance thereof:** The Project will need to take the provisions and strategies of Convention of Biological Diversity adopted by Ghana into account in the project implementation.

#### 2.4.8 Basel Convention, 2003

The Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (Basel Convention) is an important global agreement to which Ghana and other developing countries are contracting parties.

The Basel Convention takes as a basic principle the need to reduce both the generation of hazardous wastes and their trans-boundary movement to a minimum. The Convention states that all countries have the right to ban the import of hazardous waste. The exporting country has a duty to ensure that all wastes, whether for recovery or disposal can be dealt with in an environmentally sound manner. That country also has a duty to arrange for the return of wastes failing to go to an appropriate treatment or disposal plant.

The Basel Convention permits parties to it to agree bi-lateral agreements for trade in hazardous waste and prohibits such arrangements with others. Hazardous wastes which are to be exported must be packaged, labelled and transported in accordance with recognised international standards. It should also be noted that wastes which are derived from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of the Basel Convention.

The Basel Convention requires that the disposal of hazardous waste does not result in the development of another hazardous waste stream. Used Oil is considered hazardous under the Basel Convention since it is listed under Annex I: Categories of Wastes to be controlled. The waste streams applicable to this study are:

- < Y-8 Waste mineral oils unfit for their originally intended use; and
- < Y-9 Waste oils/water, hydrocarbons/water mixtures, emulsions

**Relevance:** This Convention is relevant to the company since it intends to import crude oil to the country.

**Compliance thereof:** The Project will need to take the application of both the Basel Convention into account especially the process of waste management for the project.

## CHAPTER THREE

### 3 PROJECT INTERVENTIONS DESCRIPTION AND PROPOSED LOCATIONS

This chapter gives an overview of the objectives of the project, project rationale and justification, site location, and provides description of the proposed physical facilities and equipment.

#### 3.1 PROJECT LOCATION AND TARGET AREAS

Three districts, two of which are in the Greater Accra Region and the third district in the Volta Region. The selected Districts are:

1. Ada West District Assembly: 5°52'30"N 0°21'42"E; 5.87500°N 0.36167°E; 5.87500; 0.36167.
2. Ada East District Assembly: 5°45 and 6°00 N; 0°20 to 0°35 E
3. Keta Municipal Assembly: 5.9005° N, 0.9893° E

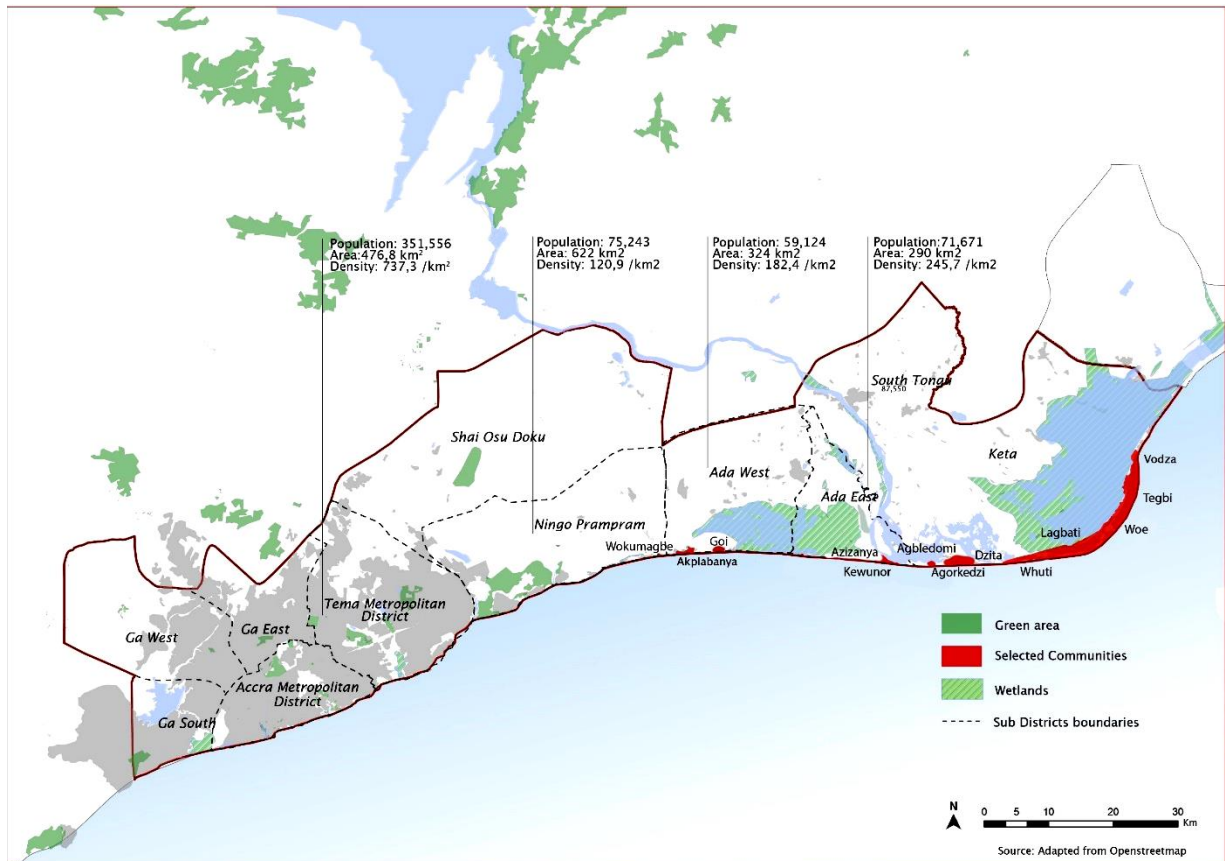


Figure 3.1: Map showing the Project area



### 3.2 PROJECT COMPONENTS

Table 3.1 below shows the project components and the beneficiary communities in the respective districts. The project will comprise of the following four components:

1. Mangrove Restoration
2. Lagoon Restoration
3. Pen Culture
4. Crop Resilient Crop and Water Infiltration

**Table 3.1: Overview of interventions per Community**

District	Community	Mangrove	Lagoon Restoration	Pen Culture	Salty Crops/ Water infiltration
Ada West	Akplabanya				
	Goi				
	Wokumagbe				
Ada East	Kewunor/Azizanya				
Keta	Agorkedzi/Atiteti				
	Agbledomi				
	Dzita				
	Vodza				
	Tegbi				
	Woe				
	Lagbati/Kashibi				
	Whuti				

#### 3.2.1 Mangrove Restoration Intervention

Mangrove forests are extremely productive ecosystems that provide numerous goods and services both to the marine environment and people. Many coastal communities depend on mangroves for their livelihood. Mangrove trees have been harvested over generations for construction materials and firewood. Mangroves provide a habitat for crabs, birds, and reptiles. There is a need of restoring mangroves in areas that will support protecting the coast and livelihoods, esp. in already deforested areas

This intervention focuses on mangrove restoration as a nature-based solution for adaptation to sea level rise, flooding, erosion, and livelihoods loss. This intervention aims to stabilize the shoreline, creating buffer zones for flood risk / inundation reduction, and securing / increasing livelihood opportunities more in-land (as pull factor from the shore) as well as the protection of exposed assets for the most vulnerable communities.

##### 3.2.1.1 Detailed Output/Activities – Mangrove Restoration

The project plans to plant about 1500 Ha of mangrove. The four communities selected for the mangrove restoration intervention include, Agorkedzi/Atiteti, Agbledomi, Dzita, and Whuti. The selected sites for the mangrove restoration have conducive ecological conditions for the growth of mangroves. The main species of mangroves planted include Red mangrove





(Rhizophora mangle / Rhizophora racemosa), White mangrove (Laguncularia racemosa), and Black mangrove (Avecinnia germinans). All these species are suitable for replanting. There are no pollution threats to the growth of mangroves in the targeted communities. The total cost for the mangrove restoration is about \$ 1,222,435. Table 3.2 below shows some detailed output activities for the Mangrove Restoration Project.

**Table 3.2: Detailed Estimated Budget for Mangrove Restoration Project**

Activities	Notes / Staff	TOTAL	Year	Year	Year	Year		
			1	2	3	4		
Phase 1: Prepare	Detailed engineering study and design	Staff (consultants)	20,000	20,000	-	-	-	
	Buying materials	Mattock, wellington boots, cutlasses	1,624	1,624	-	-	-	
	Mangrove nursery	Site leasing		1,800	300	1,500	-	-
		Construction of small wooden construction for storage (including materials, personnel, and transport)		5,170	5,170	-	-	-
		Fencing		6,800	6,800	-	-	-
		Nursery bed and bag preparation, collection of soil to site, manure and transport to site,		50,000	50,000	-	-	-
Wildlings/seeds	Materials and personnel	574,275	-	574,275	-	-		
Phase 2: Implement	Mangrove planting	Food, salary	189,540	-	189,540	-	-	
		Supervisor	12,501	-	12,501	-	-	
	Nursery personnel	Staff cost	9,600	1,600	8,000	-	-	
	Nursery management	Watering, replacement, watering can (including equipment)	9,000	-	9,000	-	-	
	Transport	Car and fuel	58,000	-	58,000	-	-	
		Driver	4,000	-	4,000	-	-	
Phase 3: Operate	Coordination support	Supervision and coordination (20%)	40,000	10,000	10,000	10,000	10,000	
		Office set up (including equipment and services). The office is common for the 4 intervention so each has its proportional part.	65,000	65,000	-	-	-	
		Experts	120,000	8,000	40,000	48,000	24,000	
Phase 4: Maintain	Maintenance	CREMA mechanism set up						
		Extra seeds in case of potential failure (5%)	41,325	-	-	41,325	-	
	Field monitoring	Including accomm, car/fuel, and staff cost	13,800	-	3,000	7,200	3,600	
Phase 5: Replicate	CREMA mechanism	Covered by revenue generated by the intervention						
	Capacity building	Covered by Component 2						
			1,222,435	168,494	909,816	106,525	37,600	



Figure 3.2: Sample of Mangrove Nursery

Figure 3.3: Young Mangrove seedlings

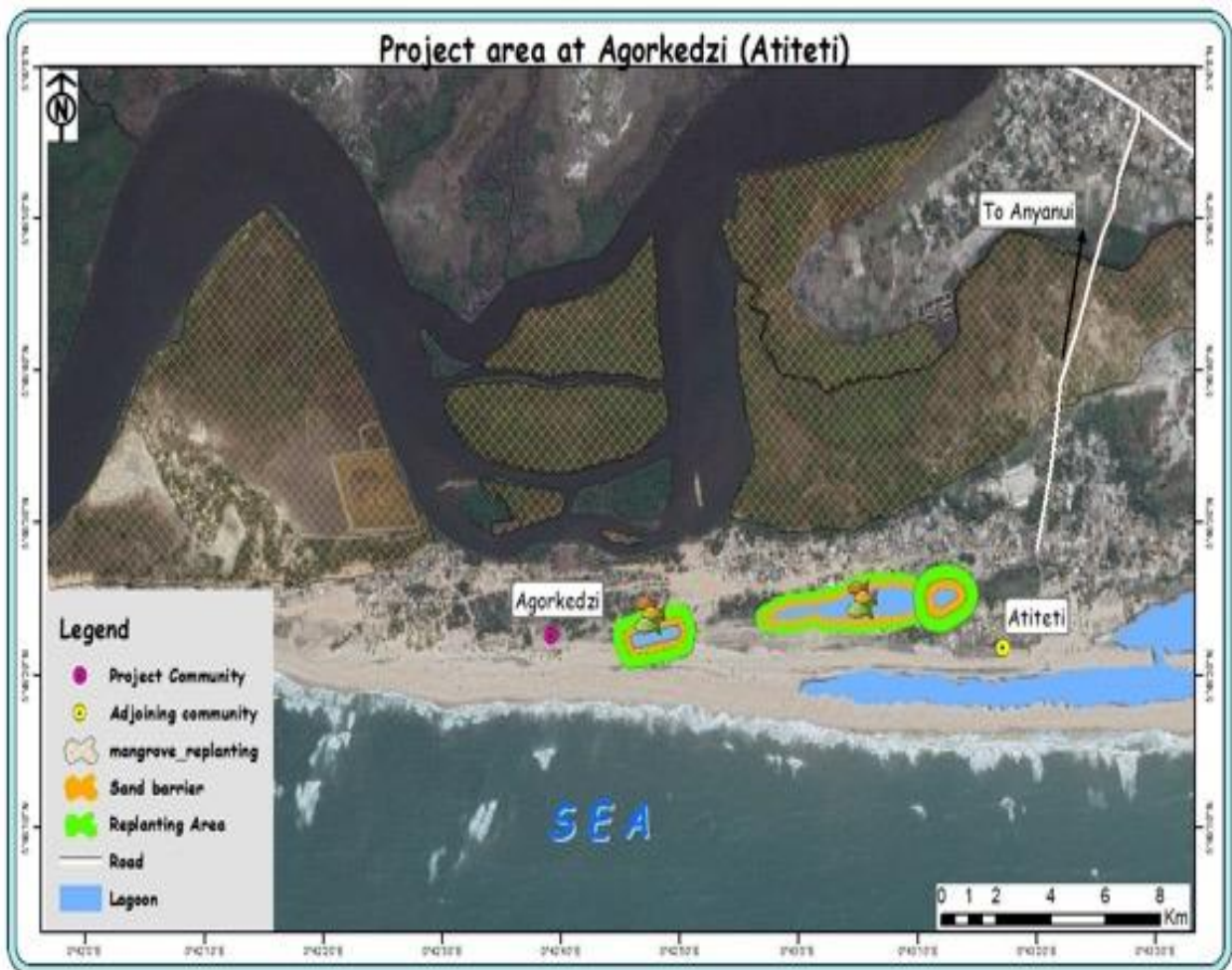


Figure 3.4: Mangrove Restoration Project site at Agorkedzi/Atiteti



Figure 3.5: Mangrove Restoration Project site at Agbledomi



Figure 3.6: Mangrove Restoration Project site at Dzita



**Figure 3.7: Mangrove Restoration Project site at Whuti**

### 3.2.2 Mangrove Restoration Sub Project Benefits

A total of about **13,082** people will directly benefit from the project in the selected communities. These direct beneficiaries include Local community (vulnerable and marginalized group: women (6,666) constituting 50.9%; youth (6,900) constituting 52.7%; children (4,991) constituting 38.1% and elderly (1,192) constituting 9.1%. Table 3.3 below shows details of the direct beneficiaries in each project community.

**Table 3.3: Mangrove Restoration Sub Project Direct Benefits**

Communities	Children	Youth	Elderly	Total	Male	Female
Agorkedzi/Atiteti	935	1,289	225	2,448	1,151	1,297
Dzita	1,185	1,496	268	2,949	1,386	1,563
Whuti	1,014	1,556	251	2,821	1,088	1,228
Agbledomi	1,857	2,559	448	4,864	1,378	1,443
<b>Total</b>	<b>4,991</b>	<b>6,900</b>	<b>1,192</b>	<b>13,082</b>	<b>5,911</b>	<b>6,666</b>

### 3.2.3 Indirect Beneficiaries and Benefits

A total of about **5,657** people from the adjoining communities will indirectly benefit from the intervention. The Table below shows details of the communities to derive indirect benefits.

**Table 3.4: Mangrove Restoration Sub Project Indirect Benefits**

<b>Communities</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
Anyanui	2,316	1,088	1,228
Salo	1,236	577	659
Bomigo	481	229	252
Genui	1624	800	824
<b>Total</b>	<b>5,657</b>	<b>2,6945</b>	<b>2,963</b>

### 3.2.4 Lagoon Restoration Intervention

Lagoons are typical and key coastal ecosystems in Ghana, playing a crucial role in providing (in-land) livelihood opportunities; due to climate change and urbanization trends many lagoons are deteriorating. There is a need to protect the coast, including critical infrastructure, settlements, ecosystems and livelihoods from above through nature-based solutions (as hard infrastructure often has a negative impact and is very costly).

This intervention focuses on lagoon restoration as a nature-based solution for adaptation to sea level rise, flooding, erosion, and livelihoods loss. This intervention will stabilize the shoreline, creating buffer zones for flood risk / inundation reduction. In addition, lagoons ecosystems will be restored facilitating biodiversity conservation and allowing to generate livelihood opportunities. The restoration process will also include mangrove replanting around lagoon's shoreline.

The seven communities selected for the mangrove restoration intervention include Wokumagbe, Akplabanya, Goi, Kewunor, Agorkedzi/Atiteti, Dzita and Agbledomi. The intervention is suitable for these targeted communities because it builds on the existing ecosystems, and environmental and socio-economic dynamics. It aims at protecting and enhancing natural assets that support coastal inhabitants, and at providing a prosperous living habitat as a source of income (pen culture). Figures 3.8 to 3.14 below show Location Maps of the target communities.



Figure 3.8: Lagoon Restoration Project site at Akplabanyai



Figure 3.9: Lagoon Restoration Project site at Wokumagbe



Figure 3.10: Lagoon Restoration Project site at Goi



Figure 3.11: Lagoon Restoration Project site at Kewunor

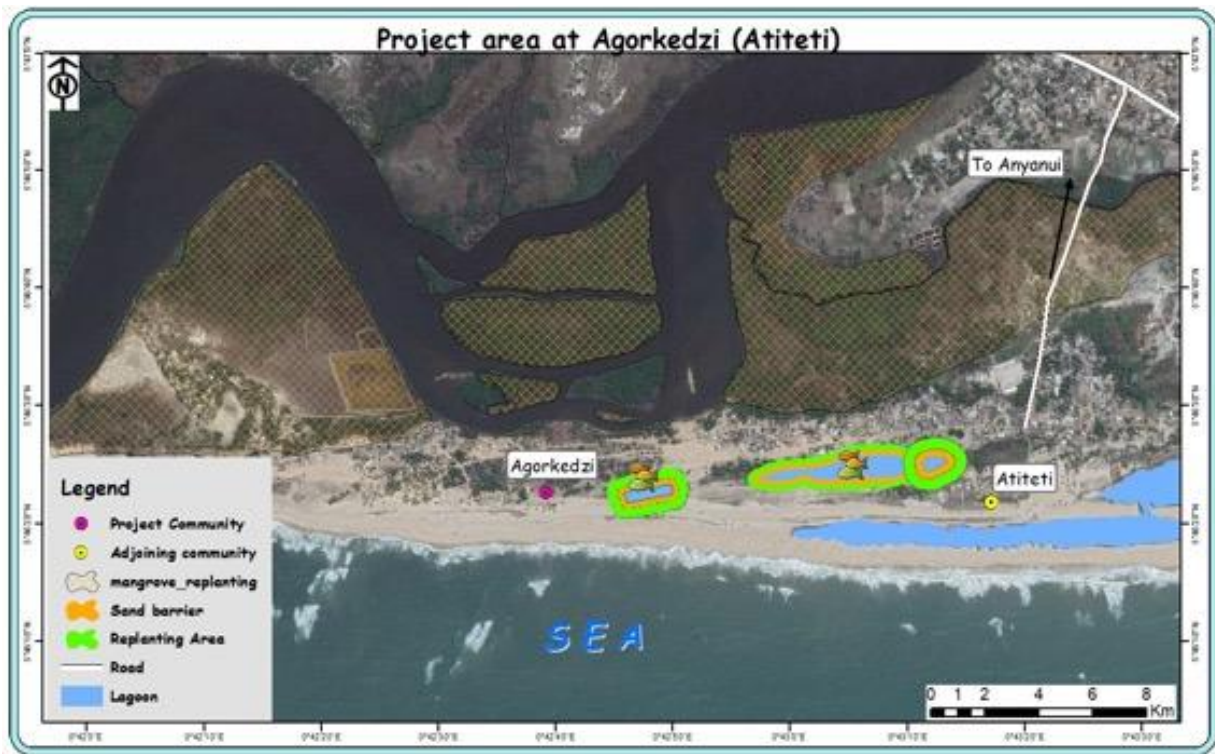


Figure 3.12: Lagoon Restoration Project site at Agorkedzi/Atiteti

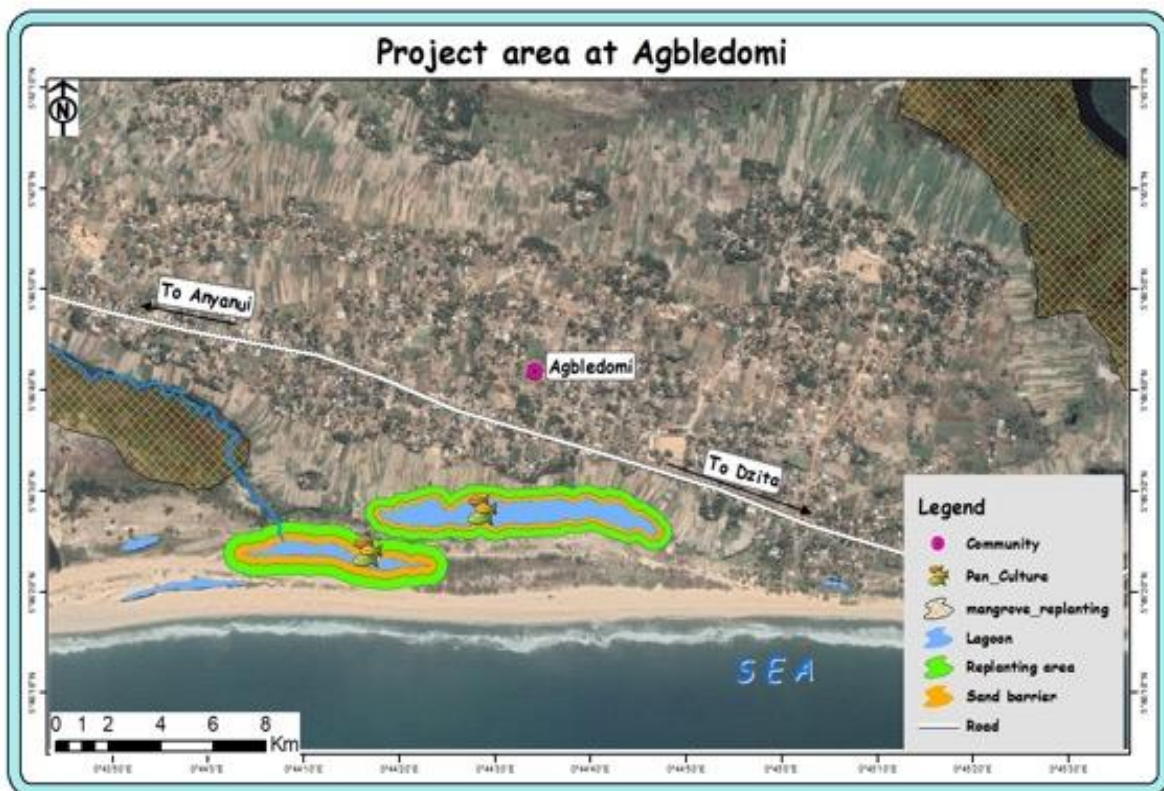


Figure 3.13: Lagoon Restoration Project site at Agbledomi





**Figure 3.14: Lagoon Restoration Project site at Dzita**

The sub-project will have a Total Area coverage/catchment areas of 175,700m<sup>2</sup> (17.57 Ha) as shown in Table 3.5 below:

**Table 3.5: Total Area coverage/catchment areas for Lagoon Restoration**

2.3 Dredging			
Communities	Area m <sup>2</sup>	Depth m	Total excavation m <sup>3</sup>
Wokumagbe	36,000	1	36,000
Aklabanya	60,000	1	60,000
Goi	43,000	1	43,000
Agorkedzi	1,800	1	1,800
Kewunor	1,200	1	1,200
Dzita	18,000	1	18,000
Dzita	7,500	1	7,500
Agorkedzi	1,200	1	1,200
Agbledomi	2,000	1	2,000
Agorkedzi	5,000	1	5,000
<b>Total</b>	<b>175,700</b>		<b>175,700</b>

The total area coverage for replanting of mangroves and sea grass along lagoon restoration areas is 5 Ha. The breakdown per selected target community is shown in Table 3;6 below:

**Table 3.6: Total Area Coverage for Replanting of Mangroves and Sea Grass**

<b>2.4 Replanting</b>		
	m <sup>2</sup> to be replanted	ha to be planted
Wokumagbe	10,200	1.02
Aklabanya	11,400	1.14
Goi	9,200	0.92
Agorkedzi	2,200	0.22
Kewunor	1,800	0.18
Dzita	6,200	0.62
Dzita	3,900	0.39
Agorkedzi	1,800	0.18
Agbledomi	700	0.07
Agorkedzi	2,900	0.29
<b>Total</b>	<b>50,300</b>	<b>5.03</b>

### 3.2.4.1 Detailed Output/Activities –Lagoon Restoration

The coastal lagoon restoration intervention involve prioritised measures to rejuvenate and conserve the lagoon ecosystem in selected lagoons. The detailed activities will involve:

#### Preparation

1. Detailed engineering study and design: detailed design and programming of the intervention will be done by the implementing partner (site evaluation, seeds survey, final zoning etc.). This will also include further detailed information/data on hydrology, sediment characteristics, and fisheries stock assessment. This activity with the support of the community plans under component 2, will result in the intervention Implementation Plan.
2. Pollution study: a pollution assessment of the lagoons water quality has been done during preparation phase in order to analyse the potential of these lagoons in terms of livelihoods support through pen culture (to be developed under project component 4). During project preparation another two studies will be done that will be used as a baseline for the cleaning activity under this intervention and its monitoring. Lagoons soil will also be assessed and monitored through two studies, one before implementation as a baseline and another one after the dredging activity.

#### Implementation

1. Lagoon cleaning: this activity will consist on removing all waste deposited in the lagoons and their surroundings. It will be done by a subcontractor that will also do the dredging activity.
2. Waste management: waste collected from the previous activity will be then disposed and treated on specific sites selected with the communities and the Municipal Assemblies. This activity will ensure an adequate treatment of the waste is done so it does not pollute the soil. Once treated, most of the content will degrade apart from plastics, which will be taken by recycling community groups, and sediments, which will be buried.



3. Dredging: in order to increase lagoons' water storage capacity, lagoons will be dredged 1m depth. This soil will be also treated and later use to create sand barriers around the lagoons.
4. Replanting: lagoons are often surrounded in many areas by mangroves. These have often been cut down which deteriorates the lagoons, especially in terms of shoreline stabilisation and fauna and flora habitat. For this intervention main deforested areas along the lagoon have been mapped and will be replanted, following the procedures of the intervention "Community-based ecological mangrove restoration".

### Operationalization

1. Management: to implement the intervention an office will be set up with time allocated from experts and a project manager. Implementation will be based on the Implementation Plan under the preparation phase.

### Monitoring and maintenance

1. Field monitoring: monitoring will consist on doing another pollution study to assess water quality and fisheries stock by using a specific monitoring kit for biophysical assessments. Mangroves will be monitored as part of the larger mangrove intervention.
2. Awareness raising through component 2.
3. Maintenance through CREMA

According to Lamptey (2011) evidence suggests that hydraulic dredging is accompanied by considerable adverse environmental impacts on the receiving ecosystem especially on the benthos and water quality. Recently, innovative dredging is designed to minimise environmental impacts and enhance the ecological settings. Evaluations of environmental consequences of such innovative dredging are essential to quantify the ecological benefits and the associated impacts to ensure good environmental management.



Figure 3.15: Proposed Lagoon to be dredged at Goi



Figure 3.16: Proposed Lagoon to be dredged at Workumagbe



**Table 3.7: Detailed Estimated Budget for Lagoon restoration**

Activities		Notes / Staff	TOTAL	Year 1	Year 2	Year 3	Year 4
Phase 1: Prepare	Detailed engineering study and design	Staff (consultants)	20,000	20,000	-	-	-
	Lagoons assessments	Water pollution (E.Coli, organic pollution, plastic and heavy metals) and fish	11,000	5,500	5,500	-	-
		Soil profile and pollution assessment	11,000	5,500	5,500	-	-
Phase 2: Implement	Lagoons cleaning	Waste removal (including equipment and personnel)	158,130	-	158,130	-	-
	Waste management	Sites rental	10,200	-	10,200	-	-
		Disposal and treatment (including equipment and personnel)	18,500	-	18,500	-	-
	Dredging	Equipment and personnel	737,940	-	737,940	-	-
	Replanting mangroves and sea grass	Personnel, seedlings, materials and transport cost (nursery costs are included under Output 3.1 since it is the same nursery)	2,772	-	2,772	-	-
	Transport	Equipment and personnel	17,484	-	17,484	-	-
Phase 3: Operate	Coordination support	Supervision and coordination (20 %)	40,000	10,000	10,000	10,000	10,000
		Office set up (including equipment and services). The office is common for the 4 intervention so each has its proportional part.		65,000			
Phase 4: Maintain	Maintenance	CREMA mechanism set up					
	Field monitoring	Including accomm, car/fuel, and per diem	15,600	-	4,800	7,200	3,600
		Monitoring kit	17,500	-	17,500	-	-
Phase 5: Replicate	CREMA mechanism	Covered by revenue generated by the intervention					
	Capacity building	Covered by Component 2					
			<b>1,125,126</b>	<b>106,000</b>	<b>988,326</b>	<b>17,200</b>	<b>13,600</b>

### 3.2.5 Pen Culture Intervention

The inhabitants of the project area in particular and Keta Lagoon Complex have been engaging in subsistence fishery activities using rudimentary methodology for several years. There is a need to protect the coast, including critical infrastructure, settlements, ecosystems and livelihoods from above through nature-based solutions (as hard infra often has a negative impact and is very costly. Sea level rise, storms and increased erosion making fishing more difficult and dangerous. Moreover, water pollution and overfishing are depleting the ocean's fish stock. There is a need to support more in-land livelihood options, including fishing, to



improve the incomes of the inhabitants and also the fluctuating nature of the fish stock as well as respond to reducing fish stock in the ocean and climate change-related sea level rise and storm risks.

In this context, pen culture has shown to be a widespread and successful income generating activity in the region. By providing the enabling environment through interventions 1 and 2, there will be more opportunities for expanding this economic activity linked to the social heritage of the communities. This intervention will increase the communities' adaptive capacities.

This intervention therefore focuses on establishing pen culture in lagoons restored under component 3, as a way to adapt to challenging fishing conditions caused by sea-level rise and storms along the coast. This intervention aims to increasing livelihood opportunities more inland (as pull factor from the shore) as well as introduce a sustainable fishing methods. Indigenous fish species (Brackish tilapia – *Sarotherodon melanotheron*) will be considered for pond stocking because it has high economic benefits and high consumption rates in these communities.

The pen culture will be introduced to nine (9) of the selected lagoon restoration sites namely, Akplabanya, Goi, Workumagbe, Azizanya, Kewonor, Dzita, Vodza, Agorkedzi/Atiteti, and Agbledomi covering total coverage/catchment areas of 175,700m<sup>2</sup> (17.57 Ha). Figures 3.17 to 3.24 below show Location Maps of the target communities.



Figure 3.17: Pen Culture Project site at Akplabanya



Figure 3.18: Pen Culture Project site at Wokumagbe



Figure 3.19: Pen Culture Project site at Goi



Figure 3.20: Pen Culture Project site at Kewunor



Figure 3.21 Pen Culture Project site at Agorkedzi/Atiteti



Figure 3.22: Pen Culture Restoration Project site at Agbledomi



Figure 3.23: Pen Culture Restoration Project site at Dzita





**Figure 3.24: Pen Culture Project site at Vodza**

Figure 3.25 and 3.26 below show some of the existing fishing practices of the target communities.



**Figure 3.25: View of typical Pen Culture**



**Figure 3.26: Fishing in the lagoon**



### 3.2.5.1 Detailed Output/Activities – Pen Culture

The pen culture development would be implemented as follows:

#### Preparation

1. Detailed engineering study and design: detailed design and programming of the intervention will be done by the implementing partner. This will also include further detailed information/data on hydrology, sediment characteristics, and fisheries stock assessment. This activity with the support of the community plans under component 2, will result in the intervention Implementation Plan.
2. Buy materials: This will be done as per the details in question 15.
3. Prepare storage structure: This will involve designing and planning of a suitable site (taking into consideration accessibility and distance to lagoon) for installation. Implementing partners will do this with the district assemblies and community chiefs.

#### Implementation

4. Pens installation: Site selection of Pen and then proceed to Preparation of net materials into required sizes. Poles or woods will be installed as supporters to hold the netting materials in the lagoons. Appropriate supporting ropes will be put in place as well. All these will be done by implementing partners.

#### Operationalization

5. Fisheries: The production cycle will be twice in a year. Restocking will be done after harvesting. For sustainability, access to the fish will be regulated. Harvesting will be done under some form of regulations (License, catch quota, - to generate some revenues) that will be spelt out in the management plan. By products generated from farm during post-harvest activities will be put into usable forms such as fertilizers and fish meal in fish feed.
6. Management: to implement the intervention an office will be set up with time allocated from experts and a project manager. Implementation will be based on the Implementation Plan under the preparation phase.

#### Monitoring and maintenance

7. Field monitoring: Water quality monitoring, Fish stock assessment, look out for general wellbeing of landscaping and sand barriers.
8. Awareness raising through component 2.
9. Maintenance through CREMA as per question 29 below.

#### Replication and exist strategy

##### Replication and sustainability through CREMA

The total cost for the pen culture restoration is about **\$ 810,099**. Table 3.6 below show the details below:



**Table 3.8: Detailed Estimated Budget for Pen Culture**

Activities		Notes / Staff	TOTAL	Year 1	Year 2	Year 3	Year 4	
Phase 1: Prepare	Detailed engineering study and design	Staff (consultants)	20,000	20,000	-	-	-	
	Material	Net, ropes, woods, buckets, scoop nets, canoe	17,840	-	17,840	-	-	
	Storage structure	Buy sites		-	-	-	-	
		Construction		95,000	-	95,000	-	-
		Solar lamps		5,000	-	5,000	-	-
	Feed, equipment and personnel		17,019	-	17,019	-	-	
Phase 2: Implement	Pen installation	Personnel	1,600	-	-	1,600	-	
Phase 3: Operate	Penculture	Personnel (feeders and security)	144,000	-	36,000	72,000	36,000	
	Transport for fish food		21,120	-	5,280	10,560	5,280	
	Fish	Tilapia fingerlins and fish food	309,120	-	77,280	154,560	77,280	
	Coordination support	Expert		60,000	-	15,000	30,000	15,000
		Supervision and coordination (20 %) Ken		40,000	10,000	10,000	10,000	10,000
	Office set up (including equipment and services). The office is common for the 4 intervention so each has its proportional part.		65,000	65,000				
Phase 4: Maintain	Maintenance	Awareness under component 2						
	Field monitoring	Including accomm, car/fuel, and per diem	20,000	-	2,000	12,000	6,000	
Phase 5: Replicate	Capacity building under component 2							

### 3.2.6 Salt Resilient Crop and Water Infiltration Intervention

In the Keta region, farmers are exposed to ever increasing challenges. The rains are becoming more and more unpredictable and saltwater intrusion is increasing. The crop season is limited to the short rainy period and farmers struggle to make a living. The Keta area consists of 120.000 hectares where 180.000 people live, so climate change and saltwater intrusion affects many people. It is the goal of this project to empower the farmers in the Keta region to overcome the challenges and ensure these farmers can thrive by providing them with the knowledge and the skills they need. This can be achieved by a combination of adaptation and mitigation. This includes smart soil, crop and water management, tailor-made to the local conditions. All these solutions have to be brought into the hands of the farmers. In this way, farmers will become more resilient and are able to adapt to increase their yield and income in a sustainable way.



Figure 3.27: Farmlands affected by high salinity at Anloga/Lagbati



Figure 3.28: Farmlands affected by high salinity at Woe

The intervention aims to adapt the agricultural practice to the new situation by introducing salt resilient varieties of already existing ones + harvesting fresh water from precipitation and direct it to agricultural land to rebalance salinity levels.

The four communities selected for Salt Resilient Crops and Water Infiltration interventions are Tegbi, Woe, Lagbati (Lashibi) and Whuti. Total area coverage/catchment areas is 379.2m<sup>2</sup> (0.038 Ha). Maps showing exact location and boundaries are presented in figures 3.29 to 3.35 below.

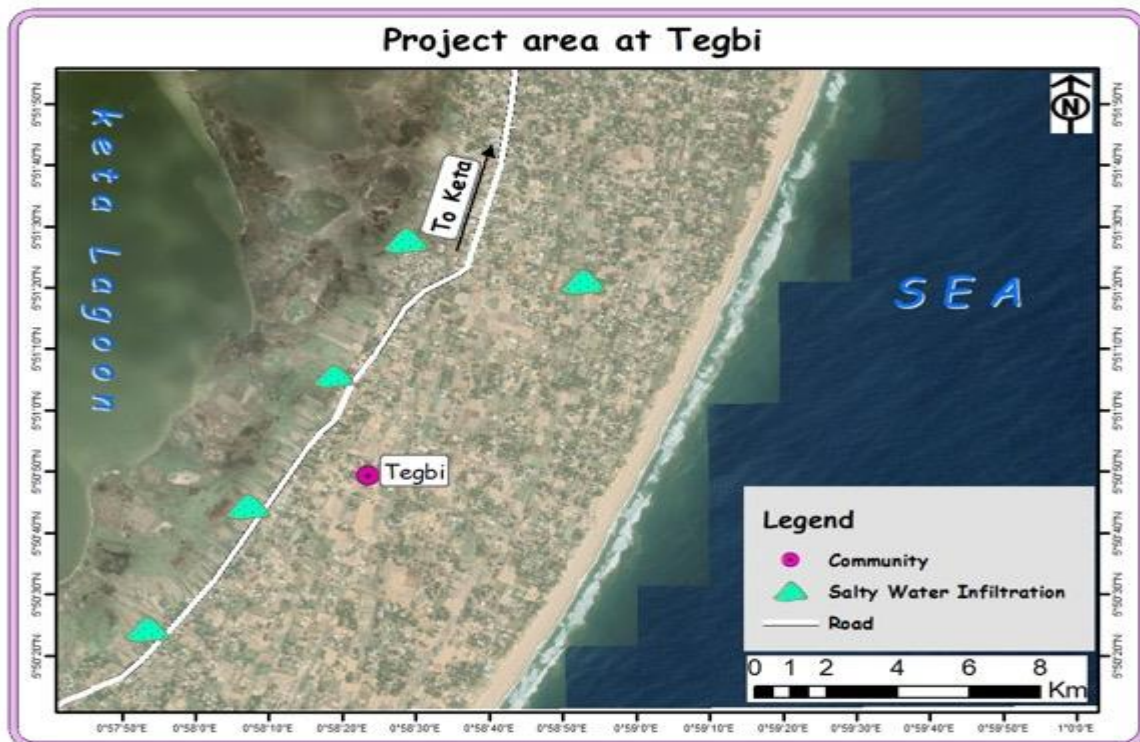


Figure 3.29: Salt Resilient Crop location sites at Tegbi



Figure 3.30: Salt Resilient Crop location sites at Woe



Figure 3.31: Salt Resilient Crop location sites at Lagbati

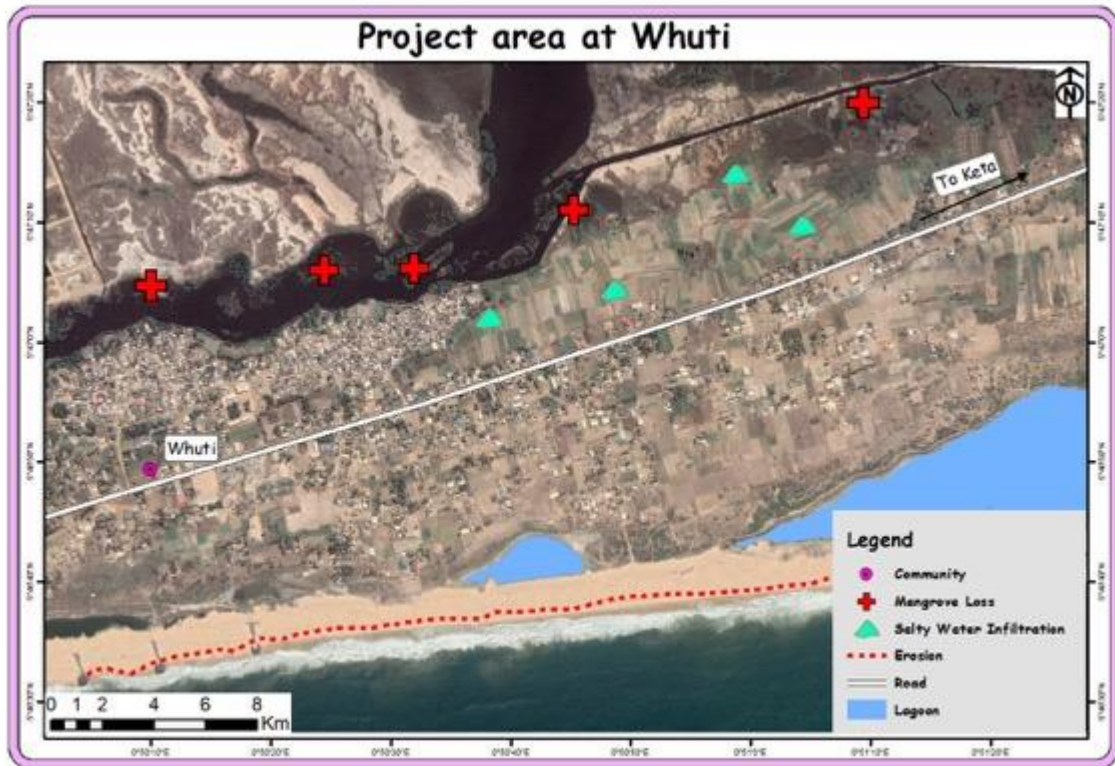


Figure 3.32: Salt Resilient Crop location sites at Whuti



Figure 3.33: Water Infiltration Location sites at Tegbe



Figure 3.34: Water Infiltration Location sites at Woe



Figure 3.35: Water Infiltration Location sites at lagbati



Figure 3.36: Water Infiltration Location sites at Whuti

### 3.2.6.1 Detailed Output/Activities – Salt Resilient Crop and Water Infiltration

The Salt Resilient Crop and Water Infiltration development would be implemented as follows:

#### Preparation

1. Detailed engineering study and design: (including plots identification)
2. Buy materials: This will be done as per the details in question 15.

#### Implementation

1. Water infiltration system construction: (This will involve site identification and preparation. Excavation of trenches to receive lining and infiltration system. The surface is then prepared,)
2. Realization of training center for salty crops: (Farm wells construction (installation of tube wells), Drip irrigation equipment (including installation) and toolkit for soil sampling and salinity measurements, Pre-sowing land clearing and preparation, construct cultivation beds, seeds, fertilizers, and land lease, Pumps for training center, Farm house construction, Develop layout and assistance)
3. Training:



**Operationalization**

1. Management:

**Monitoring and maintenance**

10. Maintenance activities:
11. Awareness raising through component 2.
12. Maintenance through CREMA

**Replication and exist strategy**

Replication and sustainability through CREMA

Tables 3.9 below provides detailed output/activities for the Resilient Crop and Water Infiltration intervention.

**Table 3.9: Water infiltration Activities**

<b>Water infiltration</b>	<b>Unit</b>	<b>Quantity m<sup>2</sup></b>
<b>Site 1: Woe</b>		
Preparing surface/ slope to receive concrete lining	m <sup>2</sup>	1,500
Excavating trench for infiltration system	m <sup>3</sup>	500
Providing and placing bondless in trench	m <sup>2</sup>	1,000
Providing and placing concrete C20 on slope and drain/trench	m <sup>3</sup>	262
<b>Site 2: Lagbati/Lashibi and Whuti</b>		
Preparing surface/ slope to receive concrete lining	m <sup>2</sup>	2,000
Excavating trench for infiltration system	m <sup>3</sup>	800
Providing and placing bondless in trench	m <sup>2</sup>	1,600
Providing and placing concrete C20 on slope and drain/trench	m <sup>3</sup>	379.2

**3.2.7 Salt Resilient Crops Activities**

The total cost for the intervention is \$ 1,068,325. See details in Table 3.10 below:



**Table 3.10: Detailed Estimated Budget for Resilient Crop and Water Infiltration**

Activities	Notes / Staff	TOTAL	Year	Year	Year	Year
			1	2	3	4
Phase 1: Prepare	Detailed engineering study and design	20,000	20,000	-	-	-
	Identification of plots (stakeholders meeting and field work)	19,200	19,200	-	-	-
Water infiltration construction	Prepare surface	1,470	-	-	1,470	-
	Provide and place bondless in trench	48,100	-	-	48,100	-
	Excavating trench, providing and placing concrete	211,678	-	-	211,678	-
	Supervision	-	-	-	-	-
Realization of training center for salty crops	Farm wells construction (installation of tube wells)	2,000	-	2,000	-	-
	Drip irrigation equipment (including installation) and toolkit for soil sampling and salinity measurements	17,200	-	17,200	-	-
	Pre-sowing land clearing and preparation, construct cultivation beds, seeds, fertilizers, and land lease	27,750	-	9,250	9,250	9,250
	Pumps for training center	3,500	-	3,500		
	Farm logistics, costs of running irrigation facility	15,000	-	5,000	5,000	5,000
	Farm house construction	10,000	-	10,000	-	-
	Develop layout and assistance	54,675	-	54,675	-	-

### 3.3 PROJECT ALTERNATIVES

Throughout the course of the Project development, many decisions were made concerning, for example, the type of technologies, the location and the processes involved in the proposed development. Alternatives that were assessed include:

1. Location/Site Alternatives
2. No Project, Avoid or Postpone Alternative
3. Proceeding with the Project Alternative
4. Technology Alternatives

#### 3.3.1 Location/Site Alternatives

The project focused on improving climate resilience of the Greater Accra region and the Volta region, specifically on the vulnerable coastline strip between Accra and the border with Togo. The reason to select this area is because it is the hardest hit by climate change. Furthermore, the selection also responds to criteria to avoid overlap with other ongoing projects at the west coast of the country. Data was collected from fourteen vulnerable communities within five

districts: Tema Metropolis, Ningo-Prampram, Ada West, Ada East and Keta (from west to east). Table 3.9 below shows the initial communities considered during the conceptual and project feasibility studies<sup>1</sup>. Out of these potential target communities, the project beneficiary communities listed in Table 3.11 were selected.

**Table 3.11: Project Location/Site Alternatives**

	District Assemblies	Considered Project Communities
1.	Tema Metropolitan Assembly	Tema New Town
2.	Ningo Pram-pram District Assembly	Prampram, Old Ningo, Ayitepa
3.	Ada West District Assembly	Akplabanya, Goi , Kportitsekope
4.	Ada East Distinct Assembly	Totope , Azizanya , Big Ada
5.	Keta Municipal Assembly	Fuvemeh , Anloga, Woe, Vodza



**Figure 3.37: Potential Target District Assemblies and Communities in Ghana**

### 3.3.2 No Project, Avoid or Postpone Alternative

Option A, Do Nothing: The ‘Do Nothing’ option would mean that the current environmental assessments and implementation to be undertaken will be brought to a halt, because the option entails not proceeding with the development project and leaving it in its current state.

This option would likely lead to adverse environmental and socio-economic impacts including but not necessarily limited to the following:

- Rising sea levels, intensifying storm surge, and extreme precipitation are likely to accentuate coastal erosion events, with significant socio-economic impacts;

<sup>1</sup> Adaptation Fund (2018). Proposal for Cote D’Ivoire and Ghana. AFB/PPRC.22-23/10  
11 June 2018



- Changing precipitation patterns could decrease the overall rainfall volumes, which would further reduce the flow of rivers in the area, thus leading to a decrease in sedimentation deposits, in turn causing increased erosion rates;
- The combination of higher temperatures, increasing salinity of coastal estuaries and groundwater resources, and alterations in river dynamics from changes in rainfall may continue to exacerbate the loss of natural ecosystems and resources located along the coast.
- The impact on agriculture, with reduced yields leading to more poverty and food insecurity (including the possibility of famine);
- Severe impacts on land use, leading to loss of biodiversity, land surface, soil fertility, land degradation and increased deforestation which would all contribute to loss of ecosystem services;
- Deteriorating health as a result of increased incidence of disease and reduced access to water and food compounded by disruption of the delivery of health services, e.g., flooding of health facilities, and the loss of transport infrastructure;
- Water scarcity causing increased pressure on water for communities and economic activities and reducing the potential for hydropower;
- The impact on women and the girl child, who are particularly vulnerable to the impact of climate change, given their higher levels of poverty and their responsibilities for obtaining household water, food and fuel;
- Increased rural-urban migration that will add to the pressure on cities and urban services.

### 3.3.3 Proceeding with the Project

Option B, Proceed with Project Option: Proceeding with the proposed project interventions means an evaluation or assessments have been undertaken that proves that the implementation of the project would bring enhanced benefits and sustainability to the project area. An objective assessment and analysis of monitoring and assessment information before, during and after project implementation provides a basis for effective and sustainable project management.

This option would likely improve the current environmental and socio-economic status of the area. Some of the key benefits which have been identified at the feasibility stage<sup>2</sup> include the following:

- Protect and conserve the lagoon biodiversity.
- Environment (protection and development of biodiversity, increasing water quality, stabilisation of the lagoon shoreline,)
- Social (improve living habitat, protect cultural heritage, maintain social unity)
- Economic (protection of exposed assets, safeguard of the economic interests of local population, etc.)
- Knowledge management related to building resilience to climate change<sup>3</sup>
- Establish a system for monitoring and tracking the impact of climate change

<sup>2</sup> See feasibility Sheet attached as Annex 4

<sup>3</sup> Term of Reference for feasibility study, risk screening and Environmental and Social Impact Assessment for the Adaptation Fund project: « Improved resilience for coastal communities in Cote d'Ivoire and Ghana », page 4



- Flood Control: Prevents contamination of the lagoon ecosystems and other sensitive faunal habitats; Flow regulation and flood mitigation
- Sediment retention
- Nutrient retention and biological filter
- Healthy lagoon ecosystems mean healthy fisheries from which to fish, and healthy land on which to farm
- Beneficial use of dredged materials, such as placement of sediment to nourish shorelines or to enhance or restore wetland
- Climate change (Increase carbon sink, flood/inundation reduction, etc.)
  - Forestry
  - Fish production
  - Agriculture
  - Fuel production
  - Harvestable goods
  - Transport function

### 3.3.4 Technology and Project Design Alternatives

During the full proposal development phase, the framework for selecting and monitoring interventions was developed and interventions responding to different needs and situations were selected - matching community needs and priorities with innovative but feasible interventions as identified and analysed by consultants and team of experts from UN-Habitat. The priority list of interventions were fully screened and assessed to identify potential environmental and social risks, including following national standards and processes with the aim to select the interventions with manageable potential risks and impacts. Through this process, all project activities have been fully identified at community levels. Table 3.12 below summarises the various technological and design options considered for the proposed projects.

**Table 3.12: Technological and Project Design Alternatives**

	Project Intervention	Alternative A	Alternative B	Cost Effective Option
1.	Mangrove Restoration	<p><b><u>Mangrove Planting</u></b> The project plans to plant about 1,852,500 seedlings of mangrove. This will cover a total area of about 185 hectares (i.e. 10,000 seedlings per hectare).</p>	<p><b><u>Groyne Construction</u></b> constructing a groyne as an alternative engineering option to prevent flooding and intrusion of sea water to the lagoons costs between £5,000 and £10,000 per linear meter</p>	<p>The planting of mangroves option is more cost-effective. Whiles this measure is less expensive in offering protection, it also offers other economic potentials like tourism, fisheries abundance enhancement and other ecosystem services at the same time.</p>
2.	Lagoon Restoration	<p><b><u>Lagoon Dredging</u></b> The project plans to dredge 10 lagoons covering a total area of about 175,700m<sup>2</sup>.</p>	<p><b><u>Groyne Construction</u></b> constructing a groyne as an alternative engineering option to prevent flooding and intrusion of sea water to the lagoons costs between £5,000 and £10,000 per linear meter</p>	<p>The Lagoon Dredging option is cost effective. It also offers other economic potentials like tourism, fisheries abundance enhancement and other ecosystem services at the same time</p>



3.	Pen Culture	<p><b><u>Pen Culture Option</u></b> The project plans to introduce pen culture into the proposed restored lagoon area.</p>	<p><b><u>Aquaculture Development Option</u></b> The cost of constructing aquaculture pond as an alternative engineering option, costs between \$100,000 and \$150,000 per hectare.</p>	<p>The pen culture is more cost-effective.<sup>4</sup> While this measure is less expensive in offering protection, it also offers other economic potentials like fisheries abundance, increase livelihoods and other ecosystem services</p>
4.	Salt Resilient Crops and Water Infiltration	<p><b><u>Water Infiltration Option</u></b> The project plans to implement the Water Infiltration and salty water sub component at an estimated cost of \$ 1,069,625.</p>	<p><b><u>Sea Dyke Construction</u></b> The cost of constructing a sea dyke as an alternative engineering option to prevent flooding and intrusion of sea water costs about \$9,470million<sup>5</sup>,</p>	<p>The Water Infiltration Option is comparably more cost-effective. While this measure is less expensive in offering coastal protection and sea water intrusion, it also offers other economic potentials like improved sustainable agriculture, food security, improved nutrition and good health as well as other ecosystem services at the same time.</p>

### 3.4 PROPOSED PROJECT IMPLEMENTATION WORK

The project has a planned 3,5 year implementation duration spanning from 2021 to 2025. Table 3.13 below shows an indicative timeline for project implementation.

<sup>4</sup> Aquaculture estimation costs. [business.qld.gov.au](http://business.qld.gov.au)

<sup>5</sup> Delan/Canada (October 2012). Cost of Adaptation – Sea Dikes and alternative strategies. Final Report.



TABLE 3.13: PROPOSED PROJECT IMPLEMENTATION WORK

Project Activities	2020						2021						2022						2023																						
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
<b>Project Preparatory Phase</b>																																									
1.	Feasibility/ Studies																																								
2.	Functional/Conception Designs																																								
3.	Environmental Social Management Framework (ESMF)																																								
4.	Detailed Design/ Procurement Mobilisation																																								
<b>Mangrove Restoration Project</b>																																									
5.	Phase 1: Prepare – Mangrove Nursery																																								
6.	Phase 2: Mangrove Planting and management																																								
7.	Phase 3: Coordination, supervision and support																																								
8.	Phase 4: maintenance and Field monitoring																																								
<b>Lagoon Restoration Project</b>																																									
9.	Phase 1: Pollution Study																																								
10.	Phase 2: Lagoon Cleaning, Dredging, Waste Mgt., and Mangrove Replanting																																								
11.	Phase 3: Coordination, supervision and support																																								
12.	Phase 4: Maintenance and Field monitoring																																								



TABLE 3.13: PROPOSED PROJECT IMPLEMENTATION WORK CONT'

Project Activities	2020					2021					2022					2023														
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>Project Preparatory Phase</b>																														
<b>Pen Culture Project</b>																														
13.																														
14.																														
15.																														
16.																														
<b>Salty Resilient Crops and Water Infiltration Project</b>																														
17.																														
18.																														
19.																														
20.																														





## CHAPTER FOUR

### 4 DESCRIPTION OF THE EXISTING ENVIRONMENT

#### 4.1 CLIMATE

The project area lies within the Dry Equatorial Climatic Zone. The area is influenced by the Southwest Monsoon Winds twice in a year resulting in a double maxima rainfall regime. A real positive point about the climate and project site is that it is not subject to very large storms and hurricanes with large tide surges.

##### 4.1.1 Temperature

The climate is dry equatorial with an average annual rainfall below 1000mm and unevenly distributed over the year. There are two maxima. The main season occurs between May and July when the south westerly monsoon winds dominate with a minor occurring between late August and early October. From November to February the north eastern harmattan winds dominate giving rise to a long dry season (Awadzi et al., 2008)

On average, the hottest month is February; with a mean temperature of about 28°C (83°F) while August is the coolest month with an average temperature of about 25°C (77°F). Figure 4.1 below shows the average high/low temperature for Srogbe/Whuti, Ghana

**Table 4.1: Rainfall and Temperature for Srogbe/Whuti**

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Avg. Temperature (°C)	27.4	28.2	28.4	28.2	27.6	26.4	25.3	24.7	25.8	26.6	27.4	27.4
Min. Temperature (°C)	24.2	25	25.1	24.8	24.1	23.5	23	22.4	23.3	23.7	24	23.6
Max. Temperature (°C)	30.6	31.5	31.7	31.7	31.1	29.3	27.6	27.1	28.3	29.6	30.9	31.2
Avg. Temperature (°F)	81.3	82.8	83.1	82.8	81.7	79.5	77.5	76.5	78.4	79.9	81.3	81.3
Min. Temperature (°F)	75.6	77.0	77.2	76.6	75.4	74.3	73.4	72.3	73.9	74.7	75.2	74.5
Max. Temperature (°F)	87.1	88.7	89.1	89.1	88.0	84.7	81.7	80.8	82.9	85.3	87.6	88.2
Precipitation/Rainfall (mm)	7	22	62	105	163	205	80	22	44	92	42	14

**Source:** <https://en.climate-data.org/africa/ghana/volta-region/srogbe-493251/>

The difference in precipitation between the driest month and the wettest month is about 198 mm. During the year, the average temperatures vary by 3.7 °C.



The Ada West District, for example, is encapsulated by the south-eastern coastal plains of Ghana which is one of the hottest parts of the country. Temperatures are high throughout the year and range between 23°C and 28°C. A maximum temperature of 33°C is normally attainable during the hot season. Rainfall is generally heavy during the major seasons between March and September. The average rainfall is about 750 millimeters. The relatively high temperatures help in the quick crystallization of salt for the salt industry.

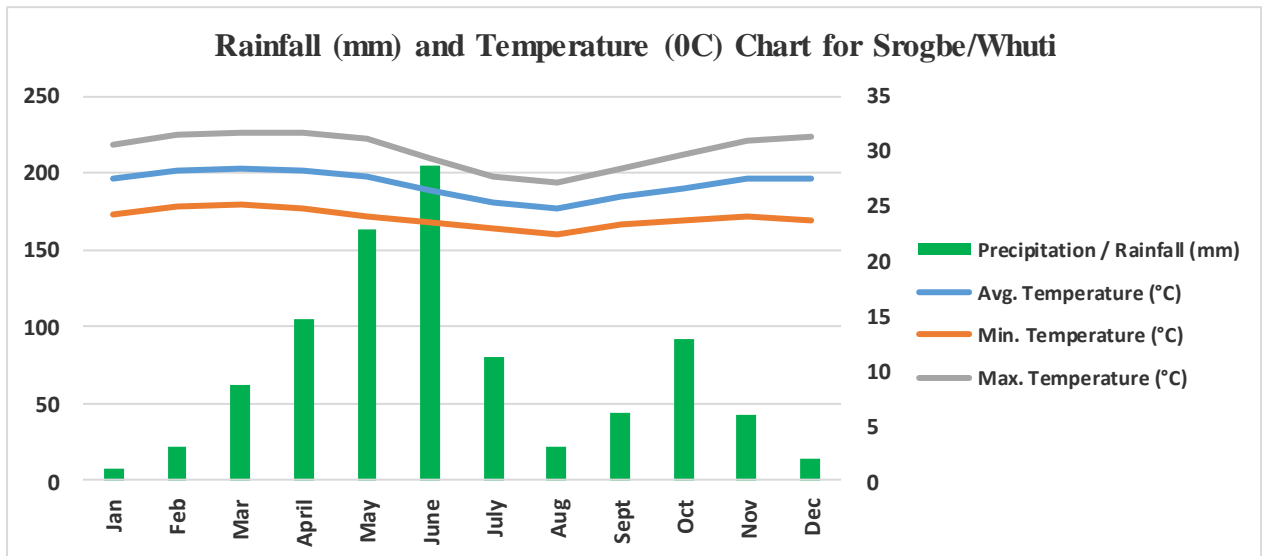


Figure 4.1: Rainfall and Temperature for Srogbe/Whuti, Ghana

#### 4.1.2 Precipitation

In general, there are two rainy seasons in the project area - first, from April till end of July and second, from October till end of December. The driest month is January, with 7 mm of rainfall. With an average of 205 mm, the most precipitation falls in June.

##### 4.1.1 Relative Humidity

Relative Humidity (RH) is usually over 90% during the night and early morning, reaching 95 to 100% on the coast. Generally, Relative humidity decreases during the day, with a minimum in the later afternoon. The Relative humidity can drop to about 65% with a seasonal variation of about 15%. Due to the Harmattan, extremely low Relative humidity may occur for a few days during December to February.

##### 4.1.2 Sunshine

The number of hours of sunshine ranges between 4 and 8. Sunshine exhibits a bi-modal pattern with peaks in March-April and October-November. Insolation or solar radiation varies from about 370 gm.cal/cm<sup>2</sup>/day in January and rises to 474 gm.cal/cm<sup>2</sup>/day in April. The maximum median daily solar radiation is probably experienced in the dry season(s), and solar radiation reduces to its minimum during the rainy periods. The incidence of solar radiation is relatively high throughout the year in Ghana

#### 4.1.1 General Ambient Air Quality

The project area is generally serene with no traffic at all and no dust generating activities. There are no major industrial activities present in the region and most emissions arise from the smoke of cooking fires/generators used for power supply and bush clearing of lands for farming. The ambient air quality is therefore reminiscent of a typical rural setting.

Earlier ambient air quality monitoring undertaken by the Consultant (Eco-Management Consult, (2019) at two sites, Srogbe/Whuti near Dzita and the second site Adidokpo near Anyanui areas all within the project site indicated that all the parameters measured, Particulate Matter (PM<sub>10</sub>), Total Suspended Particulates (TSP), Carbon Monoxide (CO), Nitrogen Dioxide (NO<sub>2</sub>) and Sulphur (SO<sub>2</sub>) dioxide were all within the national acceptable permissible values of 70µg/m<sup>3</sup>, 230g/m<sup>3</sup>, 10mg/m<sup>3</sup>, 150µg/m<sup>3</sup>, and 150µg/m<sup>3</sup> respectively. Figure 4.2 and 4.3 below shows the graphical representation of the monitoring readings.

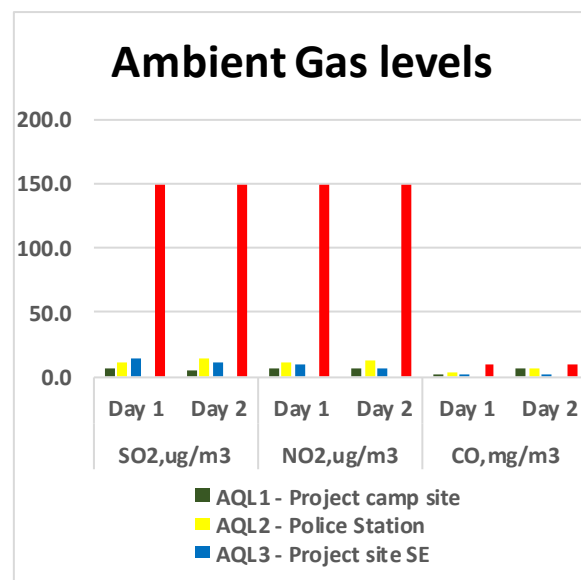
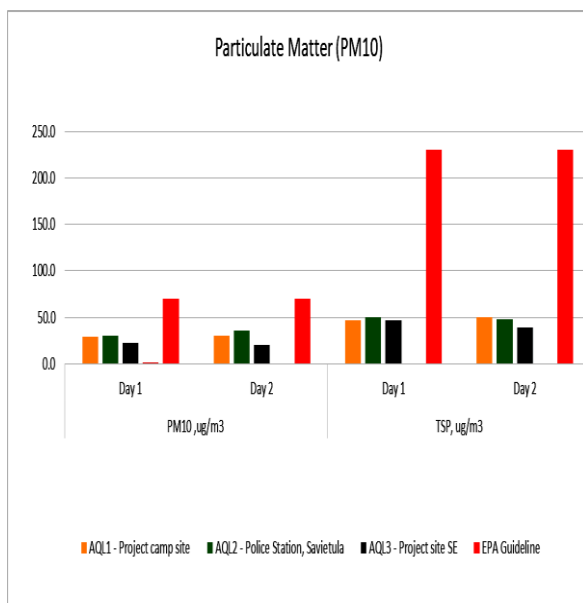


Figure 4.2: Particulate Matter results compared with EPA standards in red bar

Figure 4.3: Gas level results compared with EPA standard levels in red bars

Source: Eco-management Consult, 2019)<sup>6</sup>

#### 4.1.2 Wind

In general, the wind blows from the direction west-southwest to southwest. In January and February it sometimes blows a dry and cold wind called “Harmattan”, which is polluted with dust and fine sand from the north. Normally, the wind velocity is very low besides the thunderstorm-tornados which comes suddenly during the rainy season.

<sup>6</sup> Eco-Management Consult (2019).



The predominant wind directions during the south-west monsoon (May to Sept) are from 157.5° to 225° which accounts for 60% of the annual wind climate and more than 80% winds during the SW monsoon. The prevalent wind direction during the North –east monsoon which is also called post monsoon (Nov to Jan) are from 0° to 60°N which is about 70% of the time in NE monsoon. However, the wind speed from offshore during this period is found to be less than 40 knots. The wind rose diagram is shown in Figure 4.4.

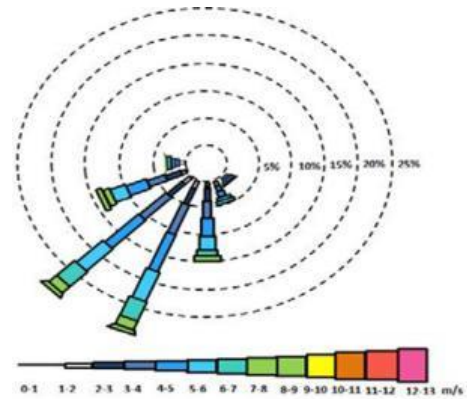


Figure 4.4: Wind rose diagram of Ghana

### 4.2 NOISE

An earlier representative sampling Ambient Noise survey was conducted by the Consultant (Eco-Management Consult, 2019) to monitor existing ambient noise levels around the Whuti/Srogbe areas. A 24-hour continuous ambient noise campaign was undertaken for two (2) consecutive days at seven (7) different locations for day and night. Results showed that generally, the daytime and night time ambient noise results respectively, compared with the EPA standard values of 60 dB(A) and 48 dB(A) respectively. Noise and vibration levels within the project area and its immediate environ are expected to be temporary elevated during the construction and dredging of the selected lagoons and expected noise from haulage trucks.

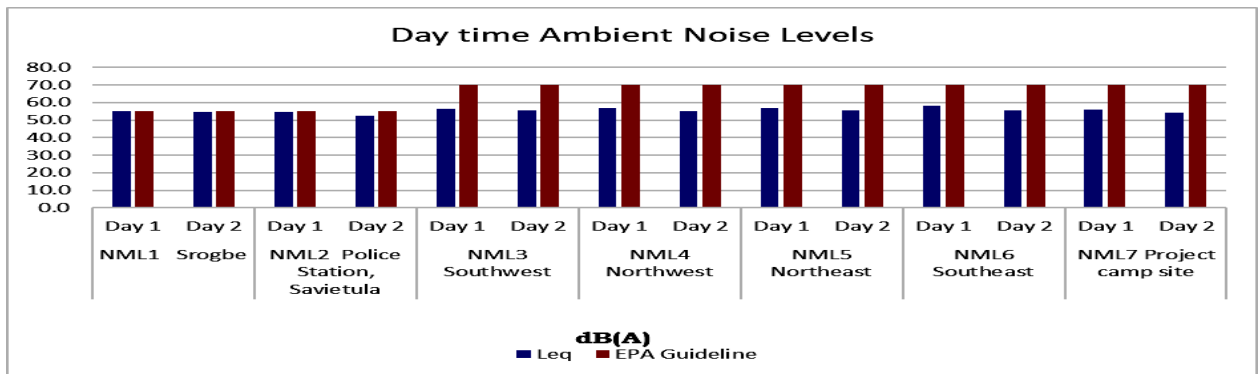


Figure 4.5: Day time Ambient Noise Monitoring Results compared with EPA standards in red bar

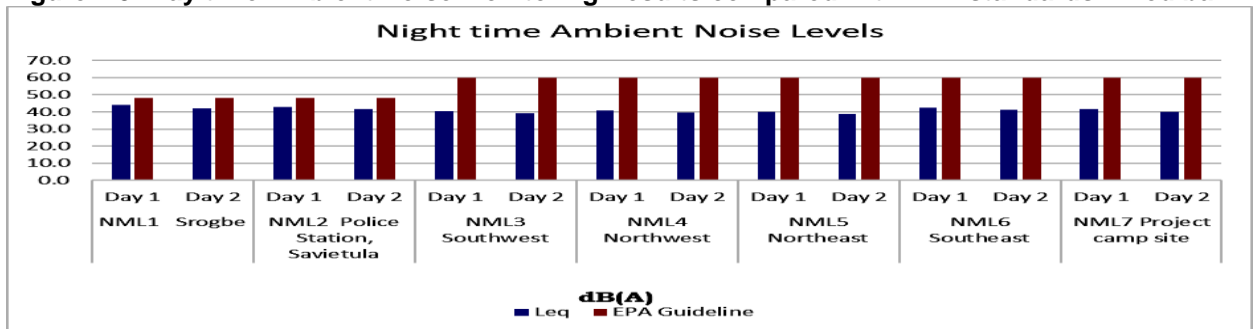


Figure 4.6: Night time Ambient Noise Monitoring Results compared with EPA standards in red bar

Source: Eco-Management Consult, 2019



### 4.3 GEOLOGY

Generally, the project area is underlain by pre-cambrian rocks which mainly include shales, sandstones and biotite gneiss which is generally medium to coarse grained and foliated. Overlying these rocks are either marine rocks of the cretaceous and eocene series or surficial rocks consisting principally of plastic shale, glauconitic sandstone, mudstone and limestone. Over the littoral the surface geology is composed of mainly consolidated beach sands with lagoonal clays that have a westward thickening trend. Underlying these recent deposits is a series of continental beds of tertiary age, consisting mainly of semi-consolidated limonitic, argillaceous sand and gritty sands, with a rather persistent gravel layer at its base. Coastal erosion is prevalent and severe in the basin because of the weak geological formations. Figure 4.7 below shows the geologic formation of the Keta Basin.

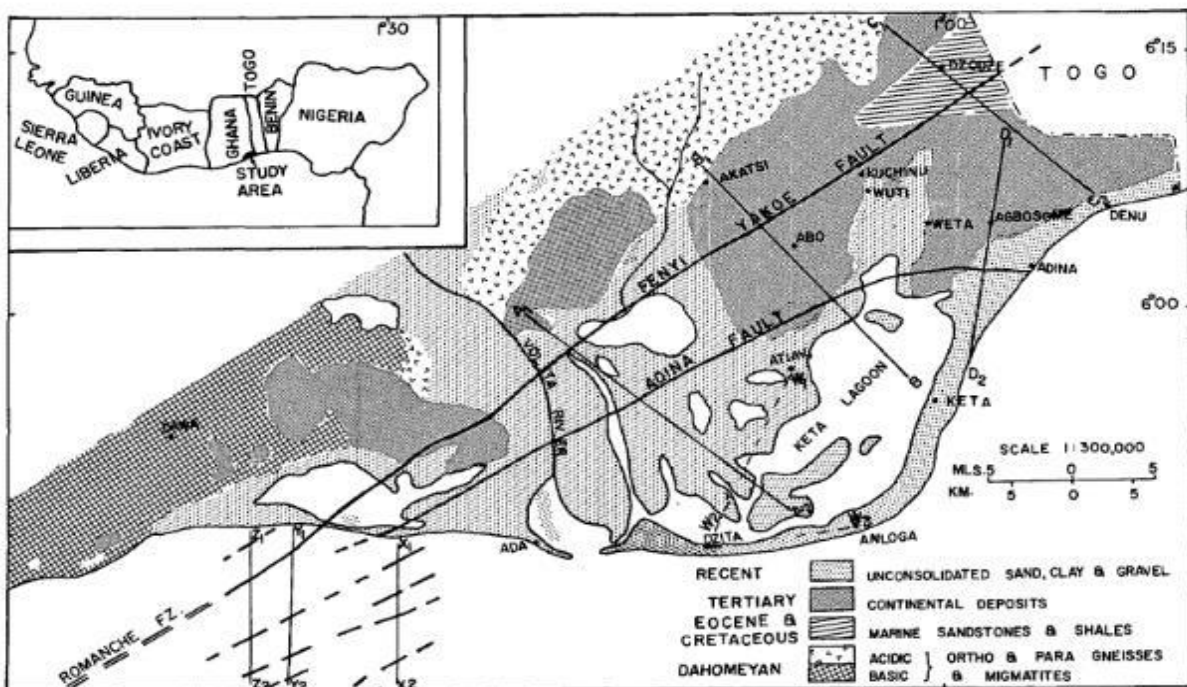


Figure 1. Geologic map of the Keta basin, Ghana (modified from the Ghana Geological Survey, 1966), and locality. X<sub>1</sub>X<sub>2</sub>, Y<sub>1</sub>Y<sub>2</sub>, and Z<sub>1</sub>Z<sub>2</sub> are locations of offshore seismic profiles made available by the Ghana Geological Survey. A<sub>1</sub>A<sub>2</sub>, B<sub>1</sub>B<sub>2</sub>, C<sub>1</sub>C<sub>2</sub>, and D<sub>1</sub>D<sub>2</sub> are locations of both gravity and topographic profiles shown in Figure 4. W<sub>1</sub>W<sub>2</sub> are well sections shown in Figure 8. Location of Romanche Fracture Zone (Emery and others, 1974; Arens and others, 1971; Burke and others, 1970) in relation to Fenyi-Yakoe fault is shown.

Source: Akpati, B.N. (1978)<sup>7</sup>

### Figure 4.7: Geologic Map of the Project Area

### 4.4 SOILS

The project area and its surrounding low-lying areas have deep muds of variable compositions. These soils are generally waterlogged, mostly with low salinity or freshwater and have variable depth. They are dark in color, rich in organic matter and have fine to medium texture. These soils mostly indicate acidic reaction and are saturated with aluminium and iron and have extremely low levels of available phosphate. They support a variety of vegetation.

<sup>7</sup> Geologic Structure and Evolution of the Keta basin, Ghana, West Africa.



Except the exploitative-capture fisheries and cutting of mangroves, other operations of economic significance are uncommon in this area.

The underlying rocks in the area are metamorphic in origin. The major soils formed over these geological formations include Ziwai-Zebe Complex, Tondo-Motawme Complex and Agawtaw-Pejeglo Complex soils which are formed over the Dahomeyan Acidic Gneiss rocks. Toje-Agawtaw Association and Amo-Tefle Association soils have the Acidic Gneiss and Schists as their parent rocks. Ada-Oyibi Association, Ada Association, Aveyime-Ada Association and Oyibi-Muni Association soils have alluvial and coastal deposits as their parent rock.

#### 4.4.1 Lagoon Soil Sediments Analysis

Sediment samples were collected from 7 sites – two from Akplabanya; two from Azizanya; two from Wokumagbe; and one from Goi lagoon areas – and tested at the Water Research Institute, Environmental Chemistry Division, Accra, for presence of heavy metals namely copper, cadmium, Lead and mercury. (Refer Annex D).

Ghana has no national guidelines/standards for sediment quality. The results were therefore compared with the Threshold Effect Concentration (TEC) values of Department of Environmental Conservation, Vermont, USA.<sup>8</sup> Apart from samples number AK1 collected from the Akplabanya site where mercury values of 3.17 mg/kg was recorded above the Sediment Quality Guidelines (SQG) of 0.18 mg/kg, all the recorded parameters were within the threshold level. There is the need to undertake further studies to establish the cause of elevated mercury concentrations at the AK1 sampling site. Table 4.2 and Figure 4.8 below shows the results of the lagoon sediments

**Table 4.2: Lagoon Sediment Analysis Results**

Sample ID	Copper (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
Akplabanya (AK1)	7.98	< 0.002	<0.500	<b>3.17</b>
Akplabanya (AK2)	14.9	< 0.002	18.1	<0.001
Azizanya (A21)	6.97	< 0.002	22.7	<0.001
Azizanya (A22)	8.45	< 0.002	6.11	<0.001
Wokumagbe (WK1)	8.17	< 0.002	<0.005	<0.001
Wokumagbe (WK1)	11.0	< 0.002	<0.005	<0.001
GOI-GOI2	24.5	< 0.002	<0.005	0.071
<b>SQG for Vermont, USA (TEC mg/kg – ppm DW)</b>	<b>31.6</b>	<b>0.99</b>	<b>35.8</b>	<b>0.18</b>

Source: Water Research Institute, Environmental Chemistry Division, Accra, August 2020

<sup>8</sup> Department of Environmental Conservation, Vermont, USA. <http://dec.vermont.gov/watershed>

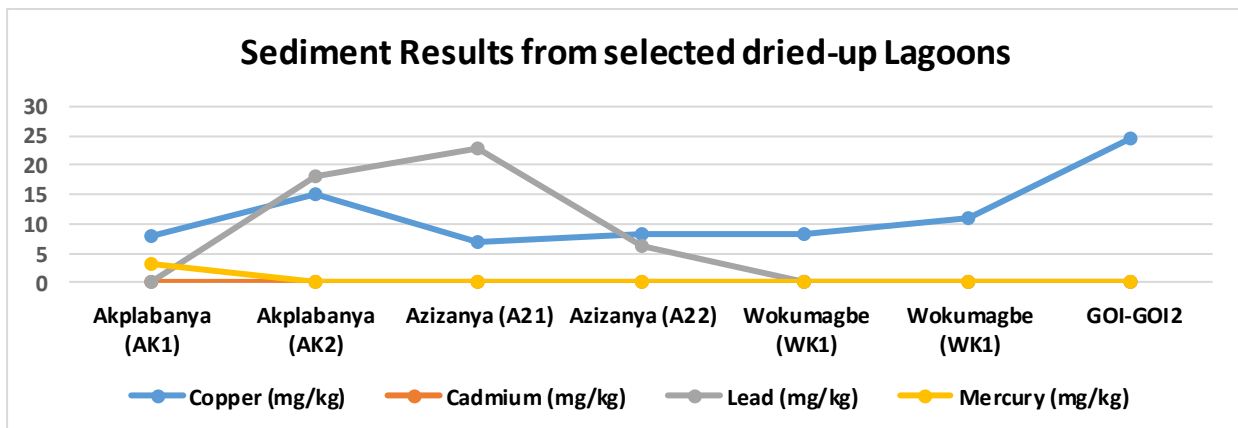


Figure 4.8: Sediment Results from Some Selected Lagoons

## 4.5 WATER RESOURCES

### 4.5.1 Surface Water

The three project districts are endowed with rich water resources. The general drainage pattern of the Ada West District can be described as dendritic with some of the streams taking their sources from the Volta River. Water bodies such as Anyamam, Akplabanya, and Sege, among others spring up with increased and decreased capacities in the wet and dry seasons respectively.

The Ada East District can also be described as dendritic with some of the streams taking their sources from the Volta River. The Volta River forms the eastern border of the district extending to the Gulf of Guinea southwards thereby forming an Estuary, about 2 kilometers away from the District capital, Ada-Foah. A few strands of mangrove trees can be found along the tributaries of the Volta River where the soil is waterlogged and salty. Water bodies such as Tamatoku among others are sprung ups with increased and decreased capacities in the wet and dry seasons respectively.

The main drainage system at the Keta Municipality is dominated by open lagoons, rivers, creeks and swamp lands which are subject to periodic inundation. Among the large water bodies that form the basin complex are Keta Lagoon, Avu Lagoon, Angor Lagoon and the waters of the Lower Volta River estuary. Together these water bodies form the largest natural lagoon water body in Ghana and cover an area of 300km<sup>2</sup>, stretching 40km along the coast and acting as a reservoir for the flood waters of the Lower Volta River as well as major rivers flowing from Central Volta Region such as River Tordze, Nuyi, Belikpa and Aklikpa.

The lagoons are separated from the sea along much of its coastal length by a sand bar referred to as the coastal littoral. However, at its western end the lagoon complex is joined to the sea through the Lower Volta Estuary and therefore subject to the daily and seasonal tidal regimes of the sea.



**Figure 4.9: The Volta River Estuary at Ada**



**Figure 4.10: Some mangrove vegetation along the Keta Lagoons**

#### 4.5.2 Water Quality Monitoring

Water samples were collected from twelve (12) locations in and around the selected sampling points such as Agorkodzi (Atiteti) and Dzita areas from Friday, February 28<sup>th</sup> to Monday 22<sup>nd</sup> June, 2020. The location ID, location and GPS coordinates of the water sampling sites are provided in the maps shown in Figures 4.11 and 4.12 below. Surface water and sediments samples were analysed at the Ghana water Research Institute Chemistry Laboratory.



**Figure 4.11: Inspecting a well**



**Figure 4.12: Water sampling Agbledomi**

##### 4.5.2.1 Quality Control

Sampling bottles were kept clean and free from contaminants by ensuring they were tightly sealed prior to sample collection from the field. The bottles were also sealed after the samples were collected, to avoid contaminants. The sampling bottles were sterilized thoroughly with the samples at each sampling location, before being filled finally.

The samples were filled to the brim to overflow, before being covered. This was done to ensure that absence of air gaps at the tip of the bottles, which could impact on the water quality





results. Sampling bottles were labeled accurately to avoid instances of mix-ups on the field. The water samples were stored and sent to the laboratory immediately they were taken to minimize the time between collection, storage and laboratory analysis.

#### 4.5.2.2 Results

Table 4.3 below shows the results as obtained after the laboratory analysis on the water samples collected from the project site. The analysis results show that with the exception of BOD, all the tested parameters for Phosphate, Nitrate, Ammonia, Copper, Cadmium, Lead and Mercury were within the Ghana Standards and the WHO Standards. The BOD at Goi of 85.8 (mg/l) is higher than the Ghana Standard value 50(mg/l) signifying high organic pollution. Using the WHO value of 2.0 (mg/l) for BOD, seven of the samples from Dzita, Atiteti and Agbledomi were higher than the acceptable limit. The certified laboratory results of the water quality analysis are shown in Annex D.

**Table 4.3: Summary of Water Monitoring Results**

Sample ID	Phosphate (mg/l)	Nitrate (mg/l)	Ammonia (mg/l)	Copper (mg/l)	Cadmium (mg/l)	Lead (mg/l)	Mercury (mg/l)	BOD (mg/l)
Kewunor (KN1)	0.756	0.013	<0.001	<0.010	< 0.002	<0.005	<0.001	0.890
Atiteti (A2)	0.283	0.015	<0.001	<0.010	< 0.002	<0.005	<0.001	0.060
Kewunor (KN2)	0.700	0.010	<0.001	<0.010	< 0.002	<0.005	<0.001	1.12
Agorkedzi (AG1)	0.171	0.015	<0.001	<0.010	< 0.002	<0.005	<0.001	1.50
Dzita (DZX)6:59pm	0.188	0.171	<0.001	<0.010	< 0.002	<0.005	<0.001	3.06
Dzita (DZ1)6:33	<0.001	0.058	<0.001	<0.010	< 0.002	<0.005	<0.001	7.92
Dzita (DZX-1)	0.046	0.022	<0.001	<0.010	< 0.002	<0.005	<0.001	3.06
Dzita (DZ2) 6:33	0.195	0.030	0.235	<0.010	< 0.002	<0.005	<0.001	6.34
Agorkodzi (AG2)	0.298	0.018	<0.001	<0.010	< 0.002	<0.005	<0.001	0.660
Atiteti (A1)	0.604	0.240	0.240	<0.010	< 0.002	<0.005	<0.001	28.2
GOI-GOI-1	12.8	<0.001	<0.001	<0.010	< 0.002	<0.005	<0.001	<b>85.8</b>
Agbledomi	0.612	0.076	<0.001	<0.010	< 0.002	<0.005	<0.001	7.78
<b>Ghana Standard</b>	-	<b>10</b>	<b>0.00 -1.5</b>	<b>0.2</b>	<b>0.01</b>	<b>0.1</b>	<b>0.005</b>	<b>50</b>
<b>WHO Guideline</b>	-	<b>10</b>	<b>0.00 -1.5</b>	<b>0.2</b>	<b>0.01</b>	<b>0.1</b>	<b>0.005</b>	<b>2</b>

Source: Water Research Institute, Environmental Chemistry Division, Accra, August 2020

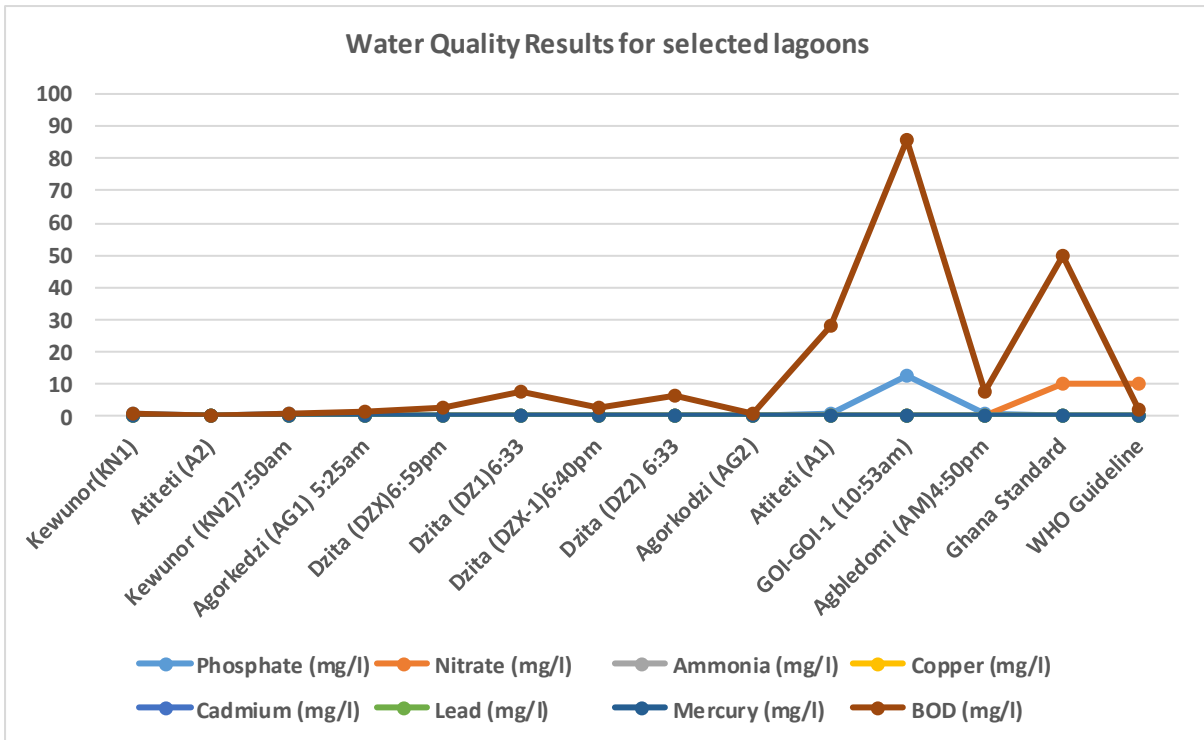


Figure 4.13: Water Quality Results from Selected Lagoons

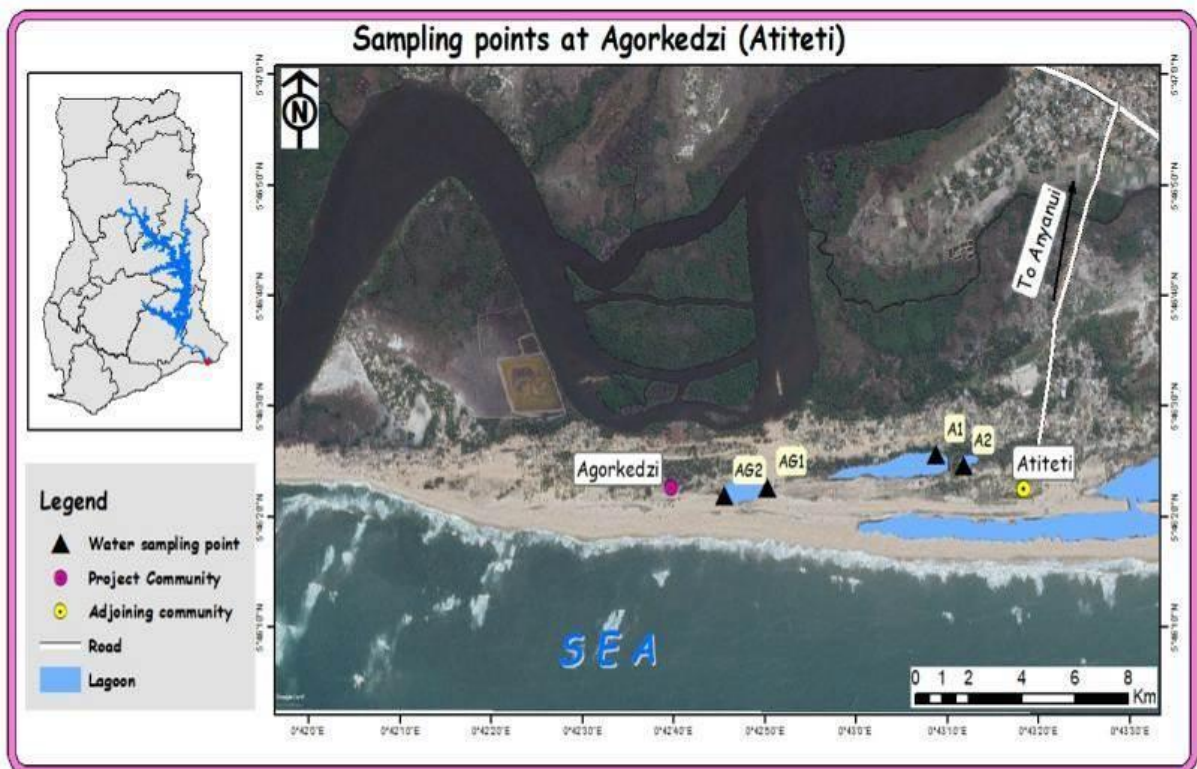


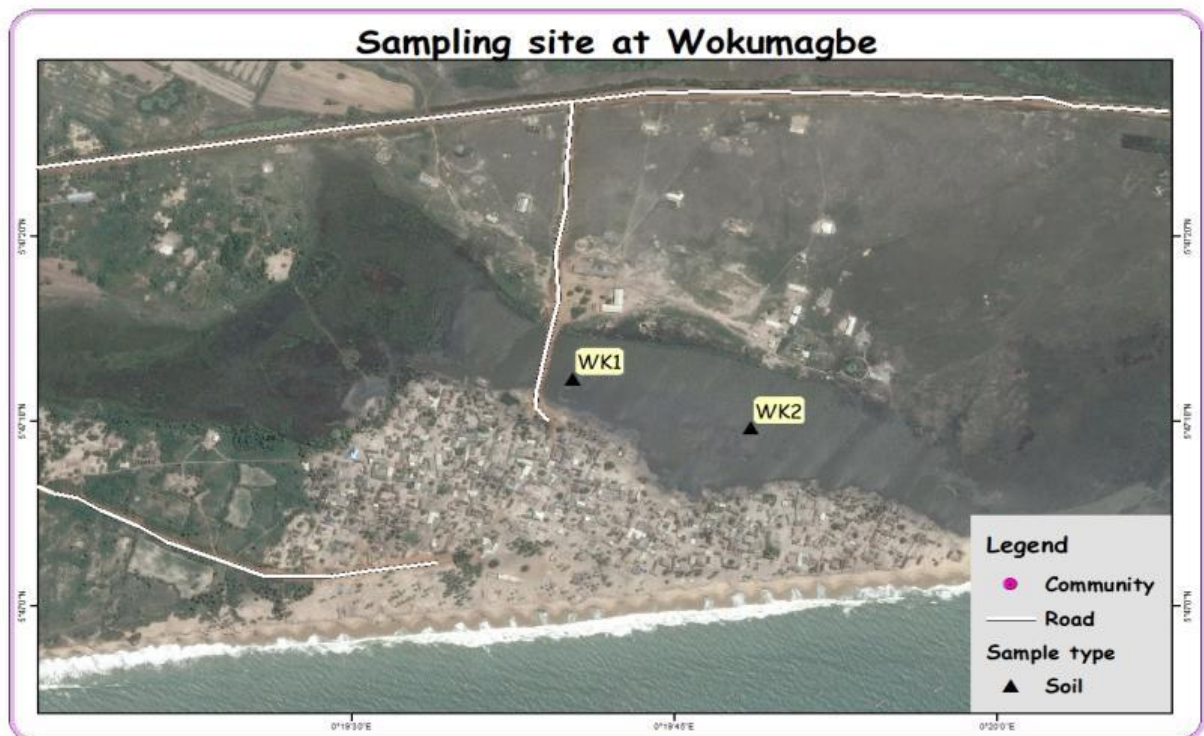
Figure 4.14: Selected Water Sampling Point along the coast at Agorkodzi



Figure 4.15: Selected Water Sampling Point along the coast at Dzita



Figure 4.16: Selected Water Sampling Point along the coast at Goi



**Figure 4.17: Selected Water Sampling Point along the coast at Wokumagbe**

### 4.5.3 Polycyclic-Aromatic Hydrocarbons (PAH) Analysis

Water and soil samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis. Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants<sup>9</sup> They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter. PAHs are largely known as ubiquitous environmental contaminants due to their ability to be sorbed onto atmospheric particulate matter and become transported all over the planet. Soils, surface waters, and sediments may be contaminated by PAHs due to atmospheric fallout, urban runoff, deposition from sewage, and by oil or gasoline spills. Hence, there is a potential for ingredients like food crops to become environmentally contaminated as a result (Kobayashi R, 2007).

The samples for the PAH in soils were taken from Wokumagbe, Azizanya, Kewunor, Akplabanya and Goi. The samples for PAH in Water were taken from Dzita, Agorkedzi, Atiteti, Kewunor, Goi and Agbledomi. Tables 4.4 and 4.5 below show the results as obtained after the laboratory analysis on the water samples at the Ghana Standards Authority Laboratory.

<sup>9</sup> Hodgeson J.W., Bashe W.J., Baker T.V. Determination of polycyclic aromatic hydrocarbons in drinking water by liquid-liquid extraction and HPLC with coupled ultraviolet and fluorescence detection. US Environmental Protection Agency; USA: (1990)



#### **4.5.3.1 Results**

The obtained results were compared with international standards since there were no national standards for PAH. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Benzo(a) anthracene, Chrysene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i,)perylene were all below standard. The certified laboratory results are shown in Annex E.



**Table 4.4: POLYCYCLIC-AROMATIC HYDROCARBONS (PAH) ANALYSIS IN SOILS**

TEST CODE	TEST CONDUCTED	UNIT	WOKUMAGBE-WK1	WOKUMAGBE-WK2	AZIZANYA-AZ-1	AZIZANYA-AZ-2	KEWUNOR-KN1	AKPLABANY-A AK1	AKPLABANY-A AK2	GOI GOI-2	TEC <sup>10</sup>
NAP	Naphthalene	µg/kg	<10	<10	<10	<10	2	<10	<10	<10	176
ACA	Acenaphthylene	µg/kg	ND	<10	ND	<10	ND	ND	<10	<10	-
ACE	Acenaphthene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-
FLU	Fluorene	µg/kg	ND	ND	ND	<10	ND	ND	<10	ND	77.4
ANT	Anthracene	µg/kg	ND	ND	<10	<10	ND	<10	<10	<10	57.2
PHE	Phenanthrene	µg/kg	<10	ND	<10	<10	ND	<10	<10	<10	204
FLT	Fluoranthene	µg/kg	13	16	<10	<10	ND	13	21	12	-
PYR	Pyrene	µg/kg	12	12	<10	<10	ND	<10	15	10	195
BAA	Benzo(a)anthracene	µg/kg	15	25	12	<10	ND	18	30	<10	108
CHR	Chrysene	µg/kg	<10	11	<10	<10	ND	<10	15	<10	-
BAP	Benzo(a)pyrene	µg/kg	<10	<10	<10	<10	ND	<10	<10	<10	150
BBF	Benzo(b)fluoranthene	µg/kg	32	33	15	<10	ND	<10	<10	34	-
BEP	Benzo(e)pyrene	µg/kg	<10	<10	<10	<10	ND	<10	<10	12	-
PYL	Pyrene	µg/kg	<10	<10	<10	<10	ND	<10	<10	<10	-
BKF	Benzo(k)fluoranthene	µg/kg	<10	<10	<10	<10	ND	<10	<10	<10	-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	14	15	<10	<10	ND	<10	<10	14	-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	<10	<10	<10	ND	<10	<10	<10	33
BGP	Benzo(g,h,i,)perylene	µg/kg	14	14	<10	<10	ND	<10	<10	<10	-

Source: Ghana Standards Authority Laboratory, Accra, August 2020

ND=Not detected

<sup>10</sup> Department of Environmental Conservation, Vermont, USA. <http://dec.vermont.gov/watershed> Recommended Sediment Quality Guidelines for the Protection of Aquatic Biota in Freshwater Ecosystem (TEC Threshold Effect Concentration)



**Table 4.5: POLYCYCLIC-AROMATIC HYDROCARBONS (PAH) ANALYSIS IN WATER**

TEST CODE	TEST CONDUCTED	UNIT	DZITA DZX-1	DZITA DZX-2	DZITA DZ1	AGORKEDZI AG1	AGORKEDZI AG2	ATITETI A1	ATITETI A2	KEWUNOR KN1	KEWUNOR KN2	GOI-GOI-1	AGBLEDOMI AM	TEC <sup>11</sup>
NAP	Naphthalene	µg/kg	2	2	2	3	1	4	4	2	4	2	2	176
ACA	Acenaphthylene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
ACE	Acenaphthene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
FLU	Fluorene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	77.4
ANT	Anthracene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	57.2
PHE	Phenanthrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	204
FLT	Fluoranthene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
PYR	Pyrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	195
BAA	Benzo(a)anthracene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	108
CHR	Chrysene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
BAP	Benzo(a)pyrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	150
BBF	Benzo(b)fluoranthene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
BEP	Benzo (e)pyrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
PYL	Pyrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
BKF	Benzo(k)fluoranthene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
DAA	Dibenzo(a,h)anthracene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33
BGP	Benzo(g,h,i,)perylene	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

ND=Not detected

<sup>11</sup> Department of Environmental Conservation, Vermont, USA. <http://dec.vermont.gov/watershed> Recommended Sediment Quality Guidelines for the Protection of Aquatic Biota in Freshwater Ecosystem (TEC Threshold Effect Concentration)



#### 4.5.4 Ground Water

Like the surface water conditions, the project area especially the Keta and Angaw lagoons and their surrounding areas also differ markedly in ground water hydrology. This includes the differences in depth of the ground water table, type of groundwater and their effect on soil moisture and vegetation. The ground water recorded in the Volta Region has a unique feature of upwelling (Boateng, 2009). The surface of perched water table is mostly fresh water floating on the saline water underneath, which by hydrostatic pressure comes up in open wells. That is how people in Woe and Anloga area are growing shallots by using this water.

Groundwater table is relatively shallow, (between 90cm to 1.45m depth) in samples taken. Depth of ground water table in Angaw lagoon area differed slightly among the sites studied. In most cases the depth was within 20cm. In slightly elevated areas like Adidokpo and Tunu it was 40 and 75 cm respectively. In some cases, the water table was almost at the soil surface. Ground water at different sites visited responded to the tidal flux and fluctuated by about 20cm in depth within the profile.

#### 4.5.5 Flood Risk and Sea Level Rise Sensitivity Assessment

A comprehensive study was undertaken by Boateng (2009), on sediment budget analysis and integrated shoreline management planning in the project area. A geo-reference Shuttle Radar Topographic Mission (SRTM) data (Satellite image with ground elevation) of the eastern coast of Ghana was used to assess the flood risk based on predicted future sea levels and potential storm levels. The data was opened in ERDAS Virtual GIS and three flood layers were created on the image. They are:

- **One metre**, (predicted sea-level rise by 2100; Ghana's EPA, 2000),
- **Two meters** (the latest upper limit prediction for sea-level rise by 2100; Pfeffer, et al, 2008), and
- sheet; Vaughan, 2008). The results of this assessment (Flood risk map of Keta coast is presented in Figure 4.6 below.

The assessment as shown in Figure 4.6 below identified that the project area is highly vulnerable to flooding and increase erosion that might be associated with sea level rise. Hence present settlements and developments that are located in areas with the risk of flooding, coastal erosion and potential instability might consider accommodation policies or perhaps retreat, depending on the level of risk (Walsh et al, 2004). Based the above risk it is quite clear that adaptive response potential to manage the risks of land loss, the settlements and infrastructure of the barrier strip between east of the Volta and Keta from submergence by sea level rise is therefore required.



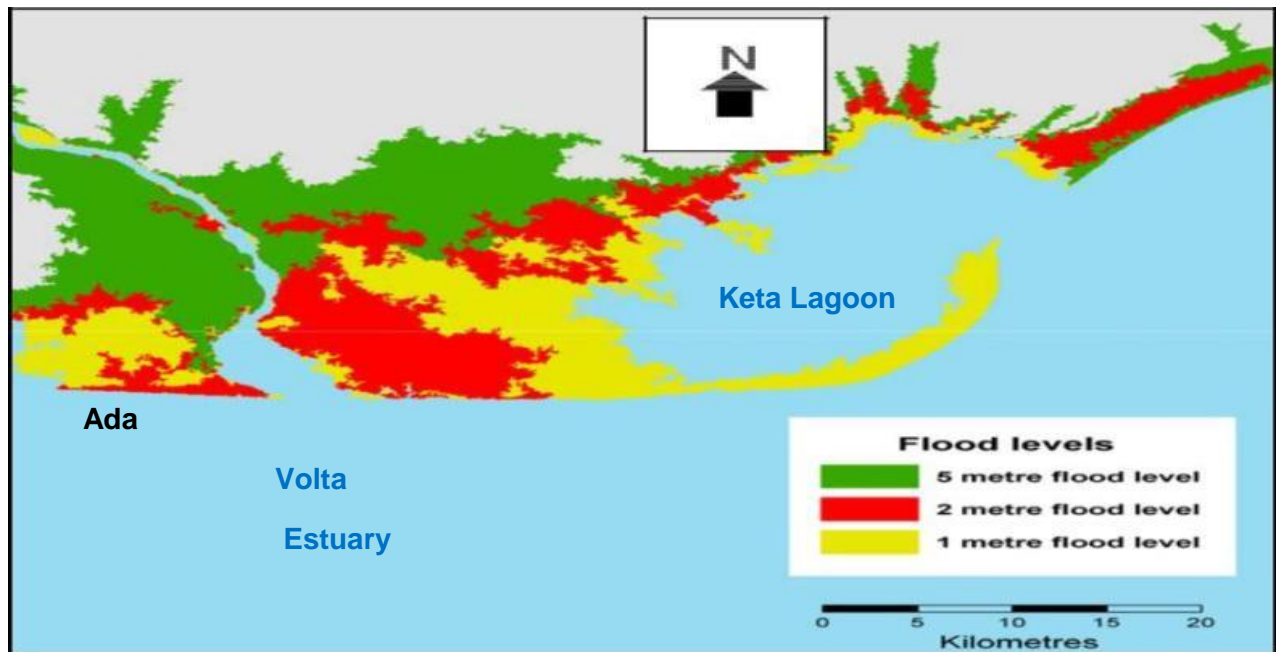


Figure 4.18: Flood Risk Assessment of Keta (Source: Vaughan, 2008).

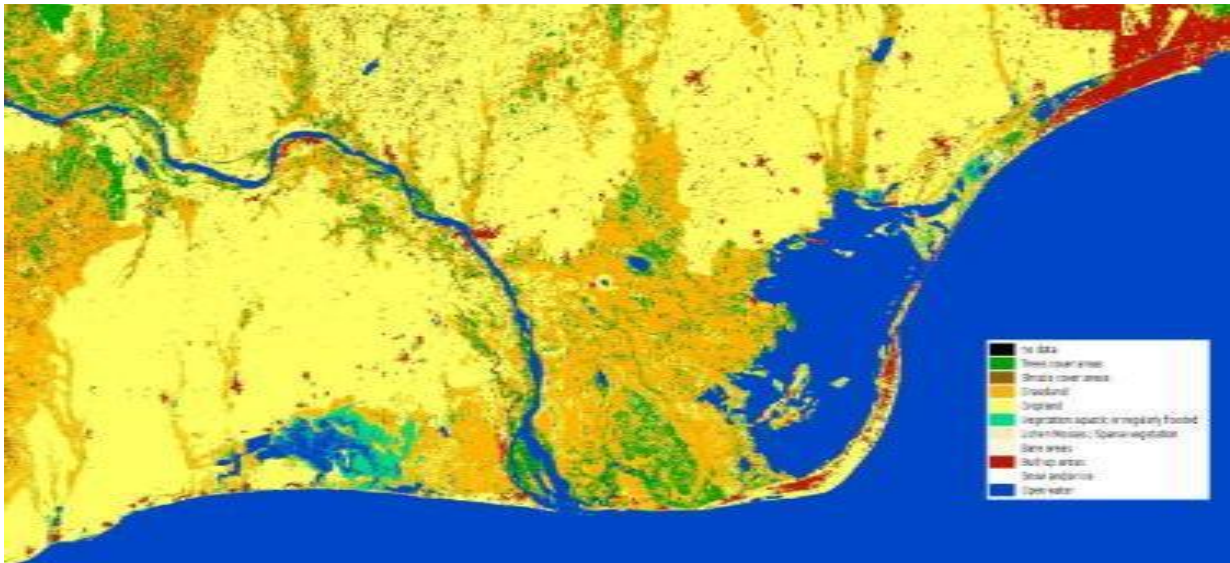
#### 4.6 VEGETATION

The project area falls within the Coastal Savanna Zone of Ghana and is relatively dry. Five main vegetation types are identifiable in the project area: saline marshes on parts of the mud and salt flats; pockets of low degraded mangroves, mainly *Avicennia african*; waterlogged grassland; and scattered thickets of shrubs and small trees on higher ground.

Some of the dominant plants species established are *Vetiveria fulvibar* and *Elaeophobia drupifera*. Patches of the grass *Paspalum sp.* and the herb *Sesuvium portulacastrum* as well as the sedge *Cyperus articulates* and the cat-tail *Typha domingensis* are common. Other characteristic species include dwarf palm, *Phoenix redinata* and the shrubs *Baphia nitida*, *Grewia spp.*, *Sophora occidentalis*, *Thespesia populnea* and *triumfetta rhomboidea*. Coconut palms are a common feature on the strand vegetation.



Figure 4.19: View of flora species in the project area



Source:

Figure 4.20: Indication of land cover of the Volta delta, areas indicated as grassland and marshes. An interactive map-application is available at <http://2016africallandcover20m.esrin.esa.int/viewer.php>. Derived from: CCI Land Cover – S2 prototype Land Cover 20m map of Africa 2016 (2017)

#### 4.7 FAUNA

The Project area is an important habitat for many aquatic and wetland animals and species and has been recognized as internationally important under the Ramsar Wetlands Convention – Keta-Angaw Lagoon Ramsar Site. However, increasing exploitation of the lagoon and its resources has resulted in degradation and raised concerns about the long-term sustainability of these systems.

##### 4.7.1 Water Birds

The environ of the project area as part of the Keta lagoon complex is well known for water bird. The site is particularly important for waders, supporting almost one third of the estimated East Atlantic Flyway population of *Tringa erythropus*. Other species which occur in large numbers include *Calidris ferruginea*, *C. minuta*, *Himantopus himantopus*, *Dendrocygna viduata*, as well as several heron and egret species.



Figure 4.21: *Calidris ferruginea*,



Figure 4.22: *Himantopus himantopus*,



#### 4.7.2 Fishery

A total of 18 fish species belonging to 13 families have been studied. Four of the species were found to be commercially important notably, the cichlids (*Tilapia guineensis* and *Sarotherodon melanotheron*), the Bonga shad, (*Ethmalosa fimbriata*) and the blue-swimming crab, (*Callinectes amnicola*), the most important shell fish. (Ghana Journal of Science)

Other freshwater species encountered are Nile Tilapia (*Oreochromis niloticus*), Redbelly Tilapia (*Tilapia zillii*, an aquarium fish, also converted to fishfood). Juveniles of the flat sardine (*Sardinella mardrensis*), mullets (*Mugil curem* & *Liza falcipinn*), as well as Crevalle Jacks (*Caranx hippos* – a superb, light-tackle game species and fearful predator) were encountered.

#### 4.7.3 Marine Turtles

Predation of the relatively small numbers of three species of marine turtles, *Lepidochelys olivacea*, *Chelonia mydas* and *Dermochelys coriacea* is very high along the 40km coastline of the lagoon. The catchment is huge, human population density in the area is one of the highest in the country. Land for settlement along the coastal areas is scarce and pollution from domestic waste in some of the villages is a major cause for concern. Sea erosion which previously threatened the existence of the communities along the coast has abated following the completion of the sea defence wall.



Figure 4.23: *Dermochelys coriacea*

### 4.8 SOCIO-ECONOMIC/CULTURAL ENVIRONMENT

The proposed project interventions are envisaged to have a range of social and economic impacts, some of which would be temporary, whilst others would be long-term and permanent. In accordance with the key issues outlined above, the socio-economic assessment would examine the following potential impacts:

1. Involuntary Displacement and loss of livelihood (Resettlement and displacement issues; Working Conditions and management of community relationships; Loss of community properties; Pressure on existing infrastructure facilities like hospitals, shops, schools etc.; Cultural conflicts; Impacts on vulnerable minority groups, tribal and indigenous people; Impacts on human-heritage and cultural landscapes.; Appreciation of rents etc.)
2. Employment Creation and Opportunities (Job security; Gender/female workers, workers welfare; Access to social services and housing; Improve the economic status of a number of people, and contribute to reducing the current level of unemployment)
3. Transportation and access (Public safety due to traffic accidents especially during construction period; Temporary generation of Heavy Goods Vehicles (HGVs) of traffic during the construction works; impacts of the development upon traffic flows and capacities of the local highway network; impacts upon public transport capacity and accessibility; impacts upon access and servicing arrangements of the Site)
4. Community Health, Safety and security (Increased incidence of water related



diseases; Transmission of diseases by immigrant labour population; Workers may be exposed to various hazardous situations, operate heavy machinery and other potentially dangerous equipment; Spread of transmissible diseases including HIV/AIDS both within the workforce and between the local communities; Resentment of non-local nationals by local residents if they are perceived to have taken jobs that could be successfully filled by local people, or due to non-integration with the local community; Spread of new diseases such as COVID 19 due to migration of population and workers)

5. Cultural heritage. (Culturally significant landscapes, monuments, traditions and festivals, taboos, archaeological findings etc.)

#### 4.8.1 Ada West District Location and Population Dynamics

The Ada West District shares boundaries with North Tongu District to the North, Ada East District and Ningo Prampram to the East and West respectively. It is bounded to the South by the Gulf of Guinea which stretches from Akplabanya to Goi. The total area of the district is 323.721 square kilometers. Figure 4.24 shows the location map of the Ada West District



**Figure 4.24: Ada West District Boundary Google Map**

The population of Ada West District according to the 2010 Population and Housing Census is 59,124 representing 1.5 percent of the region's total population. Males constitute 48.3 percent and females represent 51.7 percent. About 70 percent (70.3 %) of the population reside in rural localities. The District has a sex ratio (number males per 100 females) of 93.6.

The youth population (population less than 15 years) in the district account for 42.8 percent of the population depicting a broad base population pyramid which tapers off with a small number of elderly persons (population aged 60 years and older) 6.7 percent. The total age dependency ratio (dependent population to population in the working age) for the District is



90.6, the age dependency ratio for males is higher (95.4) than that of females (.86.3).<sup>12</sup> The current population based on Ghana Statistical Service record is 72,880<sup>13</sup>

#### 4.8.2 Ada East District Location and Population Dynamics

Ada east district was formerly known as Dangme East District. The total land area of the District is 289.783 (square km). The District shares common boundaries with the Central Tongu District to the North, South Tongu District and Ada West to the East and West respectively. It is bounded to the south by the Gulf of Guinea, which stretches over 18 kilometers from Kewunor to Totope. It is also bounded by the Volta River South–Eastwards extending to the Gulf of Guinea southwards thereby forming an Estuary, about 2 kilometers away from the District capital, Ada-Foah.

The population of Ada East District according to the 2010 Population and Housing Census is 71,671 representing 1.8 percent of the region's total population. Males constitute 47.5 percent and females represent 52.5 percent. About 70 percent (68.3%) of the population reside in rural localities. The District has a sex ratio (number males per 100 females) of 90.3. The youthful population (population less than 15 years) in the district account for 54 percent of the population depicting a broad base population pyramid which tapers off with a small number of elderly persons (population aged 60 years and older) 6.5 percent. The total age dependency ratio (dependent population to population in the working age) for the District is 85.5, the age dependency ratio for males is higher (89.8) than that of females (88.9).



Figure 4.25: Ada East District Boundary Google Map

<sup>12</sup> "District Analytical Report - Ada West District" (PDF). Ghana Statistical Service. Archived from the original (PDF) on 24 October 2018. Retrieved 22 December 2017.

<sup>13</sup> Ghana Statistical Services". [www.statsghana.gov.gh](http://www.statsghana.gov.gh). Retrieved 2020-05-27



### 4.8.3 Keta Municipal Location and Population Dynamics

Keta Municipal Assembly is one of the 25 administrative districts of the Volta Region of Ghana. It is located to the east of the Volta estuary, about 160km from Accra. The Municipality is a low-lying coastal plain with the highest point of 53 meters above sea level and the lowest between 1 to 3.5 meters below sea level thereby making it vulnerable to tidal waves and sea erosion.

The population of Keta Municipality, according to the 2010 Population and Housing Census, is 147,168 representing seven percent (7.0%) of the region’s total population. Males constitute 46.4 percent and females represent 53.6 percent of the total population of the Municipality. More than half (53.3%) of the population in Keta Municipality live in urban areas. The sex ratio of the Municipality is 86.7, which implies that there are 87 males per 100 females. The Municipality has a youthful population with 34.6 percent of the population below 15 years. This depicts a broad base population pyramid which tapers off with a small proportion of elderly persons (12.1). Table 4.6 below summarises the population characteristics

**Table 4.6: Population of Selected Project Communities by Sex**

District	Land Size (KM <sup>2</sup> )	POPULATION		
		Male	Female	Total
Ada West	323,721	28,579	30,545	59,124
Ada East	289,783	34,012	37,659	71,671
Keta	753,100	68,556	79,062	147,618
<b>Total</b>	<b>1,366,604</b>	<b>131,147</b>	<b>147,266</b>	<b>278,413</b>

Source: Compiled from the 2010 Population and Housing Census (2010 PHC) for Ada East, Ada west and Keta Municipality,



**Figure 4.26: Map showing the Keta Municipal Areas**



## 4.9 GENDER AND YOUTH ANALYSIS

The purpose of this specific 'gender assessment' is to demonstrate (in an overview) how this project will comply to the AF GP. A gender approach and data baseline has been established, which is necessary at the project start against which implementation progress and results can be measured.

In line with UN-Habitat's ESSP, the approach includes the identification and of promotion of economic, social and environmental benefits and opportunities for women and youth for each project activity (which can be seen as an additional safeguard area).

During project preparation a 'gender assessment' has been conducted to identify potential project gender equality and women's and youth empowerment issues, but also opportunities. The outcomes are summarized below, as well as arrangements that will be taken during project implementation to comply to the AF GP, including to show how the project contributes to improving gender equality, the empowerment of women and youth and the project interventions' suitability to meet the adaptation needs of targeted women and men and youth.

### 4.9.1 Methodology

During the project preparation phase, potential gender equality and women's and youth empowerment challenges and opportunities have been identified through initial data analysis / desk research, surveys and focus group discussions with women, youth and other groups. Through these methods, specific women and youth needs and perceptions were identified, as well as potential gender-related risks and impacts, including possible concerns regarding proposed project activities.

**Table 4.7: List of Project Preparatory Institutional Consultees**

Name	Organization/ Department	Position	Contact
Hon. Adzoteye L. Akrofi	Ada West District Assembly	District Chief Executive	0540630012
Agbemasu Senyo	Ada West District Assembly	Assistant Director 2A	0244411868
Delali Mordegli	Ada West District Assembly	Planning Officer	0249640532
Gotah Felix	Ada West District Assembly	Budget officer	
Ntim Gyarko	Ada East District Assembly	Planning Officer	0243106821
Hon. Sarah P. Dubakie	Ada East District Assembly	District Chief Executive	0244215119
Okantey Alexander	Ada East District Assembly	Physical Planning officer	0242527624
Emily Amerdjoe	Ada East District Assembly	Social and community Development officer	0244863561
Fredua Agyeman	MESTI	Focal Point (AF)	
Carl Fiati	EPA		
John Ntibrey	Keta Municipal Assembly	Planning officer	0553645624
Hon. Effah Godwin	Keta Municipal Assembly	Municipal Chief Executive	0246729566
Kodzoe Dekpo	Keta Municipal Assembly	Municipal Coordinating Director	0244488716
Francis Amevenku	CSIR Water Research Institute	Head Of Fisheries Division	0244573418
Saki David Anum	Fisheries Commission	Senior Fisheries officer	0244856305
Bob Alfa	Water Resource Commission		
Forestry Commission	Dr Andrew Agyare	Director	



Prof. Kwasi Appeaning	University Of Ghana	Head (Institute for Environment and Sanitation Studies)	
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#### 4.9.2 Initial Gender Assessment

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 forced to combine their work at home as homemakers and their jobs outside the home. Amu, 2004 has investigated the role of women in the Ghanaian economy especially their participation in economic activities, to identify factors that hinder their development, to shed light on how women affect and are affected by policies, programs and projects that are instituted by the government, domestic and otherwise, how best to take advantage of some of these programs and policies, and how best to minimize their negative impact on women.

Although females make up about 51 percent of the Ghanaian population as at 2000, illiteracy is more prevalent among women than men. The GLSS4 survey 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.

The gender characteristics of the project area indicate that the unemployment rate among women is lower than among males. Although women's participation in the labour force and economic activity makes up almost half of the economically active population, they are mostly found in the lower echelons of economic activity especially the private informal sector where women are predominantly entrepreneurs of small and medium scale businesses. Women are found mainly employed in agriculture, fish smoking and trading. These women, in recent times, have increasingly become the backbone of their families as breadwinners. Table 4.8 below shows the database of the men women and vulnerable in the project intervention communities.

**Table 4.8: Data baseline – women and youth**

Project Intervention	Community	Sex		Children	Youth	Elderly	Total
		Male	Female				
Mangrove Restoration	Agorkedzi/Atiteti	1,151	1,297	935	1,289	225	<b>2,449</b>
	Agbledomi	2,286	2,578	1,857	2,559	448	<b>4,864</b>
	Dzita	1,386	1,563	1,185	1,496	268	<b>2,949</b>
	Whuti	1,378	1,443	1,014	1,556	251	<b>2,821</b>
<b>Total</b>		<b>17,941</b>	<b>20,179</b>	<b>4,991</b>	<b>6,900</b>	<b>1,192</b>	<b>13,083</b>
Lagoon Restoration	Akplabanya	2,500	2,601	2,184	2,718	199	<b>5,101</b>
	Goi	1,707	1,950	1,315	2,067	275	<b>3,657</b>
	Wokumagbe	765	865	693	833	104	<b>1,630</b>
	Azizanya/ Kewunor	1,414	1,416	1,081	1,489	260	<b>2,830</b>
	Agorkedzi/Atiteti	1,151	1,297	935	1,289	225	<b>2,448</b>
	Agbledomi	2,286	2,578	1,857	2,559	448	<b>4,864</b>





	Dzita	1,386	1,563	1,185	1,496	268	<b>2,949</b>
<b>Total</b>		<b>11,209</b>	<b>12,270</b>	<b>9,250</b>	<b>12,451</b>	<b>1,779</b>	<b>23,479</b>
Pen culture	Akplabanya	2,500	2,601	2,184	2,718	199	<b>5,101</b>
	Goi	1,707	1,950	1,315	2,067	275	<b>3,657</b>
	Wokumagbe	765	865	693	833	104	<b>1,630</b>
	Kewunor	1,414	1,416	1,081	1,489	260	<b>2,830</b>
	Agorkedzi/Atiteti	1,151	1,297	935	1,289	225	<b>2,448</b>
	Agbledomi	2,286	2,578	1,857	2,559	448	<b>4,864</b>
	Dzita	1,386	1,563	1,185	1,496	268	<b>2,949</b>
	Vodza	1,532	1,837	1,185	1,927	257	<b>3,369</b>
<b>Total</b>		<b>12,741</b>	<b>14,107</b>	<b>10,435</b>	<b>14,378</b>	<b>2036</b>	<b>26,849</b>
Salty Crops/ Water infiltration	Tegbi	5,614	6,550	4,161	6,831	1,172	<b>12,164</b>
	Woe	5,080	5,559	3,898	5,944	797	<b>10,639</b>
	Lagbati/Lashibi/ Avume	10,652	12,070	7,430	13,273	2,019	<b>22,722</b>
	Whuti	1,378	1,443	1,014	1,556	251	<b>2,821</b>
<b>Total</b>		<b>22,724</b>	<b>25,622</b>	<b>16,503</b>	<b>27,604</b>	<b>4,239</b>	<b>48,346</b>

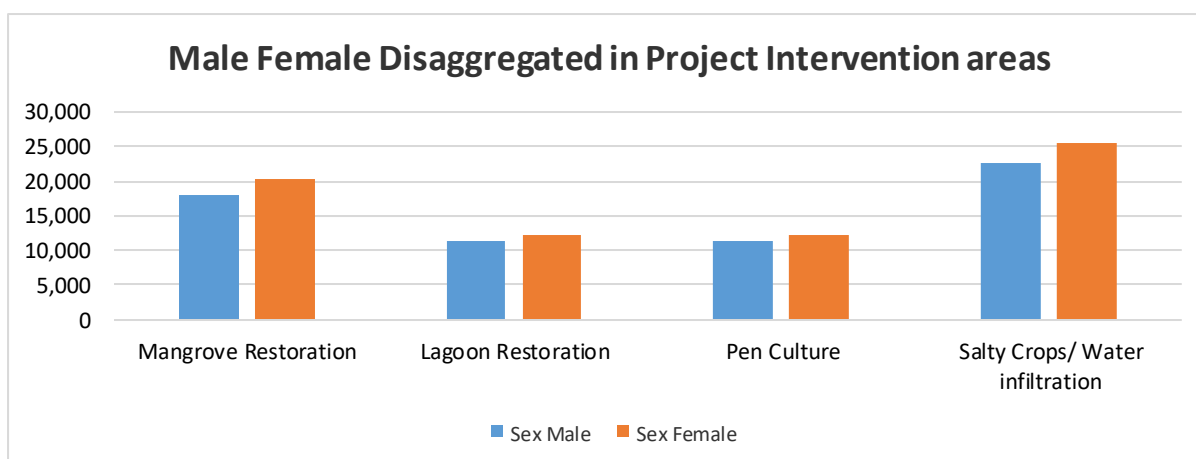


Figure 4.27: Male and Female Disaggregation in Project Intervention Areas

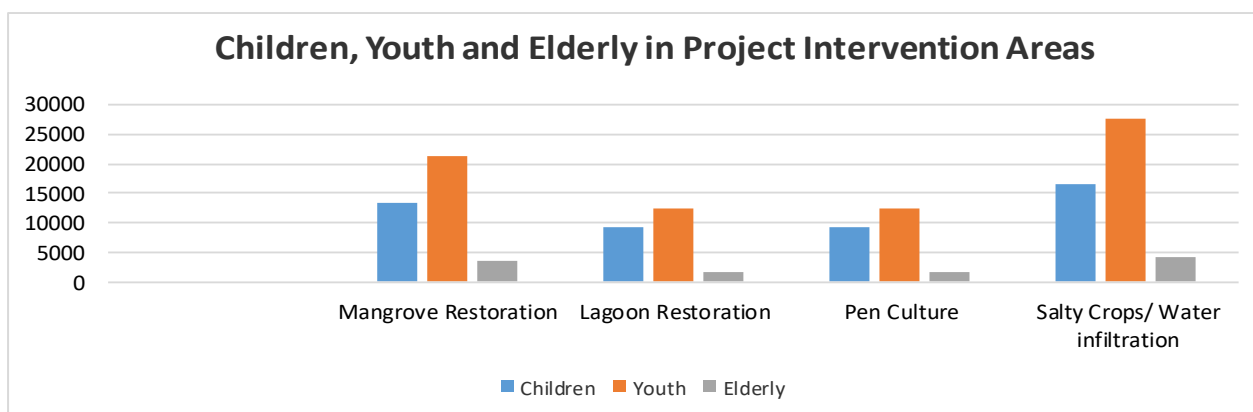


Figure 4.28: Children, Youth and Elderly in Project Intervention Areas



**Figure 4.29: Focus Group Discussions with Women in Agbledomi**

### 4.9.3 Differentiated Climate Change Impacts On Men And Women

Differentiated climate change impacts on men and women and their differentiated capacities do adopt to these, gender division of labour and gender-based power structures. Table 4.9 below shows Differentiated climate change impacts on men and women.

**Table 4.9: Differentiated climate change impacts on men and women**

Sector / Livelihood relevant to the project	Climate change impact	Gender and youth equality and empowerment issues, incl. specific Vulnerabilities / barriers to adapt	Capacity to adapt and opportunities for promoting a 'women' and 'youth' as agents of change
Nursery for Mangroves	Drought / less work		Women organization
Fish Smoking and Marketing	Drought / less work		Women organization
Agriculture (salty Crops)	Drought / less work	High dependency on agriculture sector for income; and strong cultural and traditional beliefs	Women organization

### 4.9.4 Capacity Gaps affecting GP Compliance

Table 4.10 below summarises the capacity of the potential executing entities to carry out gender responsive activities



**Table 4.10: Capacity of potential executing entities to carry-out gender responsive activities.**

Potential executing entity	Skills and expertise to provide gender mainstreaming inputs	Specific requirements execution entities for compliance	Capacity building needs
UN Habitat	Yes (UN core value) Yes (UN core value)	<ul style="list-style-type: none"> <li>▪ Appoint gender focal point</li> <li>▪ Target women and youth for awareness and capacity building activities</li> <li>▪ Identity specific women and youth needs in roll-out project activities</li> <li>▪ Where realistic, use quota targets for women and youth participation in project activities</li> <li>▪ Highlight specific gender and youth considerations in knowledge management</li> <li>▪ Have a participatory (women and youth monitoring system)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness on requirements</li> <li>▪ Share guidelines for execution entities to comply</li> </ul>
Development Institute	Limited (as government entity) Limited (as company) Some (as NGO / institute)	<ul style="list-style-type: none"> <li>▪ Appoint gender focal point</li> <li>▪ Target women and youth for awareness and capacity building activities</li> <li>▪ Identity specific women and youth needs in roll-out project activities</li> <li>▪ Where realistic, use quota targets for women and youth participation in project activities</li> <li>▪ Have a participatory (women and youth monitoring system)</li> <li>▪ Appoint gender focal point</li> <li>▪ Target women and youth for awareness and capacity building activities</li> <li>▪ Identity specific women and youth needs in roll-out project activities</li> <li>▪ Where realistic, use quota targets for women and youth participation in project activities</li> <li>▪ Highlight specific gender and youth considerations in knowledge management</li> <li>▪ Have a participatory (women and youth monitoring system)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness on requirements</li> <li>▪ Share guidelines for execution entities to comply and to ensure 'opportunities' are identified and exploited</li> <li>▪ Develop baseline and approach before project start + report</li> </ul>

**4.9.5 Opportunities for promoting a ‘women’ and ‘youth’ as agents of change**

The project aims to utilizing women’s traditional knowledge by targeting women in community level skill building and trainings. Enhancing women and youth’s capacities for the management and use of critical local resources will help address their vulnerabilities to climate change. Capacity building, training and implementation of adaption programmes would secure a source of livelihoods for women. Opportunities include:

- Have women, youth and children participate in assessment and planning processes + monitoring
- Include women and youth considerations / roles in strategies and plans
- Target and strengthen women organizations
- Women and the youth to be involved with Operation and Maintenance activities of the projects



- Youth to be target and if possible, lead awareness raising campaigns on adaptation to water scarcity.

#### **4.9.6 Economic Activities**

The main economic activity of the people living in the project area is fishing, both from the sea and the lagoon. Marine fishing is carried out along the 75km stretch of coastline from Aflao in the east to the Volta River at Atiteti/Anyanui (Kufogbe, 1997). Communities around the Keta lagoon are also involved in fishing from the lagoon. Shallot and other vegetable farming occur extensively on the sand spit throughout the year. The zone is also noted for coconut and mango plantation farming. Poultry farming is also an important contributor to the local economy (Nukunya, 1997).

Wood cutting (Mangrove harvesting) is an important economic activity. This is intensive around Anyanui, Atorkor and Salo for domestic and commercial use. Both the red and the white mangrove are harvested (Keta Municipal Assembly, n.d). The mining of sand within the Keta Municipality until recently was an established economic activity. Places like Dzita, Atorkor, Dzelukope, Tegbi and Woe are extensively mined. Salt is also mined along the banks of the lagoon though this is restricted to the dry season (Keta Municipal Assembly, n.d, Ahiawodzi, 1997).



## CHAPTER FIVE

### 5 STAKEHOLDER CONSULTATIONS

#### 5.1 INTRODUCTION

This chapter presents the process of undertaking consultations with the relevant stakeholders. The consultations are essential to ensure that all relevant environmental and social impacts of the projects are identified with the corresponding mitigation measures to limit the adverse impacts of the project on the environment and community.

The broad objectives of the stakeholder consultation were to identify and notify interested and affected parties (IAPs) of the proposed development and to provide the IAPs with the opportunity to comment on the proposed activity and raise issues and concerns. Specifically, the consultation process among others sought to:

- familiarise the relevant stakeholders with the proposed site and the surroundings;
- clarify the legal requirements for the proposed study;
- present the proposed study approach and get confirmation of the regulatory institutions based on the conditions of the site observed;
- identify specialists that may be required for the project based on the observation made on site;

#### 5.2 CONSULTATION APPROACH

A participatory and consultative approach was adopted for the consultation with the relevant stakeholders. This approach entailed the involvement of the concerned and relevant key stakeholders in relation to the implementation of the project in the process of data collection and analysis, and the development of appropriate mitigating mechanisms/interventions. Responses from the consultations provided the relevant background information to help identify major environmental and social concerns of the project for the preparation of the environmental impact statement.

To collect the relevant data from the consultation, a Field Consultation Questionnaire was developed (Attached as Annex F) to obtain the following information:

- Characteristics of stakeholder/Vulnerable Groups
- Confirmation of most important climate hazards which have impacted the community
- Baseline information on existing groups in the affected communities
- Potential ESP Risks screening and impact Assessment
- Suggestions that might be relevant to the EIA such as land use, geology, water quality, socio-cultural issues etc.

##### 5.2.1 Stakeholder Mapping

The stakeholder mapping took into consideration the relevant regulatory authorities, local assembly, opinion leaders, identified concerned groups and residents abutting the project site. For the purpose of the consultation, the stakeholders were segmented into two: Primary and Secondary stakeholders.



### **5.2.1.1 Secondary Stakeholders**

The secondary stakeholders are the major regulatory and service providers of relevant policies, legislative and legal frameworks which the project is required to comply with. Consultations with the secondary stakeholders is essential since understanding the potential environmental and social impacts as well as regulatory constraints in relation to the proposed developmental project is critical to developing timely and cost-effective project plans, sound engineering designs, effective stakeholder management, and successful permitting.

### **5.2.1.2 Primary stakeholders**

The primary stakeholders are the immediate population closer to the project site of which the impacts (positive or negative) of the project would significantly be felt. In other words, the primary stakeholders are mostly the Project Affected Parties (PAPs). Attached in Annex G is the Signed List of stakeholders who participated in the consultations process.

## **5.2.2 Stakeholder Engagement Tools**

The major data collection tools employed in the consultation process are key informant interviews and Focus Group Discussions (FGDs). The key informant interviews were conducted with the secondary stakeholders while the FGDs were conducted with the primary stakeholders. However, some interviews were also conducted with a segment of the primary stakeholders (individual residents abutting the proposed site for the project). The FGDs were done with the identified concern groups including the Youth Groups, Farmers, and Traditional Chiefs and Elders.

## **5.2.3 Community Entry**

The Consulting Team worked with staff of the Development Institute, an NGO working in the project area. This NGO has had earlier interventions in the Communities so the people were fully aware of the project and therefore fully cooperated and assisted in the data/information collection

## **5.2.4 Site Observations**

As part of the consultation, an initial reconnaissance field visitation was undertaken the Consultation Team to the project site together with the Development Institute. This initial observation was relevant in the mapping of the relevant stakeholders as well as the identification of activities closer to the project site. During the site observation, the following were considered:

- Location of the project site
- Income generating activities (IGAs) on-going in and around the project site
- Proximity of the community to the project site
- Road network in and around the project site
- Alternative uses of the project lands (salt winning and farming)

Figures 5.1 to 5.10 below show some of the observations made in the field.



Figure 5.1: View of Lagoon at Dzita



Figure 5.2: Dried up and silted lagoon at Goi



Figure 5.3: Farming method at Agbledomi



Figure 5.4: Mangrove Deforested area at Agorkedzi/Atiteti



Figure 5.5: Poor waste management at Akplabanya



Figure 5.6: State of wetland areas at Agbledomi



Figure 5.7: State of Mangroves at Agbledomi



Figure 5.8: Fishing dug-out canoes at Dzita



Figure 5.9: View of lagoon area at Atiteti



Figure 5.10: Coastal Erosion at Vodza

### 5.3 SUMMARY OF STAKEHOLDERS' KEY CONCERNS

Table 5.1 below shows summary of concerns and recommendations raised by the stakeholders interviewed.





**TABLE 5.1: SUMMARY OF STAKEHOLDERS' ISSUE - RESPONSE MATRIX**

No.	Institution/ Individual	Sex	Community/Venue Date of Interview	Telephone	Main Issues	Responses/Recommendations
1.	Agbotadua Ahevi	Male	Dzita 3 <sup>rd</sup> June 2020	0244116528	<ul style="list-style-type: none"> <li>We plead that the lagoon should be protected to prevent accidents such as children drowning unknowingly</li> </ul>	<ul style="list-style-type: none"> <li>We appeal to the project owners to seek our concern during every decision regime</li> </ul>
2.	Jasper Agbanator	Male	Agbledomi 3 <sup>rd</sup> June 2020	0548302123	<ul style="list-style-type: none"> <li>We plead that foot bridges should be constructed to access the beach.</li> <li>We plead that regulations should be put on the use of the lagoon to ensure sustainability and equal access to the resource</li> </ul>	<ul style="list-style-type: none"> <li>We suggest the project takes into consideration access routes to the beach from the community</li> </ul>
3.	Moses Akorli	Male	Agorkedzi 3 <sup>rd</sup> June 2020	0249870973	<ul style="list-style-type: none"> <li>Some people fish from the lagoon, how do they get fish again when the project has taken over the lagoon?</li> </ul>	<ul style="list-style-type: none"> <li>We plead that we perform necessary rites where it is due during project take off.</li> </ul>
4.	Agbanavor Raphael	Male	Atiteti 3 <sup>rd</sup> June 2020	0244044376	<ul style="list-style-type: none"> <li>We plead that the land owners be consulted before acquiring the land for use in the project</li> <li>We plead that regulations should be put on the use of the lagoon to ensure sustainability and equal access to the resource</li> </ul>	<ul style="list-style-type: none"> <li>We plead that land owners around the lagoons should be made to agree to the use of their lands during project implementation</li> <li>We suggest that in the future the project can scale into constructing sea defence structures</li> </ul>
5.	Joseph Kweku	Male	Whuti 3 <sup>rd</sup> June 2020	0545165409	<ul style="list-style-type: none"> <li>Crop failure</li> <li>Destruction of agriculture</li> <li>Lagoon erosion</li> </ul>	<ul style="list-style-type: none"> <li>We plead that land owners around the lagoons should be made to agree to the use of their lands during project implementation</li> </ul>
6.	Agbota Ernest Xorlalinam	Male	Lagbati 3 <sup>rd</sup> June 2020	0240989717	<ul style="list-style-type: none"> <li>How do they get fish again when the project has taken over the lagoon?</li> </ul>	<ul style="list-style-type: none"> <li>We plead that we perform necessary rites where it is due during project take off</li> </ul>
7.	Akpalu Reinhold	Male	Woe 3 <sup>rd</sup> June 2020	0245302566	<ul style="list-style-type: none"> <li>Crop failure</li> <li>Lagoon flooding</li> </ul>	<ul style="list-style-type: none"> <li>Mangroves should be planted along the lagoon to restore vegetation.</li> </ul>
8.	Christopher Mensah	Male	Tegbi 3 <sup>rd</sup> June 2020	-	<ul style="list-style-type: none"> <li>We plead that the land owners be consulted before acquiring the land for use in the project</li> </ul>	<ul style="list-style-type: none"> <li>We suggest that in the future the project can scale into constructing sea defense structures</li> </ul>



**TABLE 5.2: SUMMARY OF STAKEHOLDERS' ISSUE - RESPONSE MATRIX cont'**

No.	Institution/ Individual	Sex	Community/Venue Date of Interview	Telephone	Main Issues	Responses/Recommendations
9.	Labia Fredrick	Male	Vodza 3 <sup>rd</sup> June 2020	0242649276	<ul style="list-style-type: none"> <li>We plead that regulations should be put on the use of the lagoon to ensure sustainability and equal access to the resource</li> </ul>	<ul style="list-style-type: none"> <li>We plead that we perform necessary rites where it is due during project take off</li> </ul>
1.0	Nomo Tetteh	Male	Akplabanya 3 <sup>rd</sup> June 2020	0246779145	<ul style="list-style-type: none"> <li>We plead that the project should consider making access routes between the community and the beach in the form of small bridges.</li> </ul>	<ul style="list-style-type: none"> <li>We plead that waste bins should be provided for the community to manage waste.</li> </ul>
11.	Ruben Otipeseku	Male	Goi 3 <sup>rd</sup> June 2020	0247266003	<ul style="list-style-type: none"> <li>Dikes should be such that it prevents accidental falling into lagoon.</li> <li>We plead that regulations should be put on the use of the lagoon to ensure sustainability and equal access to the resource</li> </ul>	<ul style="list-style-type: none"> <li>We plead that waste bins should be provided for the community to manage waste.</li> </ul>
12.	Fredrick Nartey	Male	Wokumagbe 3 <sup>rd</sup> June 2020	0240331041	<ul style="list-style-type: none"> <li>We plead that the lagoon should be protected to prevent accidents such as children drowning unknowingly</li> </ul>	<ul style="list-style-type: none"> <li>We plead that land owners around the lagoons should be made to agree to the use of their lands during project implementation</li> </ul>
13.	Roselyn Oleki	Female	Azizanya 3 <sup>rd</sup> June 2020	0547022976	<ul style="list-style-type: none"> <li>Lagoon flooding</li> <li>Destruction of agriculture</li> </ul>	<ul style="list-style-type: none"> <li>We plead that the lagoon should be protected to prevent accidents such as children drowning unknowingly</li> </ul>
14.	Zormelo William	Male	Kewunor	0242772494/ 0246379274	<ul style="list-style-type: none"> <li>Lagoon erosion</li> <li>Low fish yield</li> </ul>	<ul style="list-style-type: none"> <li>We plead that we perform necessary rites where it is due during project take off.</li> </ul>




**Table 5.3: NATIONAL FISH PROCESSOR AND TRADERS (NAFPTA) KETA MUNICIPAL ASSEMBLY - DEKA WORWOR CO-OP FISH PROCESSORS AND MARKETING ASSOCIATION-DZITA**

No.	Institution/ Individual	Age	Community/ Venue	Telephone	Main Issues	Responses/Recommendations
1.	Madam Dzanyiepor	50	Dzita	0242806099	Reduce fishing options; Lagoon flooding Lagoon erosion	Employ youths of the community
2.	Mama Afahedo	65	Dzita	0249551209	Coastal erosion Women should be engaged in decision making during project implementation	Engage youth and women in the decision makings
3.	Aklika Wugbagba	58	Dzita	0559421299	Mangroves should be restored in the area to enhance livelihood Low fish yield	Plant more mangroves along the lagoon Employ youths of the community
4.	Peace Akorli	24	Dzita	0558369311	Coastal flooding Lack of capital to start business	Engage youth and women in the decision makings Consult elders before project commence
5.	Rita Kpordorlor	40	Dzita	0541900757	Introduce fishery varieties into lagoon Coastal erosion	Heritage sites should be protected
6.	John Wutsikah	35	Dzita	0248614364	Low fish yield Coastal erosion	Lagoon should be protected to prevent accidents such as children drowning unknowingly
7.	Yayra Adedzashie	58	Dzita	0247170598	Mangroves should be planted along the lagoon	Engage youth and women in the decision makings
8.	Ernestina Dzameshie	34	Dzita	0244125183	Low fish yield Lack of capital for business	We plead that waste bins should be provided for the community to manage waste.
9.	Mawushie Seade	24	Dzita	0247962107	Inadequate firewood for fish smoking Coastal erosion	Consult elders and perform necessary rites before project implementation
10.	Abotsigah Faustina	27	Dzita	0544230810	Create access routes between the community and the beach in the form of small bridges.	Engage youth and the community in decision making and implementation Provide job for youth of the community.
11.	Tsoenamawu Kpogo	50	Dzita	0542362960	Coastal inundation Lagoon flooding	Provide waste bins for the community to improve sanitation
12.	Nanashie Ngorgbawoshie	56	Dzita	0248614364	Low fish yield Lagoon flooding	Consult elders and perform necessary rites before project implementation
13.	Comfort Agbledu	50	Dzita	-	Low fish yield Lack of capital for business	Heritage site should be protected during project implementation
14.	Babynayoka Dorah	60	Dzita	0246586759	Mangroves should be planted along the lagoon; Coastal erosion	Engage youth and women in the decision makings






**TABLE 5.4: SUMMARY OF STAKEHOLDERS' ISSUE - RESPONSE MATRIX cont'**

Date	Stakeholder/Participants	Objectives	Issues and Conclusion	Evidence
28/02/2020	Agbledomi (18 participants) Assemblyman, Fishermen, Opinion leaders etc (Refer Annex G) Focal Point: Jasper Agbenator (0548302123)	To solicit views and concerns of the PAPs about the project interventions	<p>Questions and issues raised:</p> <ul style="list-style-type: none"> <li>• There is a deity associated with the lagoon. The name is called 'Detor'. Also there are lagoons associated with deities such as Amekutoe, Vitame and Bateme.</li> <li>• These lagoons used to be overseen by Batε clan.</li> <li>• Are land owners willing to release land for mangrove restoration program?</li> <li>• ANS: YES, we are willing to give our lands</li> <li>• Land ownership - Land is private and we are ready to give out lands where it is due.</li> </ul>	
03/07/2020	Agorkedzi (11 participants) Focal Point: Moses Akorli (0249870973) (Refer Annex G)	To solicit views and concerns of the PAPs about the project interventions	<ul style="list-style-type: none"> <li>• Will they nourish the beach for the community?</li> <li>• ANS: No, the project will not do that.</li> <li>• Heritage sites – Currently, there is not identified heritage site in the community.</li> <li>• The deity identified here is called Mama Akorvi</li> <li>• Land ownership - Land is private and we are ready to give out lands where it is due.</li> </ul>	






ADAPTATION FUND

**Environmental and Social Management Framework for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

<p>13/07/2020</p>	<p>Akplabanya Fish Smokers Association (119 Participants); Community Members (17 participants) Focal Point: Frederick Labia (0246779145) (Refer Annex G)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• The meeting commenced around 10:15 am with a short prayer in the chief's (Agbotadua) compound followed by Self introduction of participants.</li> <li>• Will there be installation of machines or monitoring systems in the community to do anything with regards to coastal erosion?</li> <li>• Heritage sites – Currently, there is not identified heritage site in the community.</li> <li>• Land ownership - Land is private and we are ready to give out lands where it is due.</li> </ul>	
<p>14/07/2020</p>	<p>Atiteti (11 participants) Refer to list of participants  Focal Point: Agbanavor Raphael (0244044376) (Refer Annex G)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• Will the land eventually turn out to be owned by The UN-HABITAT/ The DI?</li> <li>• ANS: No, The project belongs to the community and so with the CREMA model or approach, the community will be made to manage the project properly</li> <li>• Heritage sites – Currently, there is not identified heritage site in the community.</li> <li>• The deity so far identified is Nana Akigeli.</li> <li>• Land ownership - Land is private and we are ready to give out lands where it is due.</li> </ul>	
<p>14/07/2020</p>	<p>Dzita (14 participants) Focal Point: Agbotadua Ahevi (0244116528) (see above table)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• The meeting commenced around 11:30 am with a short prayer in the chief's (Agbotadua) compound followed by Self introduction of participants.</li> <li>• -Will there be installation of machines or monitoring systems in the community to do anything with regards to coastal erosion?</li> <li>• Heritage sites – There is a shrine in the community called "Vitame" The shrine area is made up of small shrubs mixed tall trees (Neem tree, Grape tree and Efor)</li> </ul>	



<p>04/07/2020</p>	<p>Goi (16 participants Stool elder, Chief Fisherman, Youth, (Refer Annex ) Focal Point: Nomo Tetteh Ruben Otisepeku (0247266003) (Refer Annex G)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• -Will drainage systems be constructed in the community to solve flooding issues around school and library?</li> <li>• Will the sea affect the community when we deepen the lagoon</li> <li>• Ans: The deepening of the lagoon will rather reduce flooding.</li> <li>• Heritage sites – Currently, heritage site in the community close to the lagoon is called “Amalengor”.</li> </ul>	
<p>28/02/2020</p>	<p>Lagbati/Lashibi (20 participants) Focal Point: Mr. Agbota (0240989717) (Refer Annex G)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• Meeting commenced with prayer at 9:30 am and self-introduction</li> <li>• Will the project give us saline crops to plant?</li> <li>• ANS: Yes, this will help solve issue of crop that do not well in salty soils in your area</li> <li>• Heritage site – None has been identified in the project area.</li> </ul>	
<p>15/07/2020</p>	<p>Whuti (43 members) Refer list Focal Point: Joseph Ali (0545165409) (Refer Annex G)</p>	<p>To solicit views and concerns of the PAPs about the project interventions</p>	<ul style="list-style-type: none"> <li>• Fear of Crop failure</li> <li>• Destruction of agriculture</li> <li>• We plead that land owners around the lagoons should be made to agree to the use of their lands during project implementation</li> <li>• Lagoon erosion</li> </ul>	



## CHAPTER SIX

### 6 RISKS ANALYSIS AND POTENTIAL IMPACT ASSESSMENT

#### 6.1 PROJECT AREA OF INFLUENCE

The geographical, environmental, socio-economic and institutional influences of the Project are foremost identified and briefly described below.

##### 6.1.1 Geographical Area of Influence

The immediate geographical area of influence of the Project is the Ada East, Ada West and Keta Municipal Assembly area.

##### 6.1.2 Environmental Media to be Influenced

The main environmental media to be impacted are water, land and air. The Keta Basin area, Lagoons in the Ada East and Ada West areas, the Volta estuary and the sea will be the main recipient of any water impact. Threats to biodiversity, contamination of aquatic systems, waste generation and disposal, air and noise pollution are key environmental issues to be considered.

##### 6.1.3 Socio-economic Influence

It is anticipated that social structures, income levels and economic wellbeing, social infrastructure (roads, education, health) will be significantly improved in the Project district.

##### 6.1.4 Institutional and Organizational Influence

There are many institutions which will share interest in the proposed Project in various capacities including for promotional, regulatory and monitoring purposes, and which must be adequately informed and engaged in the entire life of the Project. The institutions with major influence on the Project in accordance with their statutory mandates have been discussed in chapter two of this report.

#### 6.1 SCREENING AND CATEGORIZATION

A screening process, selection and evaluation of the project interventions are required to manage environmental and social aspects of these activities. The extent of environmental assessment that might be required prior to the commencement of the projects will depend on the outcome of the screening process. The purpose of the screening process is to determine whether projects are likely to have potential negative environmental and social impacts; to determine appropriate mitigation measures for activities with adverse impacts; to incorporate mitigation measures into the project design; to review and approve projects proposals and to monitor environmental parameters during implementation.

##### 6.1.1 Categorization

The Consultant used the requirements of the Ghana EPA as well as the Adaptation Fund (AF 15) to screen and categorize the proposed project interventions.



### 6.1.1.1 Ghana EA Screening Requirements

According to the Environmental Assessment Regulation 1999 LI 1652, the Ghana EPA within 25 days on receipt of a Registration Form will 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 (equivalent to World Bank Category B2 Project)
- Environmental and Social Impact Assessment (ESIA) required (equivalent to World Bank Category B1).

Table 6.1 below shows the EIA/ESIA legal and procedural requirements in Ghana

**Table 6.1: ESIA/ESMF legal framework, applicability and steps in Ghana**

Criteria	Procedures/Contents
Legal Framework	<input type="checkbox"/> Constitution of Ghana <input type="checkbox"/> Environmental Protection Agency (“EPA”) Act, 1994 (Act 490) <input type="checkbox"/> Ghana Environmental Assessment Regulations 1999, LI 1652 <input type="checkbox"/> Environmental Impact Assessment Procedures, June 1995
Applicability	Projects likely to have “significant impacts on the environment” required to <ul style="list-style-type: none"> <li><input type="checkbox"/> Register with the Ghana EPA</li> <li><input type="checkbox"/> Obtain environmental permits prior to beginning construction and operations</li> <li><input type="checkbox"/> Include specific requirements for sectors and types of projects</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Registration of potential project with EPA</li> <li>2. Screening of registration by EPA within 25 days</li> <li>3. Scoping and Terms of Reference</li> <li>4. Development of Environmental Impact Statement (“EIS”)</li> <li>5. Provisional Environmental Permit</li> </ol>

Based on limited available information on project specific locations and scope at the time of application, the EPA requested for the preparation of an **Environmental and Social Management Framework (ESMF)** as per their letter attached as Annex B.

### 6.1.1.2 The ESP Requirements

The ESP requires that projects and programmes proposed for funding by the Adaptation Fund are categorized according to their potential environmental and social impacts. Table 1 shows the criteria by which the categories are identified.



**Table 6.2: Environmental and social safeguards categories for AF-funded projects/programmes.**

ESP category Criteria	
Category A	Projects or programmes <b>likely</b> to have significant adverse environmental or social impacts that are for example diverse, widespread and irreversible
Category B	Projects or programmes with <b>potential</b> adverse impacts that are less adverse than Category A projects or programmes, because for example they are fewer in number, smaller in scale, less widespread, reversible or easily mitigated.
Category C	Those projects or programmes with <b>no</b> adverse environmental or social impacts.

The project components and activities were initially screened at the concept note stage, to identify potential environmental and social risks and impacts using the 15 Adaptation Fund Principles. With the information available at the full proposal stage, the project is classified to fall into **Medium Risk Category B** which requires the preparation of an Environmental and Social Impact Assessment (ESIA).

Table 6.3 below gives an overview /summary of project risks management approach using the 15 Adaptation Fund Principles and the Project Interventions

6.2 OVERVIEW / SUMMARY OF SUB PROJECT RISKS MANAGEMENT APPROACH

Table 6.3: MANGROVE RESTORATION - ENVIRONMENTAL AND SOCIAL RISKS

Environmental And Social Risks Present? (Yes/No)	Impacts Assessment (Quantify)	Safeguard / Mitigation Measures	Monitoring Indicator(S)	Baseline Condition For Each Monitoring Indicator
<p><b>Principle 1 - Compliance with the law</b>  <i>Requirement: The proposed activity should be in compliance with all applicable domestic and international law.</i></p>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<p>During project preparation, all relevant rules, regulations and standards have been identified (refer chapter 2) for all proposed project activities, including procedures / steps to comply with these. Procedures for compliance of key ones initiated. Therefore, no potential risk of non-compliance exists.</p>	<p>As required by national law, Ghana Environmental Assessment Regulations 1999, LI 1652, The project has been registered and a positive response was received from the Environmental Protection Agency to proceed with the ESIA. This report has been done and submitted for approval and issuance of permit.</p>	<ul style="list-style-type: none"> <li>• The relevant international, national laws and regulations will duly be complied with. Regular monitoring will be in compliance to national and international standards.</li> </ul>	
<p><b>Principle 2 - Access and equity</b></p>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• All project beneficiaries have been mapped (see Tables 3.3 and 3.4) for each project activity / output.</li> <li>• Community consultations and focus groups discussions have been conducted to identify main challenges and opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Equal allocation and distribution of project / programme benefits will be ensured during project execution. Moreover, there will be neither discrimination nor favouritism in accessing project/programme benefits.</li> <li>• Project benefits will be allocated and distributed equally through a participatory process and through joint decision-making using water user and agriculture associations.</li> <li>• CREMA mechanism will be established to ensure fairness in benefits sharing</li> </ul>	<ul style="list-style-type: none"> <li>• Component 2 has been designed to facilitate this process, including awareness raising and capacity building of communities and vulnerable groups to operate, maintain and replicate proposed activities under component 3.</li> <li>• Under component 1, various groups will be equally involved, in assessment and planning processes (if needed through quotas).</li> <li>• CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines</li> </ul>	
<p><b>Principle 3 – Marginalized and vulnerable Groups</b></p>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<p>The most vulnerable groups identified are women, children, youth, and elderly. Through field work the characteristics of</p>	<ul style="list-style-type: none"> <li>• Disaggregated data at the district and municipal and activity beneficiary level has been used to</li> </ul>	<ul style="list-style-type: none"> <li>• Desk research, expert consultations and community consultations and focus group discussions will be used to identify possible</li> </ul>	

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	<p>vulnerable groups have been identified and provided in Table 4.7</p> <p>Based on the consultations and focus group discussions there will be no adverse impacts for vulnerable people.</p>	<p>identify and quantify marginalized and vulnerable groups.</p> <ul style="list-style-type: none"> <li>Community management system such as the CREMA will be implemented.</li> </ul>	<p>risks / adverse impacts of project activities on marginalized and vulnerable beneficiary groups (i.e. specific needs, limitations, constraints and requirements of groups).</p> <ul style="list-style-type: none"> <li>CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines</li> </ul>	
<b>Principle 4 – Human rights</b>				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Ghana has not been cited in any Human Right Violation and she is in compliance to this principle 4</li> <li>Communities may not be fully aware of their human rights and may except activities that are not in line with their rights</li> </ul>	<ul style="list-style-type: none"> <li>Ghana is yet to ratify: <ul style="list-style-type: none"> <li>CCPR-OP2-DP - Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty</li> <li>CED - Convention for the Protection of All Persons from Enforced Disappearance</li> <li>CRC-OP-SC - Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Any agreement signed will include reference to Human rights</li> <li>From the start of the project, communities will be made aware of their rights with posters and other awareness / information sharing activities</li> <li>This will be done through participatory planning process and by included standard clauses in all contract with contractors ensuring all beneficiary groups will have equal access and opportunities. Moreover, awareness about this will be raised through poster, explaining rights and grievance options.</li> <li>Compliance with all relevant laws and regulation</li> </ul>	
<b>Principles 5 – Gender equality and women’s empowerment</b>				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<p>Ghana has ratified all the important International Instruments on Gender Equality (GE) and Women Empowerment (WE). Critical among them are:</p> <ul style="list-style-type: none"> <li>The Universal Declaration of Human Rights, 1948</li> <li>The Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) 1979 (Signed 17 July 1980 and Ratified on 2nd January, 1986);</li> <li>The Optional Protocol to the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW OP) 1999 (Signed on 24 February 2000)</li> </ul>	<p>Culturally, women are offered aspects of value chains in the community. The formulation of plans, and design and implementation of programmes and projects are guided by:</p> <ul style="list-style-type: none"> <li>Children’s Act of 1998 (Act 560)</li> <li>Persons with Disability Act 2006, Act 715</li> <li>National Gender Policy, 2015</li> </ul>	<ul style="list-style-type: none"> <li>Arrangements that ensure equal participation in project activities and consultations and equal access to benefits have also been identified in the gender assessment (approach and baseline).</li> <li>Appoint gender focal point</li> <li>Target women and youth for awareness and capacity building activities</li> </ul>	<ul style="list-style-type: none"> <li>A specific ‘gender’ approach and baseline section has been developed based on a gender assessment.</li> </ul>

6 Principles – Core labour rights				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<p>Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act 2003, Act 651. However, the country is yet to ratify the following:</p> <ul style="list-style-type: none"> <li>Fundamental Conventions: 8 of 8</li> <li>Governance Conventions (Priority): 2 of 4. Not ratified:                             <ul style="list-style-type: none"> <li>C122 - Employment Policy Convention, 1964 (No. 122)</li> <li>C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)</li> </ul> </li> <li>Technical Conventions: 41 of 178. Relevant not ratified:                             <ul style="list-style-type: none"> <li>C155 - Occupational Safety and Health Convention, 1981 (No. 155)</li> <li>C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Project activities will meet the core labour rights and any possible risks identified and if existing, prevented or mitigated. This will be done by making reference to these in agreements / contracts</li> <li>Complying to local laws and regulations:                             <ul style="list-style-type: none"> <li>Workmen’s Compensation Law, 1987;</li> <li>Ghana AIDS Commission Act 2002, (Act 613);</li> <li>Public Health Act 2012, (Act 851);</li> <li>Persons with Disability Act 2006, (Act 715);</li> </ul> </li> </ul>	<p>No potential risks identified. Measures in place to avoid potential risks of non-compliance include:</p> <ul style="list-style-type: none"> <li>Making reference to an agreement to comply to – ILO standards, and especially safety and health (155 and 187) in all contract and MoUs and AoCs used in the project</li> <li>UN-Habitat will ensure all contracts include standard clauses to avoid any risks and that safety measures are taken and inspections conducted.</li> </ul>	
Principles 7 – Indigenous peoples				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>There are no indigenous people or settlement in the study area as determined by other similar studies<sup>14</sup></li> <li>Ghana has not ratified the ILO Convention 169 (Indigenous and Tribal Peoples Convention, 1989)</li> </ul>	<p>During project preparation, the project determined that no indigenous people are present in the project / programme target areas.</p> <ul style="list-style-type: none"> <li>The project activities are consistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. The institutional and technical roles of NADMO (National Disaster Management Organisation) and EPA will be sought during project implementation</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable. There are no indigenous people or settlement in the study area</li> </ul>	
Principles 8 – Involuntary resettlement				

<sup>14</sup> Global Alliance for Green and Gender Advocacy. This project is in its second phase of building capacity for gender and environmental justice community organizations to better engage duty bearers on sustainable management of the Keta Lagoon Complex Ramsar site. Both ENDS/MoF Netherlands and the Development Institute

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The project determined that no physical or economic displacement will take place due to the project/programme.</li> <li>• There will be no involuntary resettlements since mangrove replanting will not displace individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Landowners, private or public, have agreed with using their land for project activities</li> <li>• Agreement with the Chiefs and Elders for use of their lands have been signed</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable since resettlement issues are not anticipated</li> </ul>	
<b>Principles 9 – Protection of natural habitats</b>				
<ul style="list-style-type: none"> <li>• Yes/No</li> </ul>	<ul style="list-style-type: none"> <li>• Project implementation (mangrove planting, nursery management etc) will not affect the existing habitats as the interventions will solely be restoration of existing areas noted for growth of mangroves</li> <li>• There may be a risk that communities will cut the replanted mangroves</li> <li>• Risk mitigation measures are required to reduce risk of Mangrove cutting</li> </ul>	<p>The critical habitats this intervention will impact are the mangrove ecosystems the project aims at restoring. Its characteristics and critical value have been understood and integrated for the intervention design.</p> <p>The project plans to plant about 1,852,500 seedlings of mangrove. This will cover a total area of about 1,500 hectares.</p>	<ul style="list-style-type: none"> <li>• Ha covered by replanted mangroves (communities and district)</li> <li>• By-laws accepted and contracts signed</li> </ul>	
<b>Principles 10 – Conservation of biological diversity</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<p>Nesting sites to the Sea Turtle (Leatherback) are identified in Agorkedzi / Atiteti, Dzita, Agbledomi, and Wuti.</p> <p>National plans and legal documents: Leatherback sea turtle IUCN Red List of Threatened Species; Butterfish; Ghana Mole Rat</p>	<ul style="list-style-type: none"> <li>• Nesting sites of turtles are not directly in project sites. However, risk mitigation measures will be put in place in order to avoid any project-related movement in these nesting site areas.</li> <li>• No potential exist for invasive species as local mangrove species will be used</li> </ul>	<ul style="list-style-type: none"> <li>• The Wildlife Department was consulted for data/maps on Nestling sites. The exact location of these areas will be protected during project implementation.</li> <li>• List and map of nesting sites (UN-H and NGO)</li> </ul>	
<b>Principles 11 – Climate change</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<p>There will be no major works so no increase in GHG emissions is expected.</p>	<ul style="list-style-type: none"> <li>• Mangrove planting to reduce erosion and flooding and increase availability of fish and claims.</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with United nations framework convention on climate change</li> </ul>	
<b>Principles 12 – Pollution prevention and resource efficiency</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• There will be no risk of inefficiencies as the intervention will be community-based / small scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring of waste handling</li> <li>• Construction and O &amp; M report addressing standards of water quality.</li> </ul>	<ul style="list-style-type: none"> <li>• National Effluent Quality Discharge Standards (GS 1212, 2019). This provides the national effluent quality discharge guideline levels as administered by the EPA.</li> </ul>	

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

		<ul style="list-style-type: none"> <li>• A waste and pollution prevention and management plan to be considered in the ESMF</li> </ul>		
<b>Principles 13 – Public health</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse health risks are anticipated</li> <li>• The restoration of the mangrove will enhance and improve the social and environmental integrity of the local area. No adverse health risks are anticipated. Appropriate measures will be taken to manage and monitor public health.</li> <li>• Appropriate measures will be taken to manage and monitor public health. Compliance with Public Health Act 2012 (Act 851)</li> </ul>	<p>Appropriate measures will be taken to manage and monitor public health.</p> <ul style="list-style-type: none"> <li>• Compliance with Public Health Act 2012 (Act 851)</li> </ul>	<ul style="list-style-type: none"> <li>• Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis.<sup>15</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Benzo(a) anthracene, Chrysene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(e)pyrene, Pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i,)perylene were all below the risk standard.</li> </ul>	
<b>Principles 14 – Physical and cultural heritage</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• According to the Ghanaian government and UNESCO, the Forts and Castles, Volta, Greater Accra, Central and Western Regions are the closest recognised protected heritage sites. These are not located in the project target area.</li> </ul>	<ul style="list-style-type: none"> <li>• Heritage sites will be protected</li> <li>• Economic activities such as tourism will be encouraged</li> <li>• No cultural heritage sites identified specifically in potential areas for mangrove restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional Priest will be delegated to perform rites before project commence.</li> </ul>	

<sup>15</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

Principle 15 – Lands and soil conservation				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>No fragile soils identified in the selected communities. The soils are generally waterlogged, mostly with low salinity or freshwater and have variable depth. They are dark in color, rich in organic matter and have fine to medium texture. These soils mostly indicate acidic reaction and are saturated with aluminium and iron and have extremely low levels of available phosphate. They support a variety of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Mangrove planting to reduce erosion and flooding and increase availability of fish and claims.</li> <li>Soil conservation measures have been addressed in the ESMF/ESIA. Mangrove planting to reduce erosion and flooding and increase availability of fish and claims.</li> </ul>	<ul style="list-style-type: none"> <li>Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis.<sup>16</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Benzo (a) anthracene, Chrysene, Benzo(a)pyrene, Benzo (b) fluoranthene, Benzo(e)pyrene, Pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i,)perylene were all below standard.</li> </ul>	

<sup>16</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

Table 6.4: LAGOON RESTORATION – ENVIRONMENT AND SOCIAL RISKS

Environmental and Social Risks present? (Yes/No)	Impacts assessment (quantify)	Safeguard / mitigation measures	Monitoring indicator(s)	Baseline condition for each monitoring indicator
<b>Principle 1 - Compliance with the law</b>				
<ul style="list-style-type: none"> <li>• YES</li> </ul>	<ul style="list-style-type: none"> <li>• All relevant rules, regulations and standards have been identified for all proposed project activities (refer chapter 2), Procedures for compliance of key ones initiated. Therefore, no potential risk of non-compliance exists.</li> </ul>	<ul style="list-style-type: none"> <li>• The project has been registered and a positive response was received from the Environmental Protection Agency to proceed with the ESIA. This report has been done and submitted for approval and issuance of permit.</li> <li>• The relevant international, national laws and regulations will duly be complied with.</li> </ul>	<ul style="list-style-type: none"> <li>• The relevant international, national laws and regulations will duly be complied with. Regular monitoring will be in compliance to national standards.</li> </ul>	
<b>Principle 2 - Access and equity</b>				
Yes	<p>All project beneficiaries have been mapped (see Tables 3.3 and 3.4) for each project activity / output.</p> <p>Community consultations and focus groups discussions have been conducted to identify main challenges and opportunities.</p> <ul style="list-style-type: none"> <li>• . Details on the consultation process provided under chapter 5.</li> </ul>	<ul style="list-style-type: none"> <li>• Equal allocation and distribution of project / programme benefits will be ensured during project execution. Moreover, there will be neither discrimination nor favouritism in accessing project/programme benefits.</li> <li>• Project benefits will be allocated and distributed equally through a participatory process and through joint decision-making using water user and agriculture associations.</li> <li>• CREMA mechanism will be established to ensure fairness in benefits sharing</li> </ul>	<ul style="list-style-type: none"> <li>• CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines etc.</li> </ul>	
<b>Principle 3 – Marginalized and vulnerable Groups</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The most vulnerable Groups have been identified and youth, women, and children. These groups have been quantified. identified and provided in Table 4.7</li> <li>• Women group (12,270)</li> <li>• Children (9,250)</li> <li>• Elderly (1,779)</li> </ul>	<ul style="list-style-type: none"> <li>• Community management system such as the CREMA will be implemented.</li> <li>• Women group will be positively affected. Alternative source of fish production will also increase their economic opportunities.</li> <li>• Disaggregated data at the district and municipal and activity beneficiary level</li> </ul>	<ul style="list-style-type: none"> <li>• CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines etc.</li> </ul>	



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	Based on the consultations and focus group discussions there will be no adverse impacts for vulnerable people.	has been used to identify and quantify marginalized and vulnerable groups.		
<b>Principle 4 – Human rights</b>				
• Yes	<ul style="list-style-type: none"> <li>Ghana has not been cited in any Human Right Violation and she is in compliance to this principle 4</li> <li>Communities may not be fully aware of their human rights and may except activities that are not in line with their rights</li> </ul>	<p>Ghana is yet to ratify:</p> <ul style="list-style-type: none"> <li>CCPR-OP2-DP - Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty</li> <li>CED - Convention for the Protection of All Persons from Enforced Disappearance</li> <li>CRC-OP-SC - Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with all relevant laws and regulation</li> <li>Any agreement signed will include reference to Human rights</li> <li>No potential human rights issues have been identified</li> </ul>	
<b>Principles 5 – Gender equality and women’s empowerment</b>				
• Yes	<p>Ghana has ratified all the important International Instruments on Gender Equality (GE) and Women Empowerment (WE). Critical among them are:</p> <ul style="list-style-type: none"> <li>The Universal Declaration of Human Rights, 1948</li> <li>The Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) 1979 (Signed 17 July 1980 and Ratified on 2nd January, 1986);</li> <li>The Optional Protocol to the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW OP) 1999 (Signed on 24 February 2000);</li> </ul>	<p>Culturally, women are offered aspects of value chains in the community. The formulation of plans, and design and implementation of programmes and projects are guided by:</p> <ul style="list-style-type: none"> <li>Children’s Act of 1998 (Act 560)</li> <li>Persons with Disability Act 2006, Act 715</li> <li>National Gender Policy, 2015</li> <li>Youth will gain employments direct</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Appoint gender focal point</li> <li>Target women and youth for awareness and capacity building activities</li> <li>CREMA mechanism will be established to ensure fairness in distribution</li> </ul> <p>Arrangements that ensure equal participation in project activities and consultations and equal access to benefits have also been identified in the gender assessment (approach and baseline). Appoint gender focal point</p> <ul style="list-style-type: none"> <li>Target women and youth for awareness and capacity building activities</li> </ul>	
<b>6 – Core labour rights</b>				
• Yes	Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act 2003, Act 651	<ul style="list-style-type: none"> <li>Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act 2003, Act 651</li> </ul>	Guidelines will be developed. Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act	

	<p>However, the country is yet to ratify the following:</p> <ul style="list-style-type: none"> <li>• Fundamental Conventions: 8 of 8</li> <li>• Governance Conventions (Priority): 2 of 4. Not ratified:</li> <li>• C122 - Employment Policy Convention, 1964 (No. 122)</li> <li>• C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)</li> <li>• Technical Conventions: 41 of 178. Relevant not ratified:</li> <li>• C155 - Occupational Safety and Health Convention, 1981 (No. 155)</li> <li>• C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)</li> </ul>	<ul style="list-style-type: none"> <li>• The project will meet project activities meet the core labour rights and that possible risks have been identified and if existing, prevented or mitigated. This will be done by making reference to these in agreements / contracts.</li> <li>• Complying to local laws and regulations:</li> <li>• Workmen's Compensation Law, 1987;</li> <li>• Ghana AIDS Commission Act 2002, (Act 613);</li> <li>• Public Health Act 2012, (Act 851);</li> <li>• Persons with Disability Act 2006, (Act 715);</li> </ul>		
<b>Principles 7 – Indigenous peoples</b>				
<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• There are no indigenous people or settlement in the study area as determined by other studies<sup>17</sup>.</li> <li>• Ghana has not ratified the ILO Convention 169 (Indigenous and Tribal Peoples Convention, 1989)</li> </ul>	<p>The project determined that no indigenous people are present in the project / programme target areas.</p> <ul style="list-style-type: none"> <li>• The project activities are consistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. The institutional and technical roles of NADMO (National Disaster Management Organisation) and EPA will be sought during project implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable. No indigenous people or settlement in the study area as determined by other similar studies</li> </ul>	
<b>Principles 8 – Involuntary resettlement</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The project determined that no physical or economic displacement will take place due to the project/programme. There will be no involuntary resettlements since lagoon restoration will not displace individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Landowners, private or public, have agreed with using their land for project activities</li> <li>• Agreement with the Chiefs and Elders for use of their lands have been signed (refer Annex L)</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable since resettlement issues are not anticipated</li> </ul>	

<sup>17</sup> Global Alliance for Green and Gender Advocacy. This project is in its second phase of building capacity for gender and environmental justice community organizations to better engage duty bearers on sustainable management of the Keta Lagoon Complex Ramsar site. Both ENDS/MoF Netherlands and the Development Institute

<b>Principles 9 – Protection of natural habitats</b>				
<ul style="list-style-type: none"> <li>• Yes/No</li> </ul>	<ul style="list-style-type: none"> <li>• The critical habitats this intervention will impact are the lagoon ecosystems the project aims at restoring. Its characteristics and critical value have been understood and integrated for the intervention design. There may be a risk of sediments moving back into the lagoons after dredging, filling the lagoons.</li> </ul>	<ul style="list-style-type: none"> <li>• Stabilisation of the lagoon and coastal shoreline</li> <li>• Nesting sites have been identified along the shore.</li> </ul>	<ul style="list-style-type: none"> <li>• Wildlife Department will be consulted to collect data/maps on such habitats.</li> <li>• All nesting sites will be located, and people involved in the project will be made aware.</li> </ul>	
<b>Principles 10 – Conservation of biological diversity</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• Beaches serve as nesting site Nesting sites to the Sea Turtle (Leatherback) are identified in Agorkedzi / Atiteti, Dzita, Agbledomi, and Wuti.</li> <li>• The Wildlife Department was consulted for data/maps on Nestling sites. The exact location of these areas will be protected during project implementation.</li> <li>• Although nesting sites of turtles are not directly in project sites, risk mitigation measures will need to be put in place in order to avoid any project-related movement in these nesting site areas</li> </ul>	<ul style="list-style-type: none"> <li>• There won't be any loss of biodiversity</li> <li>• No risk exist for introduction of invasive species as local mangrove species will be used. Dredging will only take place in lagoons that are already degraded and contain limited flora and fauna. Any potential sensitive areas will be identified.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring of biological diversity will be in compliance with international Convention on Biological Diversity (CBD)</li> </ul>	
<b>Principles 11 – Climate change</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• For the excavation work some diesel/gas oil will be needed. However, works are limited. Therefore there no major increase in GHG emissions is expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Lagoon restoration will reduce flooding/inundation and increase availability of fish and claims.</li> <li>• Increase carbon sink</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with United nations framework convention on climate change</li> </ul>	
<b>Principles 12 – Pollution prevention and resource efficiency</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<p>There will be no risk of inefficiencies as the intervention except the excavation will be community-based / small scale.</p>	<ul style="list-style-type: none"> <li>• Monitoring of waste handling</li> <li>• Construction and O &amp; M report addressing standards of water quality.</li> <li>• Water quality analysis will be undertaken to establish baseline pollution levels.</li> <li>• A waste and pollution prevention and management plan has been considered in the ESMF. Samples of the soil has</li> </ul>	<ul style="list-style-type: none"> <li>• National Effluent Quality Discharge Standards (GS 1212, 2019). This provides the national effluent quality discharge guideline levels as administered by the EPA.</li> </ul>	

		<p>been taken and appropriate dumping sites have been identified. The first 30 cm of dredged soil may contain some pollutants and this will be moved to a waste managed site and treated. Moreover, waste bins and a collection system will be put in place to avoid any more waste being dumped in the lagoons (through the CREMA process).</p>		
<b>Principles 13 – Public health</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse health risks are anticipated</li> <li>• The restoration of the mangrove will enhance and improve the social and environmental integrity of the local area. No adverse health risks are anticipated. Appropriate measures will be taken to manage and monitor public health.</li> <li>• Appropriate measures will be taken to manage and monitor public health. Compliance with Public Health Act 2012 (Act 851)</li> </ul>	<p>Appropriate measures will be taken to manage and monitor public health.</p> <ul style="list-style-type: none"> <li>• Water quality check (compliance to tap water quality standards)</li> <li>• Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis.<sup>18</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with Public Health Act 2012 (Act 851)</li> <li>• Water quality monitoring complying to standards; Awareness raising campaign; O &amp; M (training)</li> </ul>	
<b>Principles 14 – Physical and cultural heritage</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• According to the Ghanaian government and UNESCO, the Forts and Castles, Volta, Greater Accra, Central and Western Regions are the closest recognised protected heritage sites. These are not located in the project target area.</li> </ul>	<ul style="list-style-type: none"> <li>• No cultural heritage sites identified specifically in potential areas for lagoon restoration. However, any heritage sites identified during project implementation will be protected</li> <li>• Economic activities such as tourism will be encouraged</li> </ul>	<ul style="list-style-type: none"> <li>• Priest will be delegated to perform traditional rites before project commence.</li> </ul>	
<b>Principle 15 – Lands and soil conservation</b>				

<sup>18</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

<ul style="list-style-type: none"> <li>No</li> </ul>	<p>No fragile soils identified in the selected communities. The soils are generally waterlogged, mostly with low salinity or freshwater and have variable depth. They are dark in color, rich in organic matter and have fine to medium texture. These soils mostly indicate acidic reaction and are saturated with aluminium and iron and have extremely low levels of available phosphate. They support a variety of vegetation.</p> <p>There may be a risk of sediments moving back into the lagoons after dredging, filling the lagoons. This could happen during rainy season when water run-off may push sediments from the sand barriers back to the water.</p>	<ul style="list-style-type: none"> <li>Leave buffer of vegetation around site perimeter to intercept any sediment that might be transferred during surface flow.</li> <li>Soil conservation measures have been addressed in the ESMF/ESIA. Mangrove planting to reduce erosion and flooding and increase availability of fish and claims.</li> </ul>	<ul style="list-style-type: none"> <li>Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis.<sup>19</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Benzo (a) anthracene, Chrysene, Benzo(a)pyrene, Benzo (b) fluoranthene, Benzo(e)pyrene, Pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i,)perylene were all below standard.</li> </ul>	
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<sup>19</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

Table 6.5: PEN CULTURE - ENVIRONMENT AND SOCIAL RISKS

Environmental and Social Risks present? (Yes/No)	Impacts assessment (quantify)	Safeguard / mitigation measures	Monitoring indicator(s)	Baseline condition for each monitoring indicator
<b>Principle 1 - Compliance with the law</b>				
Yes	During project preparation, all relevant rules, regulations and standards have been identified (refer chapter 2) for all proposed project activities, including procedures / steps to comply with these. Procedures for compliance of key ones initiated. Therefore, no potential risk of non-compliance exists.	As required by national law, Ghana Environmental Assessment Regulations 1999, LI 1652, The project has been registered and a positive response was received from the Environmental Protection Agency to proceed with the ESIA. This report has been done and submitted for approval and issuance of permit.	The relevant international, national laws and regulations will duly be complied with. Regular monitoring will be in compliance to national and international standards.	
<b>Principle 2 – Access and Equity</b>				
Yes	All project beneficiaries have been mapped (see Tables 3.3 and 3.4) for each project activity / output. Community consultations and focus groups discussions have been conducted to identify main challenges and opportunities	CREMA mechanism will be established to ensure fairness in distribution Equal allocation and distribution of project / programme benefits will be ensured during project execution. Moreover, there will be neither discrimination nor favouritism in accessing project/programme benefits. Project benefits will be allocated and distributed equally through a participatory process and through joint decision-making using water user and agriculture associations.	Component 2 has been designed to facilitate this process, including awareness raising and capacity building of communities and vulnerable groups to operate, maintain and replicate proposed activities under component 3. Under component 1, various groups will be equally involved, in assessment and planning processes (if needed through quotas). CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines	
<b>Principle 3 – Marginalized and vulnerable Groups</b>				
Yes	The most vulnerable groups identified are women, children, youth, and elderly. Through field work the characteristics of vulnerable groups have been identified and provided in Table 4.7	Community management system such as the CREMA will be implemented. Women group will be positively affected. Alternative source of fish production will also increase their economic opportunities	CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines etc. Disaggregated data at the district and municipal and activity beneficiary	

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	Based on the consultations and focus group discussions there will be no adverse impacts for vulnerable people.		level has been used to identify and quantify marginalized and vulnerable groups.	
<b>Principle 4 – Human rights</b>				
Yes	Ghana has not been cited in any Human Right Violation and she is in compliance to this principle 4 Communities may not be fully aware of their human rights and may except activities that are not in line with their rights	No potential human rights issues have been identified Ghana is yet to ratify: CCPR-OP2-DP - Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty CED - Convention for the Protection of All Persons from Enforced Disappearance CRC-OP-SC - Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography	Compliance with all relevant laws and regulation Any agreement signed will include reference to Human rights From the start of the project, communities will be made aware of their rights with posters and other awareness / information sharing activities This will be done through participatory planning process and by included standard clauses in all contract with contractors ensuring all beneficiary groups will have equal access and opportunities. Moreover, awareness about this will be raised through poster, explaining rights and grievance options.	
<b>Principles 5 – Gender equality and women’s empowerment</b>				
Yes	Ghana has ratified all the important International Instruments on Gender Equality (GE) and Women Empowerment (WE). Critical among them are: The Universal Declaration of Human Rights, 1948 The Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) 1979 (Signed 17 July 1980 and Ratified on 2nd January, 1986); The Optional Protocol to the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW OP) 1999 (Signed on 24 February 2000)	Culturally, women are offered aspects of value chains in the community. The formulation of plans, and design and implementation of programmes and projects are guided by: Children’s Act of 1998 (Act 560) Persons with Disability Act 2006, Act 715 National Gender Policy, 2015 Youth will gain employments direct CREMA mechanism will be established to ensure fairness in distribution	Appoint gender focal point Target women and youth for awareness and capacity building activities	
<b>6 – Core labour rights</b>				

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Yes	<p>Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act 2003, Act 651. However, the country is yet to ratify the following:</p> <ul style="list-style-type: none"> <li>• Fundamental Conventions: 8 of 8</li> <li>• Governance Conventions (Priority): 2 of 4. Not ratified:</li> <li>• C122 - Employment Policy Convention, 1964 (No. 122)</li> <li>• C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)</li> <li>• Technical Conventions: 41 of 178. Relevant not ratified:</li> <li>• C155 - Occupational Safety and Health Convention, 1981 (No. 155)</li> <li>• C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)</li> </ul>	<ul style="list-style-type: none"> <li>• Project activities will meet the core labour rights and any possible risks identified and if existing, prevented or mitigated. This will be done by making reference to these in agreements / contracts</li> <li>• Complying to local laws and regulations: <ul style="list-style-type: none"> <li>• Workmen’s Compensation Law, 1987;</li> <li>• Ghana AIDS Commission Act 2002, (Act 613);</li> <li>• Public Health Act 2012, (Act 851);</li> <li>• Persons with Disability Act 2006, (Act 715);</li> </ul> </li> </ul>	<p>No potential risks identified. Measures in place to avoid potential risks of non-compliance include:</p> <ul style="list-style-type: none"> <li>• Making reference to an agreement to comply to – ILO standards, and especially safety and health (155 and 187) in all contract and MoUs and AoCs used in the project</li> </ul> <p>UN-Habitat will ensure all contracts include standard clauses to avoid any risks and that safety measures are taken and inspections conducted.</p>	
<b>Principles 7 – Indigenous peoples</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• There are no indigenous people or settlement in the study area as determined by other similar studies<sup>20</sup></li> <li>• Ghana has not ratified the ILO Convention 169 (Indigenous and Tribal Peoples Convention, 1989</li> </ul>	<ul style="list-style-type: none"> <li>• The project activities are consistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. The institutional and technical roles of NADMO (National Disaster Management Organisation) and EPA will be sought during project implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable. There are no indigenous people or settlement in the study area</li> </ul>	
<b>Principles 8 – Involuntary resettlement</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The project determined that no physical or economic displacement will take place due to the project/programme.</li> </ul>	<ul style="list-style-type: none"> <li>• Landowners, private or public, have agreed with using their land for project activities</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable since resettlement issues are not anticipated</li> </ul>	

<sup>20</sup> Global Alliance for Green and Gender Advocacy. This project is in its second phase of building capacity for gender and environmental justice community organizations to better engage duty bearers on sustainable management of the Keta Lagoon Complex Ramsar site. Both ENDS/MoF Netherlands and the Development Institute



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	<ul style="list-style-type: none"> <li>There will be no involuntary resettlements since mangrove replanting will not displace individuals</li> </ul>	<ul style="list-style-type: none"> <li>Agreement with the Chiefs and Elders for use of their lands have been signed</li> </ul>		
<b>Principles 9 – Protection of natural habitats</b>				
Yes	<ul style="list-style-type: none"> <li>Water Pollution (nutrient loading)</li> <li>There may be a possible Security, Health and Safety risks</li> </ul> <p>Cleaning of holding systems and removal of clogged materials from lagoon generating waste materials</p>	<ul style="list-style-type: none"> <li>Stabilisation of the lagoon and coastal shoreline</li> <li>Sensitization on maintaining lagoon ecosystem sustainably</li> <li>Waste management</li> <li>Storage structure</li> </ul>	<ul style="list-style-type: none"> <li>Fisheries Department will be consulted to collect data/maps on such habitats.</li> </ul>	
<b>Principles 10 – Conservation of biological diversity</b>				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<p>Nesting sites to the Sea Turtle (Leatherback) are identified in Agorkedzi / Atiteti, Dzita, Agbledomi, and Wuti.</p> <ul style="list-style-type: none"> <li>National plans and legal documents: Leatherback sea turtle IUCN Red List of Threatened Species: Butterfish; Ghana Mole Rat</li> </ul>	<p>No potential significant or unjustified reduction or loss of biological diversity been identified as well as any known invasive species introduced. Only local species of fingerlings will be promoted. No exotic fingerlings will be introduced. Necessary technical consultations and approvals to be obtained from the Fisheries Commission</p>	<ul style="list-style-type: none"> <li>The Wildlife Department was consulted for data/maps on Nestling sites. The exact location of these areas will be protected during project implementation.</li> <li>List and map of nesting sites (UN-H and NGO)</li> <li>. Indigenous fish species from the adjacent lagoons will be used for stocking to avoid introduction of foreign fish</li> </ul>	
<b>Principles 11 – Climate change</b>				
<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>There will be no major works so no increase in GHG emissions is expected.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable. Greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals that alter climate and weather patterns at global and regional scales will not occur in the implementation of this small scale pen culture intervention</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with United nations framework convention on climate change</li> </ul>	
<b>Principles 12 – Pollution prevention and resource efficiency</b>				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Coastal pollution</li> <li>Solid and liquid pollution</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of waste handling</li> <li>Construction and O &amp; M report addressing standards of water quality.</li> <li>A waste and water pollution prevention and management plan</li> </ul>	<ul style="list-style-type: none"> <li>The risk water pollution due to fish is minimal because of the low manual technology of pen culture. Water pollution discharges from domestic sources as well as fish feed nutrient loading can be reduced</li> </ul>	

		<p>has been considered in the ESMF. Some of the measures to prevent water pollution include:</p> <ul style="list-style-type: none"> <li>• Practice Good household keeping avoiding spreading domestic wastes from human/operation activities to nearby lagoons.</li> <li>• Capture and treat any contaminated storm water so that it meets applicable regulatory standards prior to discharge;</li> <li>• All wastes will be regularly disposed in an environmentally sound manner.</li> <li>• Regular monitoring of water quality through the monitoring kit budgeted under the lagoon restoration intervention.</li> </ul>	<p>and managed by carrying out regular inspections and routine tests and monitoring</p> <ul style="list-style-type: none"> <li>• Waste effluents shall comply with the following standards:</li> <li>• National Effluent Quality Discharge Standards (GS 1212, 2019). This provides the national effluent quality discharge guideline levels as administered by the EPA.</li> <li>• Target Water Quality Ranges (TWQR) of the Ghana Raw Water Quality Criteria</li> <li>• A waste and pollution prevention and management plan has been considered in the ESMF</li> </ul>	
<b>Principles 13 – Public health</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The pen culture will enhance and improve the social and environmental integrity of the local area. No adverse health risks are anticipated. Appropriate measures will be taken to manage and monitor public health.</li> <li>• Appropriate measures will be taken to manage and monitor public health. Compliance with Public Health Act 2012 (Act 851) <ul style="list-style-type: none"> <li>• No adverse health risks are anticipated</li> </ul> </li> </ul>	<p>Appropriate measures will be taken to manage and monitor public health.</p>	<ul style="list-style-type: none"> <li>• Compliance with Public Health Act 2012 (Act 851)</li> <li>• Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons (PAH) Analysis.<sup>21</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene,</li> </ul>	

<sup>21</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

			Phenanthrene, Fluoranthene, Pyrene, Benzo (a) anthracene, Chrysene, Benzo(a) pyrene, Benzo (b) fluoranthene, Benzo (e) pyrene, Pyrene, Benzo (k) fluoranthene, Indeno (1,2,3-c,d) pyrene, Dibenzo (a,h) anthracene and Benzo (g,h,l,) perylene were all below the risk standard.	
<b>Principles 14 – Physical and cultural heritage</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• According to the Ghanaian government and UNESCO, the Forts and Castles, Volta, Greater Accra, Central and Western Regions are the closest recognised protected heritage sites. These are not located in the project target area.</li> </ul>	<ul style="list-style-type: none"> <li>• Heritage sites will be protected</li> <li>• Economic activities such as tourism will be encouraged</li> <li>• No cultural heritage sites identified specifically in potential areas for mangrove restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional Priest will be delegated to perform rites before project commence.</li> </ul>	
<b>Principle 15 – Lands and soil conservation</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• No fragile soils have been identified in the project target area Coastal erosion</li> <li>• Coastal flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Leave buffer of vegetation around site perimeter to intercept any sediment that might be transferred during surface flow.</li> <li>• Soil conservation measures have been addressed in the ESMF/ESIA. Mangrove planting to reduce erosion and flooding and increase availability of fish and claims.</li> </ul>	<ul style="list-style-type: none"> <li>• Sediment samples collected from 7 sites – two from Akplabanya; two from Azizanya; two from Wokumagbe; and one from Goi lagoon areas – and tested for presence of heavy metals namely copper, cadmium, Lead and mercury. Ghana has no national guidelines/standards for sediment quality. The results were therefore compared with the Threshold Effect Concentration (TEC) values of Department of Environmental</li> </ul>	

Table 6.6: SALT RESILIENT CROPS AND WATER INFILTRATION - ENVIRONMENT AND SOCIAL RISKS

Environmental and Social Risks present? (Yes/No)	Impacts assessment (quantify)	Safeguard / mitigation measures	Monitoring indicator(s)	Baseline condition for each monitoring indicator
<b>Principle 1 - Compliance with the law</b>				
<i>Requirement: The proposed activity should be in compliance with all applicable domestic and international law.</i>				
Yes	<p>All relevant rules, regulations and standards have been identified for all proposed project activities, as per question 31 above. Procedures for compliance of key ones initiated. Therefore, no potential risk of non-compliance exists.</p> <p>This has been presented in proposal Part II.F</p>	<p>As required by national law, Ghana Environmental Assessment Regulations 1999, LI 1652, The project has been registered and a positive response was received from the Environmental Protection Agency to proceed with the ESIA. This report has been done and submitted for approval and issuance of permit.</p>	<ul style="list-style-type: none"> <li>The relevant international, national laws and regulations will duly be complied with. Regular monitoring will be in compliance to national and international standards.</li> </ul>	
<b>Principle 2 - Access and equity</b>				
Yes	<ul style="list-style-type: none"> <li>All project beneficiaries have been mapped (see Tables 3.3 and 3.4) for each project activity / output.</li> <li>Community consultations and focus groups discussions have been conducted to identify main challenges and opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Equal allocation and distribution of project / programme benefits will be ensured during project execution. Moreover, there will be neither discrimination nor favouritism in accessing project/programme benefits.</li> <li>Project benefits will be allocated and distributed equally through a participatory process and through joint decision-making using water user and agriculture associations. CREMA mechanism will be established to ensure fairness in benefits sharing</li> </ul>	<ul style="list-style-type: none"> <li>Component 2 has been designed to facilitate this process, including awareness raising and capacity building of communities and vulnerable groups to operate, maintain and replicate proposed activities under component 3.</li> <li>Under component 1, various groups will be equally involved, in assessment and planning processes (if needed through quotas).</li> <li>CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines</li> </ul>	
<b>Principle 3 – Marginalized and vulnerable Groups</b>				
Yes	<p>The most vulnerable groups identified are women, children, youth, and elderly. Through field work the characteristics of</p>	<ul style="list-style-type: none"> <li>Disaggregated data at the district and municipal and activity beneficiary level has been used to identify and</li> </ul>	<ul style="list-style-type: none"> <li>Desk research, expert consultations and community consultations and focus group discussions will be used to identify possible risks / adverse impacts</li> </ul>	

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	<p>vulnerable groups have been identified and provided in Table 4.7</p> <ul style="list-style-type: none"> <li>Based on the consultations and focus group discussions there will be no adverse impacts for vulnerable people.</li> </ul>	<p>quantify marginalized and vulnerable groups.</p> <ul style="list-style-type: none"> <li>Community management system such as the CREMA will be implemented..</li> </ul>	<p>of project activities on marginalized and vulnerable beneficiary groups (i.e. specific needs, limitations, constraints and requirements of groups).</p> <ul style="list-style-type: none"> <li>CREMA By-laws enacted by the district assembly for the protection of mangrove which will impose measures such as fines</li> </ul>	
<b>Principle 4 – Human rights</b>				
<ul style="list-style-type: none"> <li>Yes/No</li> </ul>	<ul style="list-style-type: none"> <li>Ghana has not been cited in any Human Right Violation and she is in compliance to this principle 4</li> <li>Communities may not be fully aware of their human rights and may except activities that are not in line with their rights</li> </ul>	<ul style="list-style-type: none"> <li>Ghana is yet to ratify: <ul style="list-style-type: none"> <li>CCPR-OP2-DP - Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty</li> <li>CED - Convention for the Protection of All Persons from Enforced Disappearance</li> <li>CRC-OP-SC - Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Any agreement signed will include reference to Human rights</li> <li>From the start of the project, communities will be made aware of their rights with posters and other awareness / information sharing activities</li> <li>This will be done through participatory planning process and by included standard clauses in all contract with contractors ensuring all beneficiary groups will have equal access and opportunities. Moreover, awareness about this will be raised through poster, explaining rights and grievance options.</li> <li>Compliance with all relevant laws and regulation</li> </ul>	
<b>Principles 5 – Gender equality and women’s empowerment</b>				
<ul style="list-style-type: none"> <li>Yes</li> </ul>	<p>Ghana has ratified all the important International Instruments on Gender Equality (GE) and Women Empowerment (WE). Critical among them are:</p> <ul style="list-style-type: none"> <li>The Universal Declaration of Human Rights, 1948</li> <li>The Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) 1979 (Signed 17 July 1980 and Ratified on 2nd January, 1986);</li> <li>The Optional Protocol to the Convention on the Elimination of all forms</li> </ul>	<p>Culturally, women are offered aspects of value chains in the community. The formulation of plans, and design and implementation of programmes and projects are guided by:</p> <ul style="list-style-type: none"> <li>Children’s Act of 1998 (Act 560)</li> <li>Persons with Disability Act 2006, Act 715</li> </ul> <p>National Gender Policy, 2015</p>	<ul style="list-style-type: none"> <li>Arrangements that ensure equal participation in project activities and consultations and equal access to benefits have also been identified in the gender assessment (approach and baseline).</li> <li>Appoint gender focal point Target women and youth for awareness and capacity building activities</li> </ul>	<p>A specific ‘gender’ approach and baseline section has been developed based on a gender assessment.</p>

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	of Discrimination Against Women (CEDAW OP) 1999 (Signed on 24 February 2000)			
<b>6 – Core labour rights</b>				
• Yes	<p>Ghana has ratified the eight ILO core conventions and <i>has</i> incorporated the requirements in the Labour Act 2003, Act 651. However, the country is yet to ratify the following:</p> <ul style="list-style-type: none"> <li>• Fundamental Conventions: 8 of 8</li> <li>• Governance Conventions (Priority): 2 of 4. Not ratified:</li> <li>• C122 - Employment Policy Convention, 1964 (No. 122)</li> <li>• C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)</li> <li>• Technical Conventions: 41 of 178. Relevant not ratified:</li> <li>• C155 - Occupational Safety and Health Convention, 1981 (No. 155)</li> <li>• C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)</li> </ul>	<ul style="list-style-type: none"> <li>• Project activities will meet the core labour rights and any possible risks identified and if existing, prevented or mitigated. This will be done by making reference to these in agreements / contracts</li> <li>• Complying to local laws and regulations:</li> <li>• Workmen's Compensation Law, 1987;</li> <li>• Ghana AIDS Commission Act 2002, (Act 613);</li> <li>• Public Health Act 2012, (Act 851);</li> <li>• Persons with Disability Act 2006, (Act 715);</li> </ul>	<p>No potential risks identified. Measures in place to avoid potential risks of non-compliance include:</p> <ul style="list-style-type: none"> <li>• Making reference to an agreement to comply to – ILO standards, and especially safety and health (155 and 187) in all contract and MoUs and AoCs used in the project</li> </ul> <p>UN-Habitat will ensure all contracts include standard clauses to avoid any risks and that safety measures are taken and inspections conducted.</p>	

<b>Principles 7 – Indigenous peoples</b>				
• Yes	<ul style="list-style-type: none"> <li>• There are no indigenous people or settlement in the study area as determined by other similar studies<sup>22</sup></li> <li>• Ghana has not ratified the ILO Convention 169 (Indigenous and Tribal Peoples Convention, 1989)</li> </ul>	<p>During project preparation, the project determined that no indigenous people are present in the project / programme target areas.</p> <ul style="list-style-type: none"> <li>• The project activities are consistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples. The institutional and technical roles</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable. There are no indigenous people or settlement in the study area</li> </ul>	

<sup>22</sup> Global Alliance for Green and Gender Advocacy. This project is in its second phase of building capacity for gender and environmental justice community organizations to better engage duty bearers on sustainable management of the Keta Lagoon Complex Ramsar site. Both ENDS/MoF Netherlands and the Development Institute

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

		of NADMO (National Disaster Management Organisation) and EPA will be sought during project implementation		
<b>Principles 8 – Involuntary resettlement</b>				
• Yes	<ul style="list-style-type: none"> <li>The project determined that no physical or economic displacement will take place due to the project/programme.</li> <li>There will be no involuntary resettlements since mangrove replanting will not displace individuals</li> </ul>	<ul style="list-style-type: none"> <li>Landowners, private or public, have agreed with using their land for project activities</li> <li>Agreement with the Chiefs and Elders for use of their lands have been signed</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable since resettlement issues are not anticipated</li> </ul>	
<b>Principles 9 – Protection of natural habitats</b>				
• Yes	<ul style="list-style-type: none"> <li>Key Project implementation such as provision of place bondless in trench; Excavating trench, providing and placing concrete; Water infiltration management; Farm wells construction (installation of tube wells); as well as Pre-sowing land clearing and preparation, construct cultivation beds, seeds, fertilizers will not affect any critical habitats</li> </ul>	<ul style="list-style-type: none"> <li>No risks identified on existing farming areas.</li> <li>The critical habitats this intervention will impact on (nesting sites for turtles and wetlands within the RAMSAR) have been understood and integrated into the project intervention design</li> </ul>	<ul style="list-style-type: none"> <li>National Effluent Quality Discharge Standards (GS 1212, 2019). This provides the national effluent quality discharge guideline levels as administered by the EPA.</li> <li>Compliance with the Pesticides Control and Management Act (1996) Act 528; National Wetlands Conservation Strategy 2007 and Plants and Fertilizer Act, 2010 (Act. 803).</li> <li>Baseline Water Quality monitoring undertaken to establish any existing pollution levels (see section 4.5.2)</li> </ul>	
<b>Principles 10 – Conservation of biological diversity</b>				
• Yes	<p>Nesting sites to the Sea Turtle (Leatherback) are identified in Agorkedzi / Atiteti, Dzita, Agbledomi, and Wuti.</p> <p>National plans and legal documents: Leatherback sea turtle IUCN Red List of Threatened Species; Butterfish; Ghana Mole Rat</p>	<ul style="list-style-type: none"> <li>Nesting sites of turtles are not directly in project sites. However, risk mitigation measures will be put in place in order to avoid any project-related movement in these nesting site areas.</li> </ul> <p>No potential exist for invasive species as local mangrove species will be used</p>	<ul style="list-style-type: none"> <li>The Wildlife Department was consulted for data/maps on Nestling sites. The exact location of these areas will be protected during project implementation.</li> <li>List and map of nesting sites (UN-H and NGO)</li> </ul>	
<b>Principles 11 – Climate change</b>				

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• Greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals that alter climate and weather patterns at global and regional scales will not occur or very negligible in the implementation of this small scale intervention.</li> </ul>	<ul style="list-style-type: none"> <li>• There will be no major works so no increase in GHG emissions is expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with United nations framework convention on climate change</li> </ul>	
<b>Principles 12 – Pollution prevention and resource efficiency</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• There will be no risk of inefficiencies as the intervention will be community-based / small scale.</li> </ul>	<ul style="list-style-type: none"> <li>• A waste and pollution prevention and management plan has been considered in the ESMF. Water pollution discharges from use of agrochemicals can be reduced and managed by adopting sound and safe chemical control measures (integrated pest control management techniques). Potential risks of harvesting polluted water from roadside drains will be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with national standards: <ul style="list-style-type: none"> <li>• National Effluent Quality Discharge Standards (GS 1212, 2019). This provides the national effluent quality discharge guideline levels as administered by the EPA.</li> <li>• Target Water Quality Ranges (TWQR) of the Ghana Raw Water Quality Criteria and Guidelines (Volume 4(B): Agricultural Water Use (Irrigation))</li> <li>• Monitoring of waste handling</li> <li>• Construction and O &amp; M report addressing standards of water quality</li> </ul> </li> </ul>	
<b>Principles 13 – Public Health</b>				
<ul style="list-style-type: none"> <li>• No</li> </ul>	<ul style="list-style-type: none"> <li>• There may be a risk of water pollution for irrigation because of collected polluted water and the use of pesticides.</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate measures will be taken to manage and monitor public health. Compliance with Public Health Act 2012 (Act 851)</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with Public Health Act 2012 (Act 851)</li> </ul>	
<b>Principles 14 – Physical and cultural heritage</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• According to the Ghanaian government and UNESCO, the Forts and Castles, Volta, Greater Accra, Central and Western Regions are the closest recognised protected heritage sites. These are not located in the project target area.</li> </ul>	<ul style="list-style-type: none"> <li>• Heritage sites will be protected</li> <li>• Economic activities such as tourism will be encouraged</li> <li>• No cultural heritage sites identified specifically in potential areas for mangrove restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional Priest will be delegated to perform rites before project commence.</li> </ul>	
<b>Principle 15 – Lands and soil conservation</b>				
<ul style="list-style-type: none"> <li>• Yes</li> </ul>	<ul style="list-style-type: none"> <li>• The agricultural land in the selected project sites are sandwiched between the sea and the greater Keta lagoon which are both salty in</li> </ul>	<ul style="list-style-type: none"> <li>• Leave buffer of vegetation around site perimeter to intercept any</li> </ul>	<ul style="list-style-type: none"> <li>• Soils and Water samples were collected from nineteen (19) locations for Polycyclic-Aromatic Hydrocarbons</li> </ul>	



	<p>nature. As a result, both soils and ground water quality is influenced by the sea and the lagoon because of the low altitude. In some places it is around one meter deep and in others even flows freely on the surface. These are typical hydromorphic soils and wetlands along the coast.</p> <ul style="list-style-type: none"> <li>• Various irrigation and water related studies in the region have clearly indicated that irrigation in such environment will highly enhance the upward movement of soluble salts which will move ultimately to the surface and thereby hamper plant growth<sup>23</sup>. Farmers in the area try to suppress the effects of salinity by importing fresh soil from long distance and organic manure like animal dung and plant residues, which increases their production cost. The economic return from irrigated agriculture is therefore less attractive.</li> </ul>	<p>sediment that might be transferred during surface flow.</p> <ul style="list-style-type: none"> <li>• Productive lands and/or lands that provide valuable ecosystem services within the activity area have been Identified and addressed</li> <li>• Soil conservation measures have been addressed</li> </ul>	<p>(PAH) Analysis.<sup>24</sup>. The obtained results were compared with international standards since there were no national standards for PAH in Ghana. The results were therefore compared with the Threshold Effect Concentration (TEC) values of the Department of Environmental Conservation, Vermont, USA. The analysis results show that all the tested parameters for Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Benzo (a) anthracene, Chrysene, Benzo(a)pyrene, Benzo (b) fluoranthene, Benzo(e)pyrene, Pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i,)perylene were all below standard.</p>	
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<sup>23</sup> Bekalu, Tesfaye (1996). Sustainability of irrigated agriculture in Keta district, Ghana. <http://hdl.handle.net/123456789/3143>

<sup>24</sup> Polycyclic aromatic hydrocarbons (PAHs) constitute a class of carcinogenic and mutagenic organic compounds based on two or more aromatic rings and belonging to the Food and Environment Contaminants. They are formed at high temperatures in natural processes (fires, volcanic eruptions, etc.) and in anthropogenic processes (burning of fossil fuels, vehicles emissions, plants of petroleum processing, etc.) due to the incomplete combustion of organic matter

### 6.3 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

For an overview of project activities' potential risks and impact assessment result against the 15 AF principles, see Table 6.8 below.

**Table 6.7: Project Activities and Potential Environmental and Social Impacts/Issues/Risks**

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		Mitigation Measures
		Environment	Social	
<b>Mangrove Restoration</b>				
<b>Phase 1: Prepare</b>	<b>Buying materials</b> <ul style="list-style-type: none"> <li>Site leasing and Fencing</li> <li>Nursery bed and bag preparation, collection of soil to site,</li> <li>Compost/manure and transportation</li> <li>Seed collection/Wildlings/seeds</li> </ul>	<ul style="list-style-type: none"> <li>Acquisition of land required.</li> <li>Transportation of materials (seedlings/wildlings, manure/ compost may create minimal traffic and slight noise</li> <li>Solid waste management</li> </ul>	<ul style="list-style-type: none"> <li>Potential social Conflicts and tension in land claims</li> <li>Security and safety issues</li> <li>Protection of cultural/heritage sites in the selection of land for nursery and mangrove planting</li> </ul>	<ul style="list-style-type: none"> <li>Ensure green procurement measure for all materials</li> <li>Grievance redress mechanism</li> <li>Partnerships and benefit sharing to be streamlined by stakeholders</li> </ul>
<b>Phase 2: Implement</b>	<b>Mangrove planting</b> <ul style="list-style-type: none"> <li>Nursery management</li> <li>Watering, replacement, watering can (including equipment)</li> <li>Transportation</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation losses due to site clearing and land preparation works</li> <li>Generation and disposal of solid waste</li> <li>Water resources and pollution</li> <li>Use and management of agrochemicals</li> <li>Soil disturbance and erosion</li> <li>Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>Land and compensation issues</li> <li>Security, Health and Safety</li> <li>Maintaining Livelihoods</li> <li>Occupational health and Safety</li> <li>Potential Conflicts in land claims</li> <li>Gender, vulnerability and Livelihood concerns</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that heaped compost /manure for nursery works is covered with tarpaulin to prevent wind and water transport of soil particles</li> <li>Ensure adequate stakeholder engagements with potential affected persons before land acquisition</li> </ul>
<b>Phase 3: Operate</b>	<b>Coordination support</b> <ul style="list-style-type: none"> <li>Supervision and coordination</li> <li>Office set up</li> <li>Experts and consultancies</li> </ul>	<ul style="list-style-type: none"> <li>No adverse impacts on the environment</li> <li>Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>Decent jobs for individuals and some private enterprises/consultancies</li> <li>Promoting community and investor confidence</li> <li>Local capacity building</li> </ul>	<ul style="list-style-type: none"> <li>Clearly define roles and responsibilities for coordination and supervision</li> <li>Establish and maintain credible Project Management procedures</li> <li>Prepare Project Operation Plan (POP)</li> </ul>
<b>Phase 4: Maintain</b>	<b>Maintenance</b> <ul style="list-style-type: none"> <li>Field monitoring</li> <li>Raising awareness and capacity building (component 2)</li> <li>Resources and livelihoods management plan (component 2)</li> <li>Monitoring plan (component 2).</li> <li>CREMA By-laws enacted</li> <li>Alternative ways for smoking fish and energy efficiency stove</li> </ul>	<ul style="list-style-type: none"> <li>Negligible noise nuisance during field maintenance activities</li> <li>Transport and conveyance of monitoring materials/equipment</li> <li>Generation and disposal of solid waste</li> <li>Security and community health issues</li> <li>Protection and management of common resource</li> </ul>	<ul style="list-style-type: none"> <li>Decent jobs for individuals and some private</li> <li>Corporate Social Responsibility</li> <li>Maintenance of Cultural Heritage</li> <li>Resource Access and Possible Restriction</li> <li>Local capacity building</li> <li>Maintaining Livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of local cultural identity and heritage</li> <li>Public health and safety, and traffic issues</li> <li>Establishment of grievance redress options</li> <li>Consult affected property owners/users/ communities and seek their consent early in the project development process</li> </ul>

**Table 6.7: Project Activities and Potential Environmental and Social Impacts/Issues/Risks CONT'**

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		Mitigation Measures
		Environment	Social	
<b>Lagoon Restoration</b>				
<b>Phase 1: Prepare</b>	<ul style="list-style-type: none"> <li><b>Pollution Study</b></li> <li>E.Coli, organic pollution, fish carrying capacity, plastic and heavy metals</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and Measurement of environmental media (water, soil, noise and air) and adherence to standards will enhance good environmental performance</li> <li>Unsafe disposal of hazardous chemicals and reagents</li> </ul>	<ul style="list-style-type: none"> <li>Public health and safety issues (possible use of empty chemical containers and bottles by some ignorant community members)</li> <li>Decent jobs for individuals and some private sector</li> <li>Research and development</li> </ul>	<ul style="list-style-type: none"> <li>Community health and safety measures</li> <li>Use of protective gears (PPEs)</li> <li>Preparation and Implementation of Environmental Monitoring Plan</li> <li>Periodic audit and compliance enforcement regime in line with international and national standards</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li><b>Lagoons cleaning</b> - Pen (10x10x3m, net, ropes, wood etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation losses due to site clearing and land preparation works</li> <li>Generation and disposal of solid waste</li> <li>Water resources and pollution</li> <li>Soil disturbance and erosion</li> <li>Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining Livelihoods</li> <li>Occupational health and Safety</li> <li>Land acquisition and compensation issues</li> <li>Established grievance redress options</li> <li>Public Health and safety</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of local cultural identity and heritage</li> <li>Public health and safety, and traffic issues</li> <li>Preservation of lagoon ecosystem</li> <li>Flood and erosion control measures</li> </ul>
	<ul style="list-style-type: none"> <li><b>Pen culture</b> - Waste removal (including equipment and personnel)</li> <li><b>Waste management</b> - Disposal and treatment (including equipment and personnel)</li> </ul>			
	<ul style="list-style-type: none"> <li><b>Dredging</b> Equipment and personnel</li> </ul>	<ul style="list-style-type: none"> <li>Disposal of dredged material</li> <li>Alterations in local natural water cycles/ hydrology of Lagoons</li> <li>Soil disturbance and erosion</li> <li>Generation and disposal of solid waste</li> <li>Water resources and pollution</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining Livelihoods</li> <li>Occupational health and Safety</li> <li>Land acquisition and compensation issues</li> <li>Established grievance redress options</li> <li>Improvements in nutrition status</li> </ul>	
	<ul style="list-style-type: none"> <li><b>Replanting of mangroves</b> - seedlings, materials and transport</li> </ul>	<ul style="list-style-type: none"> <li>No adverse impacts on the environment</li> <li>Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>Decent jobs for individuals and some private enterprises/consultancies</li> <li>Promoting community and investor confidence</li> <li>Local capacity building</li> </ul>	
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>Coordination support and Supervision</li> </ul>	<ul style="list-style-type: none"> <li>No adverse impacts on the environment</li> <li>Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>Decent jobs for individuals and some private enterprises/consultancies</li> <li>Promoting community and investor confidence</li> <li>Local capacity building</li> </ul>	<ul style="list-style-type: none"> <li>Clearly define roles and responsibilities for coordination and supervision</li> <li>Establish and maintain credible Project Management procedures</li> <li>Prepare Project Operation Plan (POP)</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li><b>Field monitoring</b> Water quality monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Unsafe disposal of hazardous chemicals and reagents</li> <li>Water sedimentation and pollution</li> </ul>	<ul style="list-style-type: none"> <li>Public health and safety issues (possible use of empty chemical containers and bottles by some ignorant community members)</li> <li>Decent jobs for individuals and some private</li> </ul>	<ul style="list-style-type: none"> <li>Community health and safety measures</li> <li>Use of protective gears (PPEs)</li> <li>Preparation and Implementation of Environmental Monitoring Plan</li> <li>Research and Capacity building</li> </ul>

**Table 6.7: Project Activities and Potential Environmental and Social Impacts/Issues/Risks CONT**

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Phase	Detailed Output/Activities	Potential Impacts/Issues/Risks		Mitigation Measures
		Environment	Social	
<b>Pen Culture</b>				
<b>Phase 1: Prepare</b>	<b>Material</b> (Net, ropes, scoop nets, canoe, Solar lamps) <ul style="list-style-type: none"> <li>• Feed, equipment and personnel</li> <li>• Storage structure</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation of materials</li> <li>• Solid waste management</li> <li>• Safe and sound handling and storage of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Protection of cultural/heritage sites in the selection of land for</li> </ul>	<ul style="list-style-type: none"> <li>• No to Negligible Impacts. No mitigation measures required</li> <li>• Provision of PPEs</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li>• <b>Pen installation</b></li> <li>• Pen (10x10x3m, net, ropes etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Site clearing and excavation works</li> <li>• Transport of materials</li> <li>• Generation/ disposal of solid waste</li> </ul>	<ul style="list-style-type: none"> <li>• Unavailability and poor use of personal protective equipment</li> <li>• Grievance redress options</li> </ul>	<ul style="list-style-type: none"> <li>• Security and safety issues</li> <li>• Community health and safety</li> </ul>
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>• <b>Pen culture</b></li> <li>• Tilapia fingerlings and fish food</li> <li>• Transport for fish food</li> </ul>	<ul style="list-style-type: none"> <li>• Lagoon water pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Community pride and support</li> <li>• Improve health and nutritional status of people</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality monitoring</li> <li>• Community health and safety</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li>• <b>Field monitoring</b></li> <li>• Water quality monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Unsafe disposal of hazardous chemicals and reagents</li> </ul>	<ul style="list-style-type: none"> <li>• Public health and safety issues</li> </ul>	<ul style="list-style-type: none"> <li>• Community health and safety measures</li> <li>• Use of protective gears (PPEs)</li> </ul>
<b>Salty Crops resilient and Water Infiltration</b>				
<b>Phase 1: Prepare</b>	<ul style="list-style-type: none"> <li>• <b>Materials</b> - Pumps, Farm logistics, irrigation facility, seeds, fertilizers, etc)</li> <li>• toolkit for soil sampling</li> <li>• Plots Identification &amp; Develop layout</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation of materials</li> <li>• Solid waste management</li> <li>• Safe and sound handling and storage of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of local cultural identity and heritage</li> <li>• Land acquisition and compensation issues</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure green procurement measure for all materials</li> <li>• Grievance redress mechanism</li> <li>• Partnerships and benefit sharing to be streamlined by stakeholders</li> </ul>
<b>Phase 2: Implement</b>	<ul style="list-style-type: none"> <li>• <b>Water infiltration construction</b></li> <li>• Prepare surface (Pre-sowing land clearing and preparation)</li> <li>• Farm wells construction (installation of tube wells) and Farm house construction</li> </ul>	<ul style="list-style-type: none"> <li>• Site clearing and preparation</li> <li>• Generation and disposal of solid waste</li> <li>• Water resources and pollution</li> <li>• Soil disturbance and Erosion</li> <li>• Noise and vibration</li> <li>• Post-Harvest losses (Crops diseases and agronomic practices)</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining Livelihoods</li> <li>• Occupational health and Safety</li> <li>• Established grievance redress options</li> </ul>	<ul style="list-style-type: none"> <li>• Cultural Heritage</li> <li>• Resource Access and Possible Restriction</li> <li>• Established grievance redress options</li> <li>• Water infiltration management</li> </ul>
<b>Phase 3: Operate</b>	<ul style="list-style-type: none"> <li>• <b>Training centre for salty crops</b></li> <li>• Preparation training material</li> <li>• Farmer group training</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse environmental impacts</li> <li>• Job creation opportunities will enhance people perceptions on environmental management</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity building in cultivation of salty resilient crops</li> <li>• Job opportunities and improvement in livelihoods and local economy</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Agricultural Extension Works to undertake on farm trial of salty crops</li> </ul>
<b>Phase 4: Maintain</b>	<ul style="list-style-type: none"> <li>• <b>Water infiltration and salty crops</b></li> <li>• Saline water monitoring</li> <li>• Project monitoring and reporting</li> <li>• Landscape maintenance equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Air Pollution</li> <li>• Generation/d disposal of solid waste</li> <li>• Noise and vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Unavailability and poor use of personal protective equipment and limited/ no enforcement process</li> </ul>	<ul style="list-style-type: none"> <li>• Public health and safety, and traffic issues</li> <li>• Consult affected property owners/users/ communities and seek their consent early in the project development process</li> </ul>

## CHAPTER SEVEN

### 7 ADAPTATION AND MITIGATION MEASURES

This chapter provides a summary of the mitigation and enhancement measures for the potential environmental impacts identified in chapter six. Mitigation measures have been proposed to reduce the negative impacts of the Project and to maximise the eventual positive impacts. The environmental mitigation and enhancement measures proposed considered the selection of the most effective pollution prevention method and processes with lower energy usage and lower emissions; the best available technologies and monitoring guidance; and ensuring that the controls for the project meets minimum requisite national and international environmental regulations, standards and guidelines. Table 7.1 summarises the mitigation Measures



Figure 7.1: Lagoon Restoration in the Keta Lagoon Basin (Picture Courtesy: the naturecollective.com)



Figure 7.2: Mangrove Restoration Activities

Table 7.1: Environmental and Social Mitigation Measures

Environment, Social and Health Impacts	Proposed Mitigation Action/ Measures	
	Construction stage	Operational stage
<b>Bio-Physical Environment</b>		
<b>Air quality</b>	<ul style="list-style-type: none"> <li>• Soil/sand and cement loads in transit to be well covered to reduce dust levels rising above acceptable levels.</li> <li>• Stockpiles of exposed soil and unpaved access roads to be sprinkled with water to regulate dust levels.</li> <li>• Ensure that heaped sand delivered for construction works is covered with tarpaulin to prevent wind and water transport of soil particles</li> <li>• Engines of vehicles, machinery, and other equipment to be switched off when not in use.</li> <li>• Regular scheduled maintenance and servicing to be carried out on all vehicles and equipment to minimize exhaust emissions.</li> <li>• Construction and civil works to be phased out or controlled to reduce emissions from equipment and machinery in use.</li> <li>• Monitor dust emissions from onsite offsite sources.</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate road signs to be planted on dust roads to limit vehicular speeds</li> <li>• Properly designed and constructed speed ramps on access roads</li> <li>• Select project equipment taking energy efficiency into account;</li> <li>• Monitor GHG emissions and implement a programme for identifying and implementing GHG reduction actions;</li> <li>• Monitor dust emissions, exhaust gases and fumes at onsite and offsite locations to assess atmospheric pollution performance of the construction activities.</li> <li>• All excavation activities would be closely supervised to ensure minimal disturbance to surrounding land users and dust.</li> </ul>
<b>Vibration and Noise</b>	<ul style="list-style-type: none"> <li>• Excavation and construction activities to be carried out during daylight hours.</li> <li>• Construction equipment and machinery to be regularly maintained and serviced to reduce noise generation when in use.</li> <li>• Engines of vehicles, equipment and machinery to be turned off when not in use.</li> <li>• Earthworks and other construction activities to be phased out or controlled to reduce noise generation during construction.</li> <li>• Neighboring residents and communities to be notified in advance of the project before contractor mobilizes to site</li> <li>• Work will not be carried out during sensitive times/ periods of day/ year to avoid disturbance to fauna</li> <li>• Unnecessary hooting of horns of delivery vehicles will be prohibited and defaulting drivers .will be sanctioned. Construction site workers will also be advised to avoid unnecessary noise making.</li> </ul>	<ul style="list-style-type: none"> <li>• Visible signs to be provided at suitable locations to warn workers of excessive noise</li> <li>• Carry out regular monitoring of noise levels at sensitive receptors.</li> <li>• Implement corrective measures, including operational controls and use of sound baffling devices or techniques if necessary;</li> <li>• Proper care shall be taken to insulate/enclose all the noise sources to avoid occupational exposure to the workers (ear muffs to workers) and also to minimize the generation of excess noise level.</li> <li>• Noise attenuation devices such as ear muffs must be provided to the workers in the high noise exposure areas.</li> <li>• Monitor for public complaints about noise and take corrective measures where required.</li> </ul>

<p><b>Flora Protection</b></p>	<ul style="list-style-type: none"> <li>• To the extent possible vegetation clearance will be limited to the areas required for the Pond development. Work areas will be clearly demarcated to ensure that the disruption of vegetation does not occur outside of designated areas.</li> <li>• Areas that are cleared for temporary facilities should be restored and re-vegetated, ensuring that any re-vegetation uses locally sourced and indigenous plants.</li> <li>• Vegetation clearance in construction period will be reduced as much as possible;</li> <li>• Plant green trees around the project area and along the site in compliance with Ghanaian regulation on green area (not less than 10% of total project area).</li> <li>• Clearly demarcate work areas and avoid working outside of these areas</li> <li>• Rehabilitate and re-vegetate areas cleared for temporary facilities that will not be developed further using locally sourced indigenous plants</li> </ul>	<ul style="list-style-type: none"> <li>• To the extent possible vegetation clearance will be limited to the areas required for the Pond development. Work areas will be clearly demarcated to ensure that the disruption of vegetation does not occur outside of designated areas.</li> <li>• Design facilities so that as much as possible of the natural vegetation habitat is left intact (e.g. through the use of vegetated buffer zones and habitat corridors) and that conversion and degradation of the natural habitat is minimized;</li> <li>• Areas that are cleared for temporary facilities should be restored and re-vegetated, ensuring that any re-vegetation uses locally sourced and indigenous plants.</li> <li>• Rehabilitate and re-vegetate areas cleared for temporary facilities that will not be developed further using locally sourced indigenous plants.</li> <li>• Plan clearing such that it retains habitat corridors for areas where disruption will cause the likely fragmentation of species habitat</li> </ul>
<p><b>Fauna Protection</b></p>	<ul style="list-style-type: none"> <li>• Ensure that all workers are aware of the importance of ecological resources and how to protect them (including awareness-raising regarding illegal hunting).</li> <li>• Take measures to minimize dust, light, noise and vibration to reduce disturbance to fauna during construction.</li> <li>• Provide all drivers heavy machinery operators with training on the ecological sensitivities and driving techniques required to minimize disturbance to fauna, which may be nocturnal or have specific migratory routes during the day</li> <li>• Establish and enforce appropriate speed limits on site</li> </ul> <p><u>Birds Protection</u></p> <ul style="list-style-type: none"> <li>• Undertake site surveys before commencement of construction by an appropriate Ornithologist to determine if and where any bird threatened or endangered species are roosting or nesting in close proximity of the Project area;</li> </ul>	<ul style="list-style-type: none"> <li>• Staff induction including awareness on the impacts caused to fauna during operation activities</li> <li>• General housekeeping will be ongoing to prevent litter and other wastes associated with site activities from fouling the site and areas adjacent to the site.</li> <li>• Where feasible, noise levels during dawn, dusk, and night hours will be minimised to reduce disturbance to mammals (e.g. livestock) and birds.</li> </ul> <p><u>Birds Protection</u></p> <ul style="list-style-type: none"> <li>• Ensure good housekeeping and reduce birds' access to waste storage areas</li> <li>• Ensure that power lines or substations are marked with bird flight diverters – either static or dynamic markers, generally fitted to the upper, earth wire.</li> </ul> <p><u>Turtle and Fish Protection</u></p>

	<ul style="list-style-type: none"> <li>• Ensure good housekeeping and reduce birds' access to waste storage areas</li> <li>• Minimise the disturbance impacts associated with the construction of the project by scheduling maintenance activities to avoid disturbances at sensitive times (pre-breeding, incubation, and small nestling seasons) or in sensitive areas.</li> </ul> <p><u>Turtle and Fish Protection</u></p> <ul style="list-style-type: none"> <li>• Compile a procedure for dealing with nesting turtles identified within the Project area during construction activities including involving a specialist ecologist and removal of hatchlings or eggs;</li> <li>• Liaise with local NGO in promoting education in local communities on the importance of turtles and other marine fishes</li> <li>• Develop and implement a programme for monitoring and recording sightings of any injured or dead marine mammals. Report this information to the appropriate organization or Agency (Fisheries Commission and EPA)</li> <li>• Work with the Fisheries Commission to ensure protection of fish resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Compile a procedure for dealing with nesting turtles identified within the Project area during operation activities including involving a specialist ecologist and removal of hatchlings or eggs;</li> <li>• Undertake daily inspections of the work area. If a nest is identified, the marine ecologist will be consulted for technical advice;</li> <li>• Liaise with local NGO in promoting education in local communities on the importance of turtles</li> <li>• Lighting infrastructure positioned near the beach will be fitted with directional covers and where possible feasible sodium lamps</li> <li>• Develop and implement a programme for monitoring and recording sightings of any injured or dead marine mammals. Report this information to the appropriate organization or Agency (Fisheries Commission and EPA)</li> <li>• Determine levels of contamination in fish through fish catch surveys and monitoring.</li> </ul>
<p><b>Soil Protection</b></p>	<ul style="list-style-type: none"> <li>• Top soil stockpiles will be limited to a height of less than 4 m and side slope of less than 3:1 to maintain soil fertility and to reduce potential erosion.</li> <li>• Stabilize the embankments to prevent erosion;</li> <li>• Carry out construction work during the 'dry' season to reduce sediment runoff that may pollute adjacent waters;</li> <li>• Develop a site drainage plan and storm water management plan for all phases of the Project</li> <li>• Implement best practice erosion and sediment control measures during construction (e.g. silt traps and controlling site drainage).</li> </ul>	<ul style="list-style-type: none"> <li>• A comprehensive erosion control measures will be in place and adhered to.</li> <li>• Vehicles will be confined to designated working areas and access roads.</li> <li>• A comprehensive drainage plan will be established to include measures to reduce runoff across the site and to minimize erosion.</li> <li>• A monitoring program shall be established to monitor land run-off and sedimentation in water courses as well as effectiveness of erosion control measures (i.e. netting and sand bags).</li> </ul>



<p><b>Water Resources and Lagoon pollution</b></p>	<p><u>Surface and Storm Water</u></p> <ul style="list-style-type: none"> <li>• Prepare and implement the Site Drainage Plan and Storm Water Management Plans during the engineering design phase of the Project;</li> <li>• Works not to be executed under aggressive weather conditions such as rains or stormy conditions.</li> <li>• Carried out construction activities using best practices for erosion control and silting. This would include silt traps and silt fences, interceptor ditches and berms, and covering soil stockpiles in high wind conditions and during the wet season.</li> <li>• No solid waste, fuels, or oils to be discharged into any section of a waterway.</li> <li>• Construction to be done in sections to minimize impacts and exposure of soil.</li> <li>• Excavated materials and silt, which cannot be used will be disposed of at appropriate sites as per the Waste Management Plan prepared by contractor and approved by the Assembly.</li> <li>• Temporary sediment barriers to be installed on slopes to prevent silt from entering water courses.</li> <li>• Maintenance, fueling and cleaning of vehicles and equipment to take place at off-site workshop with adequate leakage prevention measures</li> </ul> <p><u>Ground water</u></p> <ul style="list-style-type: none"> <li>• Undertake a comprehensive study of groundwater resources to inform the final project. A comprehensive hydrogeological assessment will be undertaken prior to construction.</li> <li>• Develop and implement a groundwater monitoring programme to evaluate groundwater conditions and water quality, with corrective actions</li> <li>• Release of any materials that may contaminate groundwater will be prevented.</li> </ul>	<p><u>Surface and Storm Water</u></p> <ul style="list-style-type: none"> <li>• Implement the site drainage plan and storm water management plans developed during the design phase of the Project;</li> <li>• Adequate sanitary facilities to be provided at project sites to avoid discharge of waste into water bodies</li> <li>• Practice Good housekeeping to avoid spreading domestic wastes from human/operation activities.</li> <li>• Implement best practice soil erosion and sediment control measures during the operational phase (e.g. silt traps and controlling site drainage);</li> <li>• Capture and treat any contaminated storm water so that it meets applicable regulatory standards prior to discharge;</li> </ul> <p><u>Ground water</u></p> <ul style="list-style-type: none"> <li>• All storage tanks will be above ground and in bunds with impervious liners.</li> <li>• Personal protective equipment will be readily available to reduce impacts to human health.</li> <li>• All wastes will be regularly disposed in an environmentally sound manner.</li> <li>• Subsurface pipes will be adequately maintained so that leakage is prevented.</li> <li>• All containers will be clearly and adequately labeled to identify the contents.</li> <li>• Ensure that Project water use considers technologies and operational controls to minimize water use and abstraction (e.g. low-flow devices)</li> <li>• Implement the groundwater monitoring programme developed during the construction phase;</li> <li>• Monitor groundwater near the communities.</li> </ul>
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**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

<p><b>Generation and disposal of solid wastes</b></p>	<ul style="list-style-type: none"> <li>• Develop a waste inventory and Waste Management Plan for implementation;</li> <li>• Contractors to work according to the prepared and agreed Solid Waste Management Plan.</li> <li>• Waste will only be disposed of at designated sites in consultation with the Assembly.</li> <li>• Excavated earth materials will, as much as possible, be re-used for back filling purposes to reduce waste</li> <li>• Excavated solid waste from the drain channel that are unsuitable for backfilling will be collected onsite, allowed to drain and collected for disposal at sites approved sites in collaboration by the MMDAs.</li> <li>• Provide bins on site for temporary storage of garbage such as lubricant containers, drinking water sachets and carrier bags/packaging materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Waste collection bins to be sited at vantage points to serve the general public</li> <li>• Warning signs to be posted at suitable locations against littering with possible sanctions</li> <li>• Proper arrangement with waste collection companies through the Assembly to regularly collect and dispose of solid waste</li> <li>• Develop a waste inventory and Waste Management Plan for implementation;</li> <li>• Store waste products on the Project site only within designated areas with hard standing;</li> <li>• Waste will only be disposed of at designated sites in consultation with the Assembly.</li> </ul>
<p><b>Visual intrusion</b></p>	<ul style="list-style-type: none"> <li>• Construction activities to be done in sections to reduce impacts of change and visual intrusions to the general public.</li> <li>• The construction sites to be hoarded off from public view.</li> <li>• Good housekeeping measures, such as regular cleaning, to be maintained at the construction site.</li> </ul>	<ul style="list-style-type: none"> <li>• Public to be well informed of upcoming project using appropriate signage's and display boards prior to contractor accessing sites;</li> <li>• Ensure an acceptable post-construction site as per provisions in the contract.</li> </ul>
<p><b>Occupational health and safety</b></p>	<ul style="list-style-type: none"> <li>• All workers should be given proper induction/orientation on safety.</li> <li>• The contractors will have a Health &amp; Safety Policy and procedures to guide the construction activities.</li> <li>• Regularly service all equipment and machinery to ensure they are in good working condition.</li> <li>• Regular screening and training of staff for diseases and infections.</li> <li>• Instruct employees to utilize equipment in construction activities (materials, lifting technique and limit weight).</li> </ul>	<ul style="list-style-type: none"> <li>• Implement measures to prevent, workplace hazards by adopting appropriate safe operating procedure and the use of PPEs</li> <li>• First aid facilities to be available at all sites with suitable arrangements with local health facilities to deal with emergencies</li> <li>• An Environmental Health and Safety Committee will be put in place by management to ensure that environmental health and safety rules and regulations are adhered to by all staff.</li> </ul>
<p><b>Human Environment (Socio-cultural)</b></p>		
<p><b>Employment Opportunities</b></p>	<ul style="list-style-type: none"> <li>• Over the life of the Project, a recruitment principle of hiring first from the directly affected area and neighbouring communities, then Ghana, will be applied;</li> <li>• Identify training possibilities and develop training plans as early as possible;</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate local candidates identified during construction to be trained and employed during operation;</li> <li>• Undertake a skills audit of the towns and surrounding communities;</li> </ul>

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	<ul style="list-style-type: none"> <li>• Maximise local employment where possible. This should be written into contractors' contract and made binding</li> <li>• Locally advertise employment opportunities and associated skills requirements in a timely manner to make them easily accessible to the local population;</li> </ul>	<ul style="list-style-type: none"> <li>• Employment opportunities and associated skills requirements to be well advertised locally and a recruitment centre to be easily accessible to the local population;</li> <li>• Offer certificates of employment to each employee at the conclusion of successful employment on the Project.</li> <li>• Undertake a skills audit of the towns and surrounding communities;</li> </ul>
<b>Land acquisition and compensation/ Livelihood issues</b>	<ul style="list-style-type: none"> <li>• Consult affected property owners/users/ communities and seek their consent early in the project development process</li> <li>• Allow affected persons to salvage their properties (including crops) before mobilizing to site to start work</li> <li>• Ensure fair and adequate compensation is paid to all affected persons prior to commencement of construction activities as per the provisions of the Land Valuation Board.</li> <li>• Obtain the required developmental permits from the respective Assemblies before start of work</li> <li>• Support social welfare programs and special Projects that focus on vulnerable groups;</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure appropriate compensations are paid to PAPs to be determined by the Land Valuation Board;</li> <li>• Employment and other opportunities to be given to local communities as much as possible.</li> <li>• Compensate those whose livelihoods are directly affected by the Project through a Livelihood Restoration Programme (LRP);</li> <li>• Support sustainable livelihood practices, where possible and practical, in line with the LRP.</li> <li>• Implement skills development and training programs for project employees;</li> </ul>
<b>Community Health and Safety, and Security</b>	<ul style="list-style-type: none"> <li>• Works on exposed trenches and earth materials will, as much as possible, be completed before new earth dug and trenches are created.</li> <li>• Work areas to be hoarded off adequately to avoid inquisitive trespassers especially children</li> <li>• Warning signs to be posted around work areas to discourage trespassers</li> <li>• Contractors to maintain adequate security at construction sites to avoid pilfering or vandalizing of property.</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage community leadership to form watch committees to improve security</li> <li>• Develop a Community Health and Security management Plan;</li> <li>• Work closely with local health services and HIV/AIDS structures in monitoring changes in levels of community health and wellbeing.</li> </ul>
<b>Traffic management</b>	<ul style="list-style-type: none"> <li>• Contractors to provide traffic management plans to be approved by relevant authorities</li> <li>• Adequate alternative arrangements to be made to minimize impact on motorist and pedestrians</li> <li>• Works to be completed on time to minimize inconvenience to motorists and pedestrians</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate road signs to be planted on access roads to limit vehicular speeds</li> <li>• Construct properly designed speed ramps on access roads</li> <li>•</li> </ul>

## **CHAPTER EIGHT**

### **8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN**

The critical period of any development is the implementation phase where the immediate environment could be compromised or enhanced. To ensure the construction of the proposed Project is carried out in an environmentally sound manner, as well as ensure effective and prompt reaction to any emergencies or eventualities; an environmental management plan needs be put in place.

This chapter contains proposals for a provisional environmental management plan, which is an action plan that translates the organization's goals and policy commitments into concrete actions so that environmental objectives and targets are achieved.

#### **8.1 OBJECTIVES**

The main objectives of the Environmental and Social Management Plan (ESMP) are to ensure that:

- Communication channels to report on environment related issues are in place.
- The contractor/developer is well acquainted with environmental responsibilities;
- Mitigation measures are implemented to avoid or minimise the expected negative environmental impacts;
- Establish a minimum standard for an Environmental Management System at the project site.
- Provide a framework that can be customized into a site specific Environmental Management System (EMS) following the choice of an Engineering, Procurement and Construction (EPC) contractor and the formation of the operational teams (ASP and other suppliers/ contractors);
- Provide an EMS framework that will comply to the AF ESP, especially principle 1 (law), 4 (human rights), 5 (gender) and 6 and 13 (labour and safety) and the AF GP. This includes:
  - Principle 1: References to standards and laws to which the activity will need to comply will be included in all legal agreements with all sub-contractors, including steps and responsibilities for compliance.
  - Principle 4: References to relevant Humans rights declarations will be included in all legal agreements with all sub-contractors.
  - Principle 5: Reference to relevant gender policies
  - Principle 6: Employment and working conditions following ILO standards will be included in legal agreements with all sub-contractors.
  - Principle 13: Ensure that ICSC international health and safety standards are clearly accessible and understood. e.g. by putting clearly visible signs detailing health and safety standards to be located at projects sites and by supplying protective equipment.

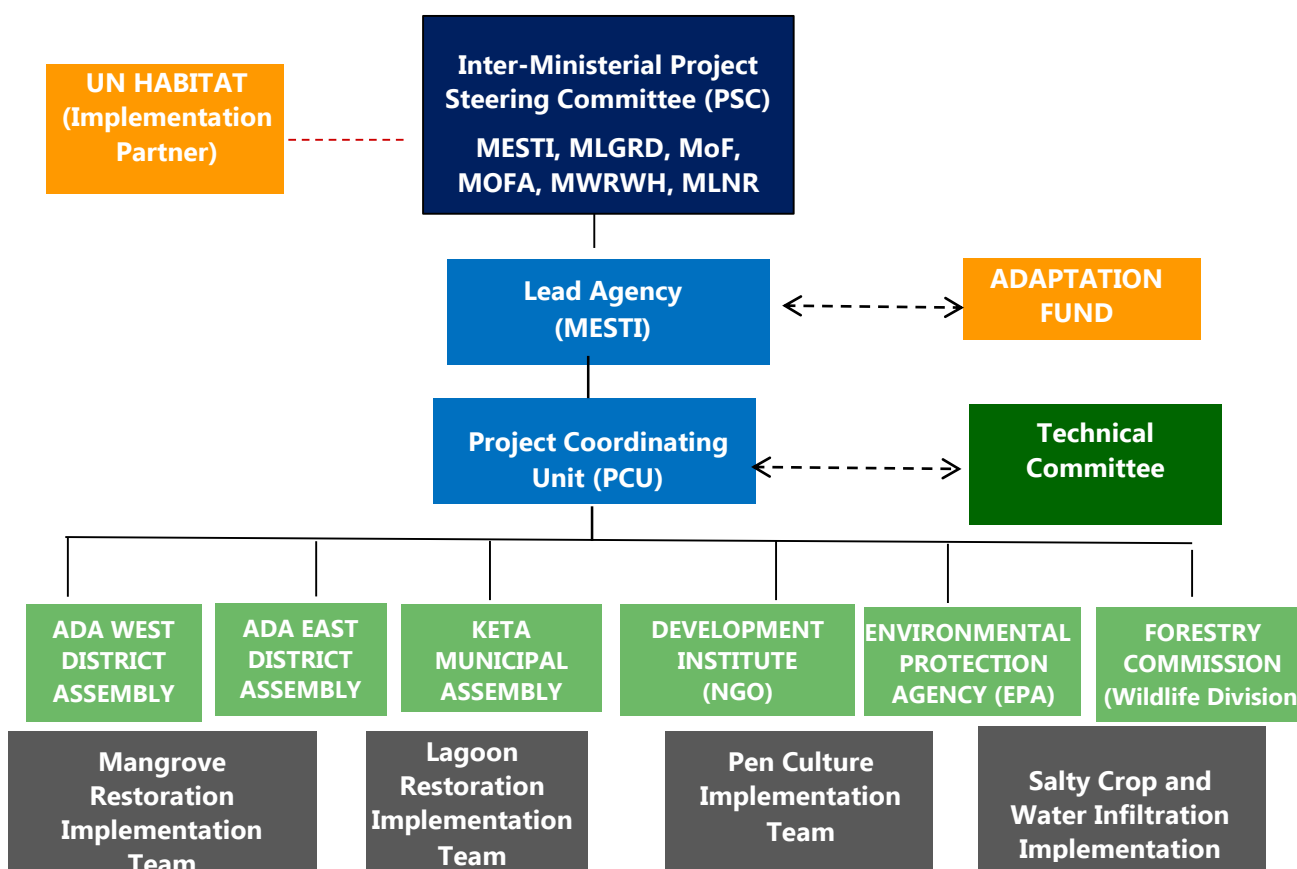
#### **8.2 PROJECT IMPLEMENTATION ARRANGEMENTS**

The following arrangements for project management (oversight, coordination and execution) have been agreed upon with AF DAs, the project steering committees and Execution Partners in Ghana. Figure 8.1 below shows the proposed structure for the project implementation arrangements

The main institutions to implement the program and projects and to ensure sound management of the environmental and social aspects include:

1. Ministry of Environment, Science, Technology and Innovation (MESTI)
2. Ministry of Finance (MoF)

3. Ministry of Local Government and Rural Development (MLGRD)
  4. Ministry of Lands and Natural Resources (MLNR)
  5. Ministry of Food and Agriculture (MOFA)
  6. Ministry of Fisheries and Aquaculture (MFAD)
  7. Ministry of Water Resources, Works and Housing (MWRWH)
- Government Regulatory:
    - Forestry Commission (Wildlife Division)
    - Environmental Protection Agency
    - Crop services division (MOFA)
    - Fisheries Commission
    - National Disaster Management Organisation (NADMO)
    - Districts/Municipal Assemblies (Ada East, Ada West and Keta)
  - Project Execution Entities
    - Town Development Committees
    - The Development Institute (NGO)
    - Consultative Women’s Group
    - District Assembly Members



**Figure 8.1: Proposed Project Management Structure**

**Table 8.1: Key Project Organogram Stakeholders and Roles and Responsibilities**

Stakeholder	Role and responsibility
Implementation Partner  UN-Habitat	Project oversight / supervision and coordination <ul style="list-style-type: none"> <li>- Compliance with AF and UN-H policies and reporting / M&amp;E requirements, incl. safeguarding system</li> <li>- Contracting and coordination execution partners</li> <li>- Coordination with Project Steering Committees to execute project components / activities</li> </ul>
Project Steering Committees	Providing technical inputs to ensure smooth implementation of the project from start to completion, including providing advice on how to deliver project outputs and the achievement of project outcomes in a timely matter in line with national and sub-national strategies and technical standards: <ul style="list-style-type: none"> <li>- Required coordination with relevant ministries and authorities</li> <li>- Approve annual work plans and review key project periodical reports;</li> <li>- Review any deviations and consider amendments to work plans and contractual arrangements.</li> </ul>
Project Coordinating Units (PCU)	<ul style="list-style-type: none"> <li>• opening and maintaining the project designated Account;</li> <li>• coordinating the preparation of the annual work/procurement plans and submitting consolidated plans to Adaptation Fund;</li> <li>• facilitating/supervising procurement activities of the various implementing agencies;</li> <li>• where certain items/services are required by all the agencies, the procurement will be done by the LA in collaboration with the Implementing Agencies to ensure efficiency and economies of scale;</li> <li>• collating M&amp;E reports and other reports that may be required and submit same to Adaptation Fund;</li> </ul>
Project Technical committee	The Technical Committee shall be made up of representatives from the beneficiary communities and chaired by a Project Coordinator. The TC will meet every quarter to review implementation progress and propose lasting solutions to challenges that may arise. The TC shall be responsible for providing quality assurance on the technical aspects of the project including providing relevant data and information required for the implementation of activities and reviewing various reports.
Project Execution Entities	Execute specific project components / activities. They will be responsible for the day-to-day implementation of the various components of the project.

The organogram in figure 8.1 above shows how the project will be supervised, coordinated and executed at the regional, national and local level. As UN-Habitat is the Multilateral Implementing Entity (MIE) of the project, UN-Habitat will be responsible for the overall implementation of the project, including contracting of execution partners and coordination with stakeholders that have a ‘stake’ or say in the project, mostly through the Project Steering Committees.

### 8.2.1 Regional level:

Regional level: at the regional level, project implementation will be supported through a **Regional Project Supervision Unit (RPSU)**. This 'Unit' will be responsible for project supervision / oversight, including coordination with and between **National Project Coordination Units (NPCUs)**, the **Regional-level Project Steering Committee (PSC)** and the **Project Execution Entities (PEE)**. The Regional Project Supervision Unit will be responsible for ensuring project compliance with the AF and UN-H policies and reporting requirements, for contracting the Project Executing Entities and it will chair the Regional-level Project Steering Committee. This Regional-level Project Steering Committee will be responsible for 'steering the 'whole' project from start to completion and for ensuring that the regional component (i.e. component 4) of the project is realized.

**Table 8.2: Regional/international level**

Stakeholder	Role and responsibility (policy / M&E, Implementation, etc)	
	Focus	Project
Abidjan Convention	Regional coordination between governments and on conventions, including on Marine and Coastal ecosystems and climate change resilience.	<ul style="list-style-type: none"> <li>- Co-Chair PSC at regional level</li> <li>- Execution outputs 5.3. and 5.4</li> <li>- Coordination execution component 5 at national level</li> </ul>
UCC	Academic expertise on regional climate change and coastal issues	<ul style="list-style-type: none"> <li>- Member PSC at regional level</li> <li>- Execution outputs 5.1. and 5.2</li> <li>- Coordination execution component 5 with AbC at national level</li> </ul>

### 8.2.2 National level:

National level: at the national level, project implementation will be supported through **National Project Coordination Units (NPCUs)**. These 'Units' will be responsible for daily project coordination in Jordan and Lebanon, including coordination on execution of the project activities with the Project Execution Entities. The 'Units' will also be a member of the **National-level Project Steering Committees (PSCs)** in Jordan and Lebanon. These National-level Project Steering Committees will be responsible for 'steering the country specific project activities from start to completion.

### 8.2.3 Local level:

Local level: at the local level, project implementation will be supported through the **National Project Coordination Units (NPCUs)**. The **National-level Project Steering Committees (PSCs)** will also have (government) representatives from the sub-national level, including from the target municipalities..

**Table 8.3: National and local level - Ghana**

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Stakeholder		Role and responsibility (policy / M&E, implementation, etc)	
Main	Sub + Commissions	Government	Project
Ministry of Environment, Science, Technology and Innovation (MESTI)	AF DA Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> <li>Sustainable development (policies and regulatory framework, especially environmental)</li> <li>AF focal point</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at regional level</li> <li>Chair PSC at national level</li> <li>AF DA – AF focal point</li> <li>EPA – Policy advise and coordination, including ensuring project activities' compliance to national environmental standards</li> </ul>
	Land Use and Spatial Planning Authority (LUPSA)	<ul style="list-style-type: none"> <li>Land Use and Spatial Planning</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>Execution component 1, including plans oversight and approval</li> <li>Coordination with RCC and MMDA to execute component 1</li> </ul>
National Development Planning Commission (NDPC)		<ul style="list-style-type: none"> <li>Development planning and strategy (finance and medium-term development plans)</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC</li> <li>Align / coordinate with (+ monitoring) national development planning</li> </ul>
Ministry of Local Government and Rural Development (MLGRD)	Regional Coordination Council (RCC)	<ul style="list-style-type: none"> <li>Good governance and balanced development of Metropolitan / Municipal / District Assemblies (i.e. decentralisation) (policies and regulatory framework)</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at regional and national level</li> <li>MLGRD through RCC-MMDAs: Align Mid-term development planning with development of spatial plans (LUSPA)</li> </ul>
	Metropolitan, Municipal and District Assemblies (MMDAs) and communities		<ul style="list-style-type: none"> <li></li> </ul>
Ministry of Water and Sanitation (MWS)	Water Resource Commission (WRC)	<ul style="list-style-type: none"> <li>Regulate and manage the sustainable utilization of water resources</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>WRC – Policy advise and coordination, esp. related to component 4</li> </ul>
Ministry of Works and Housing (MWH)	Hydrological Department Services (HDS)	<ul style="list-style-type: none"> <li>Programming and co-ordination of coastal protection works, construction and maintenance of storm drains countrywide and the monitoring and evaluation of surface water bodies in respect of floods.</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>HDS – Policy advise, coordination, esp. related to component 4</li> </ul>
Ministry of Special Development Initiatives (MSDI)	Coastal Development Authority (CDA)	<ul style="list-style-type: none"> <li>Spearheading development in coastal regions</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>FC – Policy advise, coordination, esp related to component 1 and 4</li> </ul>



Ministry of Lands and Natural Resources (MLNR)	Forestry Commission (FC) (incl. mangroves)	<ul style="list-style-type: none"> <li>Sustainable management and utilization of Ghana's lands, forests, wildlife and mineral resources for socio-economic growth and development.</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>FC – Policy advise, coordination</li> </ul>
Ministry of Fisheries and aquaculture development (MOFAD)	Inland Fisheries Management Division (IFMD) Fisheries Scientific Survey Division (FSSD) Fisheries Commission?	<ul style="list-style-type: none"> <li>Promotion of accelerated Fisheries Sector Development as a viable economic segment</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>IFMD – Policy advise and coordination</li> </ul>
<ul style="list-style-type: none"> <li><b>Non-government</b></li> </ul>			
The Development Institute		<ul style="list-style-type: none"> <li>Community mobilisation; coastal climate change resilience; gender and youth</li> </ul>	<ul style="list-style-type: none"> <li>Member PSC at national level</li> <li>Execution component 2, 3 and 4</li> </ul>

### 8.3 LEGAL AND FINANCIAL ARRANGEMENTS

UN-Habitat and the Ministry of Environment, Science Technology and Innovation (with the AF DAs) in Ghana will sign a joint **Memorandum of Understanding** to which the Project Document will be attached, to ensure that all partners are fully committed to the project.

UN-habitat will contract Project Execution Entities in Ghana through **Memorandum of Understanding (MoU) or Agreements of Cooperation (AoC)**, which are legally binding financial tools, and **UN to UN agreement** to the Abidjan Convention. The contract will be negotiated by the Regional Project Supervision Unit and cleared by UN-Habitat ROAf / HQ. For the UN to UN agreements, overheads will be passed through from the 7 percent PSC from the project cycle management fees, so there will be no double charge

The Regional Project Supervision Unit will develop an operational manual that clearly outlines the roles and responsibilities of the key project stakeholders and contain all the necessary tools, forms and templates required to administer the project. The operation manual will be shared with the National Project Coordination Units for inputs. While UN-Habitat takes responsibility of audits in line with AF requirements (each year), all contractors will be required to have 'external' audits of their budgets. The contractors will also be required to support the independent final evaluation.

### 8.4 ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL AND SOCIAL RISKS MANAGEMENT / AF ESP AND GP COMPLIANCE

The Regional Project Supervision Unit will be responsibility for environmental and social risks management, including implementation of the Project ESMP. An AF and UN-H policies and reporting compliance expert will be part of the RPSU. This expert will also supervise Project Execution Entities on the implementation of the Project ESMP. Guidelines showing how to comply to the AF ESP and GP will be shared with all execution entities and they will be guided on process, including monitoring. A Safeguarding system compliance expert will also be part of the RPSU. Monitoring staff part of the

RPSU will require having expertise in social risk management and be familiar with the AF safeguarding system. The RPSU will be backstopped by UN-Habitat HQ, with experts on climate change, human rights, environmental and social risks managements and gender policies.

The government stakeholders responsible for compliance to national environmental and social policies and standards will be part of the Regional- and National-level Steering Committees, as well as government gender focal points.

All project-related ToR's and contracts will include clauses stating contractors will need to comply to the AF ESP, especially principle 1 (law), 4 (human rights), 5 (gender) and 6 and 13 (labour and safety) and the AF GP.

Adaptive management: when changes in project activities or additional activities are required, these will need to go through a new risks screening and impact assessment process in compliance with AF, UN-habitat and national policies and standards. When this is required, this will be led by the RPSU and the Regional-level Project Steering Committee would need to approve the changes.

#### **8.4.1 Launch of the project**

At the launch of the project, UN-Habitat's, together with the Abidjan Convention will organize an **inception workshop** inviting members of the Regional-level Project Steering Committees, Excecution Partners and other key stakeholders. The project approach and the proposed outputs and outcomes of the project will be presented and discussed with the purpose to solicit feedback and inputs in a participatory manner. Comments and feedback will be incorporated in project frameworks and workplans. The Inception Workshop aims to:

1. Enhance participants' understanding of the project objectives and activities and take ownership of the project
2. Discuss and confirm the organizational structure of the project, including roles and responsibilities
3. Confirm / agree upon project monitoring framework and workplan
4. Confirm / agree upon project risks management framework
5. Discuss and agree upon project knowledge management framework and plan
6. Confirm / agree upon the project Environmental and social Risks Management Plan
7. Agree on the annual work plan for year one.

The inception workshop will be organised within three months after signing the project agreement between the Adaptation Fund and UN-Habitat.

#### **8.5 SUMMARY OF ARRANGEMENTS TO MANAGE AND IMPLEMENT ESMP**

Table 8.2 below summarises the arrangements to manage environmental and social risks identified in the ESMP

Figure 8.2: Summary of ESMP for Significant Adverse Impacts

No.	Parameter	Anticipated E & S Impact	Proposed Management Measure(s) and their Objectives	Management	Monitoring and Reporting (including performance indicators)	Frequency/ Timing	Responsible person	Budget/ Year (US\$)
<b>Preparatory (Planning/Design) Phase</b>								
1.	Land Leasing, acquisition and Compensation payment issues	Anxiety from potential loss of land/crop loss and livelihood/.	<ul style="list-style-type: none"> <li>Sensitization on scope and impact of sub-projects for locals</li> <li>Ensure all grievances/concerns of locals are resolved prior to project implementation</li> <li>Adequate compensation for any loss or damage.</li> <li>Provision of alternative livelihood</li> <li>Identify cultural heritage resources and existing ecologically sensitive areas.</li> </ul>	<p>Contractor's Community Liaison, Assembly/Unit committee members and chiefs</p> <p>DA Physical Planning/ Finance Officers</p>	<ul style="list-style-type: none"> <li>Minutes of awareness creation meetings</li> <li>Records of complaints/grievances received and status (resolved/ unresolved)</li> <li>Evidence of acceptable compensation paid</li> <li>Cultural/archaeological resources/existing infrastructure encounter incidence register</li> </ul>	Weekly	<p>Assembly/Unit committee members and chiefs</p> <p>DA Physical Planning/ Finance Officers</p>	As part of regular operations
<b>Construction Phase</b>								
1.	Site clearing and preparatory works for nursery and mangrove planting	Vegetation loss and soil degradation and sediment transport	<ul style="list-style-type: none"> <li>Carry out appropriate landscaping to preserve soils and vegetation cover.</li> <li>Control excavation works to limit the area and size to be affected.</li> <li>Stabilize loose soil by dampening to avoid sediment transport into drains and water bodies.</li> </ul>	Contractor's HSES Officer	<ul style="list-style-type: none"> <li>Area/size of gullies formed</li> <li>Amount of silt deposited in watercourses.</li> <li>Turbidity of drains/water bodies.</li> </ul>	Daily	Supervising Consultant, DA Environmental Health Unit (EHU)	To be captured in Bill of Quantities (BoQ)
2.	General Dredging and excavation activities. Generation and disposal of construction spoil and waste.	Water quality deterioration	<ul style="list-style-type: none"> <li>Consult District Assembly and EPA on appropriate sites for excavated materials</li> <li>Do not discharge any garbage/refuse, oily wastes, fuels/waste oils into drains or water bodies to prevent water pollution.</li> <li>Ensure proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials</li> </ul>	Contractor's HSES Officer	<ul style="list-style-type: none"> <li>Concentration levels of water quality parameters e.g. turbidity, oil &amp; grease, TDS etc.</li> <li>Records on waste oil collection and disposal</li> </ul>	Monthly	Supervising Consultant, DA Environmental Health Unit (EHU)	To be captured in Bill of Quantities (BoQ)



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

No.	Parameter	Anticipated E & S Impact	Proposed Management Measure(s) and their Objectives	Management	Monitoring and Reporting (including performance indicators)	Frequency/ Timing	Responsible person	Budget/ Year (US\$)
3.	Site clearing, excavation works and transportation of materials and equipment	Emissions and Air quality deterioration	<ul style="list-style-type: none"> <li>Use good quality fuel and lubricants;</li> <li>Suppress dust generation at sites;</li> <li>Deliver equipment and materials to sites at off-peak times i.e. non-market days.</li> <li>Dampen untarred routes of vehicles/trucks to the sites;</li> <li>Cover haulage trucks carrying sand with tarpaulin;</li> </ul>	Contractor's HSES Officer	<ul style="list-style-type: none"> <li>Presence and use of PPEs.</li> <li>Records of complaints/grievances resolved/ unresolved</li> <li>Baseline air quality data</li> </ul>	Daily	Supervising Consultant, DA EHU	To be captured in Bill of Quantities (BoQ)
4.	All land preparation, construction and restoration activities	Generation and disposal of waste	<ul style="list-style-type: none"> <li>Provide adequate waste reception facilities at construction/work camp sites;</li> <li>Dispose of waste at District Assembly approved waste dump sites</li> <li>Provide training as part of the ESMP on waste management.</li> </ul>	Contractor District Assembly	<ul style="list-style-type: none"> <li>Availability and use of bins</li> <li>Records on frequency and location of waste disposal site of domestic and construction waste</li> <li>Records on training</li> </ul>	Monthly Quarterly	Supervising Consultant, DA EHU, Contractor's HSE	To be captured in Bill of Quantities (BoQ)
5.	All land preparation, construction and restoration activities	Occupational Health and Safety Issues	<ul style="list-style-type: none"> <li>Active construction areas to be marked with high-visibility tape;</li> <li>Backfill and or secure open trenches and excavated areas;</li> <li>Provide suitable PPEs for construction workers;</li> <li>Provide adequate sanitary facilities;</li> <li>Train workers on site rules/regulations, safe methods of work, first aid, hygiene and disease including COVID-19 and (HIV) prevention.</li> </ul>	Contractor's HSE Officer  Health Facility nearby	<ul style="list-style-type: none"> <li>Workers' awareness of Contractor's health and safety policy</li> <li>Availability and proper use of PPEs</li> <li>Availability and proper use of warning signs</li> <li>Availability of first aid kit</li> <li>Adherence to health and safety procedures</li> <li>Records on frequency, type and source of illness/accident/injury</li> <li>Records on non-compliances</li> </ul>	Daily	Supervising Consultant  District Health Directorate	To be captured in Bill of Quantities (BoQ)



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

No.	Parameter	Anticipated E & S Impact	Proposed Management Measure(s) and their Objectives	Management	Monitoring and Reporting (including performance indicators)	Frequency/ Timing	Responsible person	Budget/ Year (US\$)
6.	Conveyance of construction materials.	Traffic Impacts	<ul style="list-style-type: none"> <li>Provide warning signs at junctions to Project sites to indicate the approach of trucks.</li> <li>Transport materials during off-peak periods.</li> <li>Use DVLA certified vehicles and drivers</li> <li>Enforce speed limits of between 40-50 km/hour within communities</li> <li>Tow broken down trucks within 24 hours.</li> </ul>	Contractor Assembly/Unit Committee Members, Chiefs CREMA	<ul style="list-style-type: none"> <li>Change in condition of roads to project site</li> <li>Availability and use of diversion/road signs or trained persons directing traffic.</li> <li>Records of accident occurrence involving truck drivers</li> <li>Frequency of truck breakdowns along road</li> </ul>	Daily	Supervising Consultant, Urban/Feeder Roads Department, MTTD, Assembly/Unit Committee Members	To be captured in Bill of Quantities (BoQ).
7.	All construction phase activities	Public health impacts	<ul style="list-style-type: none"> <li>Create awareness disease spread and prevention including COVID-19, HIV/AIDS and other STDs</li> <li>Ensure active project areas are covered to prevent falls and breeding of mosquitoes.</li> <li>Ensure the provision of adequate waste bins for collection and segregation</li> <li>Ensure provision of temporary toilet facilities at the project site for workers to prevent open defecation</li> </ul>	Contractor Assembly/Unit Committee Members, Chiefs CREMA	<ul style="list-style-type: none"> <li>Records of COVID-19 and HIV/AIDS awareness creation programmes for surrounding communities</li> <li>Presence of warning signs around excavations and other dangerous areas</li> <li>Records incident/accidents involving public</li> <li>Availability of bins and record of dislodgement</li> </ul>	Onset of project  Daily	Supervising Consultant, DA EHU, Health Directorate	To be captured in Bill of Quantities (BoQ)
8.	All construction phase activities	Change in socio-cultural characteristics	<ul style="list-style-type: none"> <li>Use local labour where possible and available.</li> <li>Identify cultural heritage resources and existing ecologically sensitive areas.</li> <li>Sensitise migrant workers on local cultural practices, norms and taboos</li> </ul>	Contractor, Assembly/Unit Committee Members, Chiefs	Complaints from project communities.	Daily	DA Community Relations Officer Community Liaison	To be captured in the BoQ

**Figure 8.2: Summary of ESMP for Significant Adverse Impacts cont'**



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

No.	Parameter	Anticipated E & S Impact	Proposed Management Measure(s) and their Objectives	Management	Monitoring and Reporting (including performance indicators)	Frequency/ Timing	Responsible person	Budget/ Year (US\$)
<b>Operation Phase</b>								
1.	All project operations	Soil degradation and sediment transport.	<ul style="list-style-type: none"> <li>Monitor soil conditions around lagoons and mangrove restoration sites.</li> <li>Adopt erosion control measures to minimize erosion and sediment transport.</li> <li>Dispose of waste at District Assembly approved waste dump site</li> </ul>	Assembly/Unit Committee Members, Chiefs CREMA	<ul style="list-style-type: none"> <li>Area and size of gullies formed.</li> <li>Results of soil test (e.g. texture; pH; organic carbon; total nitrogen; available phosphorus; potassium; CECs etc).</li> </ul>	Onset of project and subsequently biennially  Weekly checks	Assembly/Unit committee members and chiefs DA Physical Planning/ Finance	
2.	All project operations	Waste generation, management and disposal	<ul style="list-style-type: none"> <li>Keep hazardous waste (e.g. spent oils) onsite before proper disposal</li> <li>Ensure bins containing used containers are stored safely prior to safe disposal</li> </ul>	Assembly/Unit Committee Members, CREMA	<ul style="list-style-type: none"> <li>Availability and use of bins for collection of solid waste</li> <li>Availability and use of separate labelled bins.</li> </ul>	Weekly	Assembly/Unit committee members and chiefs	
3.	All project operations	Occupational Health and Safety Issues	<ul style="list-style-type: none"> <li>Ensure all staff are trained on proper equipment use;</li> <li>Provide staff with first aid training,</li> <li>Provide appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. for staff.</li> <li>Enforce safety procedures and apply sanctions when not adhered to.</li> </ul>	Assembly/Unit Committee Members, Chiefs CREMA	<ul style="list-style-type: none"> <li>Workers' awareness of health and safety policy</li> <li>Availability and proper use of PPEs</li> <li>Availability of first aid kit</li> <li>Records on frequency, type and source of illness/accident/injury</li> </ul>	Weekly	Assembly/Unit committee members and chiefs	
4.	All project operations	Public health impacts	<ul style="list-style-type: none"> <li>Illustrative warning signage and indicators will be provided to warn about proximity to dangerous sites or facility (e.g. excavations).</li> </ul>	Assembly/Unit Committee Members, CREMA	<ul style="list-style-type: none"> <li>Health records (type, frequency and causes of diseases/illnesses)</li> </ul>	Daily	DA Community Relations Officer	
<b>Decommission Phase</b>								
5.	Demolition of facilities/ structures	Waste disposal	<ul style="list-style-type: none"> <li>Ensure that demolition waste/debris is disposed of appropriately</li> <li>Inspect site to ensure contractor has properly cleaned up all sites before final payment is made to the contractor.</li> </ul>	Contractor, District Assembly EHU	<ul style="list-style-type: none"> <li>Availability and use of bins</li> <li>Records on frequency and location of disposal site of domestic waste and debris.</li> </ul>	Daily	DA Community Relations Officer	No additional cost required



## **CHAPTER NINE**

### **9 GRIEVANCE REDRESS MECHANISM (GRM)**

This chapter discusses the grievance redress mechanisms for implementing the ARAP. Implementation of the project has the potential of generating complaints and grievances. It is important that the ARAP provides mechanisms through which the PAPs can express their grievances or seek clarifications about the project.

#### **9.1 INTRODUCTION**

UN-Habitat in coordination with the execution entities will implement a grievance mechanism in the target areas, which will allow an accessible, transparent, fair and effective means of communicating if there are any concerns regarding project design and implementation. Project employees, and people benefitting / affected by the project will be made aware of the grievance mechanism for any criticism or complaint of an activity.

This mechanism considers the special needs of different groups as well as gender considerations and potential environmental and social risks, especially human rights (as shown on posters). A combination of mailboxes (at community / building level) and telephoning options offer an immediate way for employees and people affected by the project to safely express their concerns. The options will allow local languages and offer the opportunity for and people affected by the project to complain or provide suggestions on how to improve project design and implementation, which will be reviewed and taken up by the project implementation team.

#### **9.2 GRIEVANCE REDRESS PROCESS**

For the purpose of this project, the general steps of the grievance process to be followed will comprise the following steps:

1. Receive submitted
2. Grievance assessed and logged
3. Acknowledge grievance
4. Response Preparation
5. Implementation and communication
6. Complaints Response and Follow-up
7. Close grievance

#### **9.3 INSTITUTIONAL ARRANGEMENTS FOR GRIEVANCE RESOLUTION**

A three tier grievance redress arrangements will be developed to manage such grievances. These processes are:

1. Three Member Local Mediation Group (LMG):
2. Grievance Redress Committee (GRC)
3. Court of Law

##### **9.3.1 Three Member Local Mediation Group**

The first level involves a Three-Member Local Mediation Group that will receive grievances and process them for resolution for proposed schedule for Grievance Redress). The membership will include the following:

1. Assemblyman for the Community;



2. Chief or his representative of the area where the project is located
3. Chairperson or secretary of the Community Development Committee (preferably a woman representative)

The three-member focal group will be the first point of contact between the project and the community and their role/mandate will include providing project information to stakeholders and resolving grievances. If a grievance submitted to this group does not receive satisfactory resolution, the second tier (GRC) is activated.

### **9.3.2 Grievance Mediation Committee (GRC):**

The second tier, the Grievances Redress Committee, is a semi-formal and semi-adjudicatory structure within the project that receives complaints and amicably resolves them. The membership will include the following:

1. Municipal Coordinating Director of the respective District Assembly
2. Municipal Planning Officer, Secretary
3. Municipal Engineer
4. Representative of Municipal CHRAJ Office,
5. Representative of the Traditional Council,
6. Representative of Women Group
7. Representative of PAPs.

Aggrieved parties shall report directly to the Local Mediation Group through verbal narration, telephone calls, text messages and letters. The duration for resolving a grievance shall normally be a maximum of one week. The format of a Grievance and Resolution Form for documenting grievances is shown in Annex G.

It is anticipated that the number of cases which may need to be referred for redress will be relatively small, and that only the first tier of the redress mechanism (the Local Mediation Group), may need to be activated. The mediation process shall be confidential, transparent and objective, as well as accountable, easy, fast, accurate and participative. The Assembly shall offer training on basic safeguards issues using the national system to equip members of the grievance redress Committee.

### **9.3.3 Court of Law**

The third tier for grievance redress is the Court of Law. By the laws of Ghana, when all the forms of alternative dispute resolution fail, the law courts represent the last resort for an aggrieved person. Under this project the courts also represent the last resort when the first and second tiers fail to bring a satisfactory outcome. Figure 9.1 below shows a graphical summary of the grievance redress process.



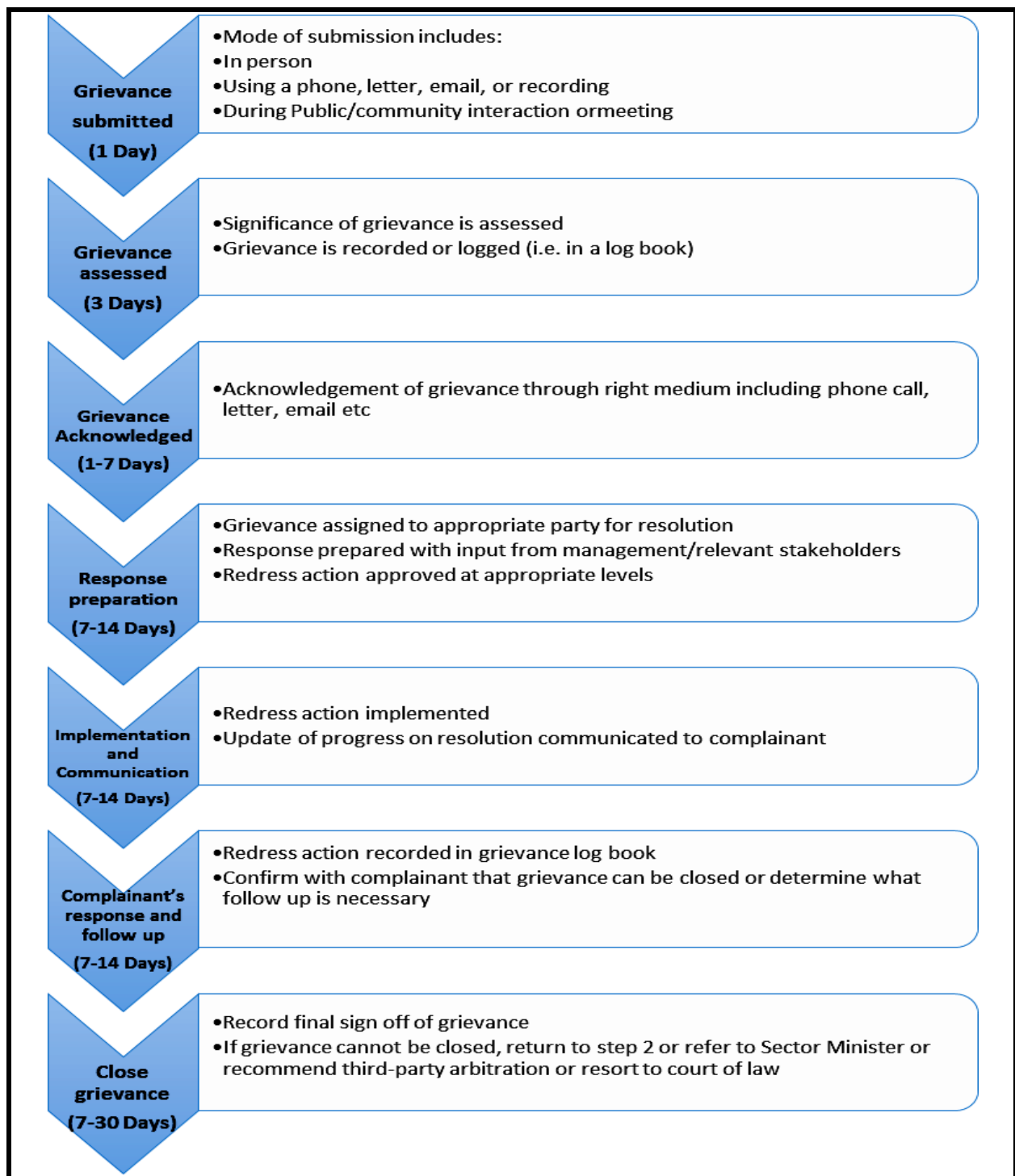


Figure 9.1: GRM Process and Procedures

## **CHAPTER TEN**

### **10 ENVIRONMENTAL MONITORING PLAN**

A well designed monitoring plan will ensure that the suggested mitigation measures for the various impacts and other activities conform to the objectives of monitoring. The monitoring programme will help the EPA to determine whether the mitigation measures suggested for the impacts are really working. This chapter provides a summary of monitoring requirements which will assess the effectiveness of the mitigation measures implemented during the Project

#### **10.1 RISKS MONITORING SYSTEM / INDICATORS**

The environmental and social risks management approach includes monitoring of potential risks and implementation of risks mitigation measures. This monitoring program commensurate with project activities and will report on the monitoring results to the Fund in the mid-term, annual, and terminal performance reports.

Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk / impact or if they need to be modified in order to achieve the intended outcome. Annual reporting will include information about the status of implementation of this ESMP, including those measures required to avoid, minimize, or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

The Regional Project Supervision Unit will be responsibility for environmental and social risks management, including monitoring of the implementation of the Project ESMP. An AF and UN-H policies and reporting compliance expert will be part of the RPSU. A Safeguarding system compliance expert will also be part of the RPSU. Monitoring staff part of the RPSU will require having expertise in social risk management and be familiar with the AF safeguarding system.

#### **10.2 MONITORING BUDGET**

The Project has been designed to minimize impacts upon the environment and obviate the need for specific mitigation of impacts arising from the Project. However, mitigation costs and costs for implementing environmental management, including monitoring costs, have been included in the overall Project budget.

Detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements. However, provisional budget to carry out the proposed monitoring programme has been provided in Table 10.1. A total amount of about US\$..... will be required annually for the implementation of the Monitoring plan.

Figure 10.1: Indicative Budget for ESMP Implementation

#	Item	Unit	Unit Cost		Total		Source of financing
			Local ¢	US\$	Local ¢	US\$	
<b>1</b>	<b>Preparation of specific ESIA/ESMF</b>						
	ESIA/ESMF						AF Project Funds
	Permit and Processing Fees						AF Project Funds
<b>2</b>	<b>Training &amp; Capacity Building</b>						
	Awareness creation and Capacity building for project staff						AF Project Funds
	Study tours (local) for selected social and environmental champions participating in .....						AF Project Funds
<b>3.</b>	<b>Mid-term audit of ES performance</b>						
	Performance Audit						Project Funds
<b>4</b>	<b>Completion audit of ES performance</b>						
	Completion Performance Audit						Project Funds
<b>5.</b>	<b>Monitoring and Evaluation</b>						
	Safeguards component for M&E						AF Project Funds
	<b>Total</b>						

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26. Wathern P. (1988). Preliminary Environmental Assessment. Theory and practice

# ANNEXES



ANNEX A

Project / Programme Components and Financing. All interventions will take place in both Ghana and Cote d' Ivoire. Project Duration: 3.5 years

Project/Program me components	Expected Outcomes	Expected Outputs	Amount
1. Climate change adaptation planning at the regional level	- Increased technical capacity to define/enhance adaptation strategies at the regional and municipal levels	1 Regional Strategy for sustainable and climate resilient development of coastal areas. - Resilience of Coastal communities as part of 2 National Adaptation Plans (NAPs) - Technical assistance and training of National Government and regional decision makers. At least 25 staff. - Data and knowledge management platform.	1,167,742
2. Climate change adaptation planning at the i) district / department, ii) city and iii) community level	Reduce the exposure to climate change related hazards of 1 Million people, in 6 districts or departments, in 6 cities and in 6 communities. Strengthen institutional and community capacities to anticipate and respond to climate change related hazards.	- Development of 6 City Resilience Assessments and Action Plans - Workshops and trainings of city leaders and municipal technical teams, at least 25 staff, to understand and implement climate resilient strategies and projects - 1 Report of collected spatial data, related to urban planning and climate change adaptation strategies, its analysis and prioritisation - Resilience Framework for Action for each of the selected cities - Peer-to-peer city learning and exchange workshops. - Workshops and trainings for the technical staff in municipalities and communities (at least 25 people), with special interest in innovative and successful technologies and approaches to address floods, erosion, develop drainage networks, public space development and service provision	1,167,742
3. Transformative projects at district / department level	Increased adaptation and resilience of the built environment and ecosystems through infrastructure projects, at district scale. Increased community resilience. Staff and communities will have acquired the capacity to manage and maintain these interventions.	- Implemented transformative projects identified in the Resilience Framework for Action. - Implemented territorial planning projects built upon ecosystem-based solutions to improve human settlements resilience through the restoration of key natural systems, such as lagoons (Ébrié Lagoon in Cote d'Ivoire) and river deltas (Volta river in Ghana), which have direct impact on coastal erosion. Example of approximately 30 km strategic plan for delta preservation (drainage, sand removing, replantation, control of amount of water used for agriculture) then addressed locally by communities. - Implementation through participatory planning and involvement of main actors.	3,503,226
4. Catalytic projects at community level	Increased adaptation and resilience through urban and ecosystems community-based	- Implemented catalytic urban planning projects for coastal protection and flood risk management, hybrid engineering and green infrastructure resulting in concrete interventions such as sand motors, sea grass plantation, foreshore	4,670,968



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	interventions. Increased socio-economic development. Municipal staff and communities will have acquired the capacity to manage and maintain these interventions.	solutions, mangrove protection, shellfish reefs, coral reefs restoration, underwater gardens and tropical “rich levee”. - Implementation through municipal and community involvement with contribution of private sector and NGO. (number of projects and prioritization according to stakeholders’ requirements)	
5. Climate change adaptation: legal and financial component	At national and regional level legal framework’s objectives and strategies will be reviewed and related in order to establish coordination between countries.	- Review of national regulations on climate change adaptation and resilience and exchange of best practices. - Review of land use planning and infrastructure regulations, environmental impact assessment and building codes. - Development of proposals for institutional and legal change to support implementation, ensuring long term sustainability. - Development of financial mechanisms for municipal finance and implementation of strategic and catalytic projects, linking projects to number of jobs and productivity increase. - Initial phase for development of land tenure and land readjustment for climate change adaptation.	1,167,742
<b>- Total components</b>			<b>11,677,420</b>
Project/Programme Execution cost			1,225,806
- Total Project/Programme cost			12,903,226
- Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			1,096,774 -
Amount of Financing Requested			14,000,000





ANNEX B

LETTER FROM THE EPA

Tel: (0302) 664697 / 664698 / 662465  
667524 / 0289673960 / 1 / 2  
Fax: 233 (0302) 662690  
Email: info@epa.gov.gh



**Environmental Protection Agency**

P. O. Box MB 326  
Ministries Post Office  
Accra, Ghana  
Website: <http://www.epa.gov.gh>

**Ghana Post (GPS): GA-107-1998**

**Our Ref: CU: 2092/01/01**

March 19, 2018

The Executive Director  
UN Habitat's Climate Change Adaptation Project  
c/o The Development Institute  
P.O. Box N 11613  
Accra

Dear Sir,

**ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)  
PROPOSED DREDGING OF LAGOON PROJECT LOCATED IN SOME  
COMMUNITIES IN THE KETA MUNICIPALITY AND ANLOGA DISTRICT OF THE  
VOLTA REGION.**

We acknowledge receipt of the completed Environmental Impact Registration Form (EA2) submitted to the Agency for the purpose of obtaining environmental approval for the above proposal in accordance with the Environmental Assessment Regulations 1999 (LI 1652).

Upon review of the information provided in the Environmental Impact Registration form (EA2) the project falls under the category of undertakings for which an Environmental and Social Management Framework (ESMF) is required. You are therefore requested to prepare and submit to the Agency five (5) hard copies of the Environmental and Social Management Framework (ESMF) to enable us take a decision on the project.

Do not hesitate to contact the EPA Head Office (M9) or on telephone number **0501301398** for any further guidance you may require in this regard.

Yours faithfully,

**Irene Amankwah**  
Ag. Director/FO-Southern Sector  
For: Ag. Executive Director

## **ANNEX C**

### **TERMS OF REFERENCE**

Environmental and Social Impact Assessment for the Adaptation Fund project:  
« Improved resilience for coastal communities in  
Cote d'Ivoire and Ghana »

### **CONTEXT AND JUSTIFICATION**

#### **Overall context**

The Governments of Ghana and Cote d' Ivoire have requested UN-Habitat to support coastal (and riverine/delta) cities and communities to better adapt to Climate Change, enhance urban planning, and build resilience to coastal erosion and related climate change impacts and risks.

Urban settlements in West Africa are growing at unprecedented rates and it is estimated that already 40 percent of the people living in Ghana and Cote d' Ivoire are settled in coastal zones, totalling more than 20 million people<sup>25</sup>. In this coastal zone, uncontrolled and unplanned urban growth patterns and poverty lead to the rapid development of substandard houses, assets, infrastructures and settlements in areas that are very vulnerable to climate change and will be seriously affected by sea level rise and other drivers leading to coastal erosion and reduction of livelihood options, which mainly rely on natural resource-based activities.

More specifically, climate related hazards include a projected one-meter rise in sea level by the end of the century that may result in regional land loss of 18,000 km<sup>2</sup> along the West African coast<sup>26</sup>. In Cote d'Ivoire and Ghana this climate change impact is combined with unsustainable land and water management. For this reason, national and local governments and communities need to plan in advance and build their capacities to shift to a more sustainable and resilient development model, as well as towards a coastal management system.

The Adaptation Fund project will provide \$14 million funding for the implementation of coastal policy, green solutions for coastal resilience and concrete transformative interventions at district and community level. Aiming at replicability at different scales, the interventions will be the most cost-effective and community inclusive, becoming a prototype for the sustainable management of coastal areas in West Africa.

The overall objective of the project is to address the challenges posed by the combination of climate change and unsustainable urbanization (increasing erosion and coastal flooding) by proposing a comprehensive approach towards reinforcing resilience of coastal communities. It also addresses coastal protection at larger scale ensuring consistency with government's priorities and action plans.

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<sup>25</sup> World Bank. (2012) and Country Fact Sheets prepared for West Africa Coastal Climate Change National Adaptation Planning Workshop

<sup>26</sup> WACA.(2016) Building Climate Resilience of Coastal Areas in West Africa. Journalists Workshop.



This comprehensive approach includes an in-depth risk and climate vulnerability assessment as well as a territorial planning, all through a participatory process, to strengthen coastal resilience from regional to local scale.

The webpage for the Adaptation Fund <https://www.adaptation-fund.org/project/improved-resilience-coastal-communities-cote-divoire-ghana/> presents the pre-concept note which includes all the key information related to this project.

### **Vulnerabilities in Ghana**

It is relevant to the Ghanaian context to understand the importance of its coastal regions- Western, Central, Accra and Volta. From these regions, the focus of the project will be on the area along the coast between Accra and the Volta river delta, Greater Accra and Volta region, due to their highest vulnerability and erosion level.

These areas while with 24% of the land, they have 44% of the national population. Over 60 % of major industries (manufacturing, refinery, mining, port and harbour, textile and smelting), urban settlements (Accra, the capital city, Tema and Takoradi, port cities), tourism, heritage and conservation sites are located in the coastal zone.

Coastal communities in this area are struggling with multiple interacting problems such as severe coastal erosion, increasing flood risk both from the ocean and the lagoons, a declining fish stock, one of the highest HIV infection rates of Ghana, limited excess to education, and pressure from industrial activities (aquaculture) and recreation activities (secondary houses/private estates/ ecotourism) on the common pool resources. This challenging context is exacerbated by the uncontrolled development of this coastal area, which is characterized by low density patterns and lack of planning deriving in an inefficient use of resources and the encroachment of environmental assets and risk areas.

Risks are also driven by sea level changes. Projections with respect to 1999, predicts an average rise of 5.8cm, 16.5cm and 34.5cm by 2020, 2050 and 2080 respectively, demonstrating the severity of the situation. Sea level rise is leading not only to increasing storm surges and coastal flooding but also to coastal erosion, at an alarming rate of more than 1.5m per annum. This rate is even higher in some of our areas of study due to the construction of dams upstream the Volta river, reaching 2-3m/year in the Volta estuary and 8m/year in Keta. Episodes of shore erosion over the last several decades caused huge losses in the built environment and is dramatically increasing poverty and inequality.

### **Project structure and justification**

The project is structured on the 5 components below:

**Component 1:** Coastal management and spatial/land-use planning strategies at district level.

Strengthened technical and institutional capacity of national and local governments to increase coastal climate change resilience through coastal management and land-use planning strategies.

Understanding of planning framework and identification of existing and missing plans (completed April 2019).

Development of a district Spatial Development Framework and local Structure Plans for the selected district and communities in the coastal area.

### **Component 2: Resilience planning at the community level**

2.1. Strengthened community capacities to anticipate and respond to climate change related coastal hazards, including protecting and / or enhancing livelihoods.

### **Component 3: Transformative concrete coastal resilience building interventions at inter-district level.**

This component aims at increasing resilience of coastal ecosystems and communities at district level. It entails large scale interventions that will have a positive impact over a wide area of the coastal territory and over a large number of population.

3.1. Identification of priority areas for the implementation of the interventions. This includes field visits and validation workshops with relevant stakeholders (completed April 2019).

3.2. Implementation of 2 large scale projects aiming at increasing districts adaptive capacity through: restoring the ecosystems communities rely on, enabling the environment for livelihoods enhancement, and flooding protection.

These interventions will focus on building with nature, cost-effectiveness and long-term sustainability.

### **Component 4: Catalytic concrete interventions at community level.**

Increased resilience of coastal ecosystems and the built environment at the community-level.

4.1. Identification of priority areas for the implementation of the interventions. This includes field visits and validation workshops with relevant stakeholders (completed April 2019).

4.2. Implementation of community scale interventions that will focus on supporting sustainable livelihoods in order to increasing communities' resilience.

Component 5: Knowledge management, communication and institutional and regulatory framework at the regional, national and local level.

5.1. Establish and manage an Urban Laboratory for Building Climate Resilience in West Africa (one per country), in order to support the development of plans, project implementation, monitoring and knowledge sharing.

5.2. Establish a monitoring system to assess the coastal impacts of climate change and urbanization.

5.3. Training of national and district staff in the use and maintenance of data systems, income generating interventions and knowledge sharing.

The purpose of developing these Terms of Reference (ToRs) is to enable the recruitment of a consultant to conduct Environmental and Social Impact Assessments (ESIAs) of transformative and catalytic interventions.

The proposed project activities will first be examined in detail in relation to the 15 principles of the Adaptation Fund to identify potential environmental and social risks and to evaluate potential impacts. When risks have been identified, measures to avoid or mitigate them will be identified.

The preparation of this Terms of Reference is in line with the Environmental and Social Policy (ESP) and the Gender Policy (GP) of the Adaptation Fund, the Environmental and Social Safeguard Policy of UN-Habitat (ESSP), and the legislation national environmental law, such as decree N ° 96-894 of November 8, 1996 determining the rules and procedures applicable to studies relating to the environmental impact of development projects.

### **Proposed interventions and project sites**

As previously described, this project will focus on the Greater Accra Region and the Volta region. Within these regions, three districts have been selected: Ada West, Ada East and Keta. The selection of these districts, as well as the communities, is based on a detailed assessment of existing vulnerabilities, most exposed areas and hazard probability. Therefore, areas and communities at higher risk are the ones to be addressed by the project.

Though more detailed screening of the potential interventions is currently being developed (exact sites, budget, suitability etc), the expected projects are:

### **Component 3:**

Transformative interventions to strengthen coastal resilience at inter-district level. Through restoring coastal ecosystems, these projects aim at increasing resilience by flood protection and by facilitating the enabling environment where communities can develop sustainable livelihoods. This will entail:

Coastal lagoons ecosystems restoration for the three districts: this includes, pollution assessment, dredging and vegetation replanting. The project will restore 8-12 of the coastal lagoons which constitute a key element of the coastal ecosystem.

Keta lagoon mangrove restoration: mangrove restoration is a sustainable solution for ecosystem restoration and lagoon shoreline protection. In parallel with the restoration, education and awareness programs will have to be implemented to prevent the local population from cutting the mangrove wood.

A comprehensive study of the environmental and social impacts and risks will be carried out and reported in the final EIA report, as well as in the form of detailed project sheets.

#### **Component 4:**

At community scale the project aims at making use of the restored environment from component 3 in order to increase their livelihoods opportunities. This will entail:

Aquaculture projects in 8-12 lagoons. Aquaculture has proven a sustainable income source for the fishing communities along the Ghanaian coast. Given the reduced fishing stock and the increasingly dangerous offshore fishing, aquaculture provides a save and more stable livelihood while maintaining the local knowledge and cultural heritage.

Rainwater infiltration in salty agriculture soil: Keta district is characterised by being one of the most suitable areas for farming along the East coast. Due to climate change impacts, salinization is an increasing phenomenon that is diminishing their agriculture capacities. These projects will work on rainwater harvesting and storage for infiltration, aiming at reducing the soil salinity and strengthening their cropping capacities.

#### **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OBJECTIVES**

The general objective of the EIA study is to identify and assess the potential environmental and social risks and impacts related to the implementation of the project and the selected interventions. If potential risks and impacts are identified, the EIA will identify possible alternatives and propose practical and effective mitigation measures to prevent or reduce potential negative implications in the implementation of the project.

The environmental and social impacts to be studied include factors affecting the natural environment, such as ecosystems, natural resources and livelihoods; social concerns including: involuntary relocation of the population, cultural heritage, landscape, vulnerable groups, gender and youth, etc.

In addition, an environmental and social management plan will be developed to ensure the best environmental and social performance.

Specifically, it will entail :

Identify, evaluate and review the major environmental and social issues in the project implementation areas.

Define, evaluate and review the environmental and social risks and impacts associated with the various project interventions.

In addition to direct and immediate impacts, derived, secondary and cumulative impacts will also be examined and studied to a reasonable degree.

Identify the strengths and weaknesses of the institutional and legal framework in relation to the environment, concerning the main actors of implementation of the project.

Propose concrete measures for managing risks and impacts.

Define alternative proposals and / or minimization measures aimed at preventing or reducing negative impacts. These are examined in order to choose a better project option in terms of environmental and social considerations.

Establish explicit procedures and methodologies for environmental and social planning as well as for the evaluation, approval and implementation of subprojects to be funded under this project.

Propose an Environmental and Social Management Plan (ESMP) with all the institutional arrangements for implementation; develop a budget for implementing the ESMP.  
Verify compliance with national legislation and policies related to climate change.

## **EXPECTED OUTCOMES**

At the end of the consultancy, the consultant must have achieved the results listed below:

- 1.1. Adequate project risk management and project activities under compliance of the 15 AF safeguard areas.
- 1.2. An approved environmental and social impact assessment.
- 1.3. An environmental and social management plan, including grievance mechanisms and budget.
- 1.4. Monitoring and evaluation measures, including budget.
- 1.5. Approach and baseline specific to gender and youth.
- 1.6. A better understanding of local communities.
- 1.7 Validation of municipalities and communities.

## **Deliverables :**

Pre-mission report detailing the methodology, work plan and mission schedule, as well as the schedule for the consultations and the list of stakeholders to be consulted.

Mission report following field visits and stakeholder consultations

Table with the management/risk analysis according to the 15 safeguard zones for each project intervention.

Subproject sheets for each project intervention.

Environmental and social impact assessment 1st draft.

Final report for the EIA.

In addition to the ESIA report and the community consultations, the project must provide additional information on:

Strategy, targets and results to ensure that men, women, youth and vulnerable groups equally benefit from the project.

Consultation and provision of expression of commitment from local communities regarding the management of the village and the sustainable management of the coastal zone.

## **TASKS FOR THE CONSULTANCY**

In order to achieve the objectives and deliverables described above, the following tasks are expected to be accomplished by the consultant:

Coordinate with local partners responsible for community mobilization and data collection.

Organize effective and relevant public consultations.

Visits to all selected sites to establish an updated baseline and data collection from relevant local authorities and communities.



Review all relevant legislation and regulations for planned interventions;  
Describe the different project components and their content (nature and potential size of the transformative interventions), following the shared model in annex xx.  
Conduct an analysis of potential environmental and social risks and impacts according to the 15 safeguard areas of the AF, and in accordance with national requirements and guidelines.  
Identify the roles and responsibilities of the various actors to implement the proposed mitigation measures in response to identified impacts;

Assess available capacity to implement the proposed mitigation measures, and make appropriate recommendations including training and capacity building needs and their costs.  
Propose a framework for environmental management and monitoring.  
Prepare a summary budget of all actions and activities proposed in the ESIA;  
Produce the final report of the study as well as the complementary data from the consultations carried out, including the results obtained following the data analysis (see deliverables in point 3).

The consultant will report directly to the UN-Habitat team, in close cooperation with the Ministry of the Environment and the Environmental Protection Agency (EPA). The consultant will have to produce the final report once the activities have been successfully completed in accordance with the agreed schedule.

## **STUDY STRUCTURE**

### **Methodology**

The methodology for the environmental and social impact assessment must be in accordance with Ghana's environmental regulations, Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP), and UN-Habitat's Environmental and Social Safeguard Policy (ESSP).

The consultant should propose a work plan with a budget and a detailed schedule to achieve the expected results with the appropriate methodology. This methodology should cover the minimum requirements proposed below:

Understand and study the project objectives and become familiar with the target areas of the project.

Review of relevant documents, legislation and regulations.

Propose a work plan, budget and deadlines to achieve the expected results.

Field visits and consultations with different municipalities, communities and stakeholders (assessment of risks / impacts not included in the assessment, including risks and impacts that may be specific to women, youth and vulnerable groups).

Compilation and review of relevant data.

Identify relevant environmental and social aspects and assess the potential environmental and social impacts and risks of the project.

Define and analyze alternative adaptation and mitigation measures to minimize the risks and impacts of climate change.



Define and analyze alternative adaptation and mitigation measures to minimize the risks and impacts of project implementation.

Restitution Session to present the findings of the assessment to the government partners.

Drafting of final report.

Report content and structure

The Environmental and Social Impact Assessment Report should be structured as follows:

1. Executive summary (English and French).

2. Context

Project justification and terms of reference objectives.

Project locations and target areas.

Project description and project activities.

Environmental, legislative and institutional policy frameworks.

3. Approach and methodology (execution modality of the EIA and information on how data has been collected and integrated in the recommendations)

4. Environmental study.

5. Impacts identification and evaluation.

6. Project interventions description and proposed locations.

7. Analysis of the potential consequences, direct and indirect, from the project implementation on the environment, and elaboration on the mitigation measures.

8. Conclusions and recommendations for impacts mitigation and optimization.

9. Annexes :

Terms of Reference for the EIAs.

Impact assessment report per subproject, including table with the framework for the management of potential environmental and social risks.

Impact evaluation reports for each sub-project.

Reporting on consultations undertaken, including itinerary (locations and dates), participants list, challenges addressed, stakeholder's response, photographic documentation etc.

Environmental and social management plan.

Bibliographical references.

Consultant resume.

The Impact Assessment Report per sub-projects will be structured as follows:

1. General information

a. Name of the proposed adaptation intervention.

b. Intervention description and needs assessment.

2. Adaptation measure and intervention details

a. Locations + land ownership and use.

b. Intervention features (dimensions and design) + required budget.

c. Beneficiaries (disaggregated data including vulnerable groups), use and accessibility.

d. Missing data (consultations, on-site registrations, etc) and monitoring (data requirements to measure interventions' effectiveness).

e. Profitability, sustainability and maintenance arrangements + alternative measures (less feasible).

3. Intervention context

- a. Environmental context
- b. Social context
- c. Gender and youth analysis.

4. Risk analysis and impact assessment

- a. List of potential environmental and social risks and opportunities.
- b. Impact assessment.
- c. Proposed risk management and mitigation measures.
- d. Monitoring indicators.

Assignment duration

The duration of the assignment will be over a period of 60 days from the effective date of the contract. Provisionally from 01 August to 01 October 2019.

Duty station: the consultant will be based in Accra, Ghana.

Estimated work timeframe:

Methodology preparation: 3-4 days

Field mission : 15-20 days

Draft report : 10-15 days

Restitution of provisional report : 5 days

Drafting of the final report: 10-15 days.

The calendar period between actual start and submission of the final report will not exceed 65 days.

Payment calendar

Twenty percent (20%) of the fees will be paid after the signature of this agreement and the submission of a work plan by 1st week of August 2019.

Twenty percent (20%) of the fees will be paid after the submission and acceptance of the first and final project report by first week of September and by September 31st 2019, respectively.

Forty percent (40%) of the fees will be paid after approval of the EIA Report by the Environmental Protection Agency by October 31st, 2019.

Twenty percent (20%) of the fees will be paid after the approval of the Global Project Proposal by the Adaptation Fund, on ... January 2020.

## **CONSULTANT PROFILE**

The following expertise and skills are required for this consultancy:

Qualifications and Experience

At least a bachelor/Master in Development, Environmental Sciences, Geography, Natural Resource Management and / or similar field with at least 5 years of professional experience in the relevant field.

Accredited as an EIA consultant to the Environmental Protection Agency and is renowned in their EIA work / to have a complementary training in environmental and social evaluation of development project (diploma, certificate, certificate, etc.)

- Minimum of 5 years of experience in conducting EIA as an individual or in a team.
- Willingness to visit the proposed project site.
- Knowledge of the country and its coastal environment is desired.

Skills



Demonstrate integrity and commitment to the principles, values and ethical standards of the United Nations.

Ability to work in a team.

Autonomous management and conflict management - Strong communication skills.

Language

Excellent professional English, oral and written skills. Understanding local language is advantageous.

## **REPORTS**

The report will be issued by the consultant in English version including an executive summary in English and French. It should be submitted electronically to the client (UN-HABITAT) for comments and possibly approval.

The final version of the report, which will have taken into account the comments of the client, will be sent by the consultant in the required format to the Environmental Protection Agency for review, comments, suggestions and validation.

## **SELECTION METHOD AND APPLICANT DOSSIER**

Price proposal and payment schedule

The consultant will have to send a financial proposal based on a lump sum. The total amount indicated must be all-inclusive and include all cost elements necessary to achieve the deliverables identified in section 3, including professional fees, travel expenses and any other costs applicable to the implementation of the mission.

The price of the contract will be a fixed price according to the production, whatever the extension of the duration defined here. Payments will be made at the end of the deliverables, as per section 5.4.

Required documents

Any consultant interested in this position will have to submit an application including the following documents to demonstrate their qualifications:

- A complete curriculum vitae, indicating any previous experience of the candidate in similar projects. As well as contact details and precise and verifiable references (certificate, certificates, etc.).
- A certified copy of the diploma (s).
- A letter of motivation indicating the interest of the consultant and his availability.
- A technical proposal including a) a brief description of why the consultant considers himself the most suitable candidate for the task, b) a methodology on how the consultant will approach and complete his / her mission, (c) a forecast schedule detailing all activities to be implemented on a temporal basis.
- A financial proposal.

All applications must be submitted electronically to the following address: xxx no later than xxx. Incomplete applications will not be considered.

ANNEX D



**COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH**  
**WATER RESEARCH INSTITUTE**

Our Ref:

13th March, 2020

**ANALYTICAL REPORT**

SENYO ADZAH

Tel:

Attn:

Date of Arrival : 03.03.20

Time of Arrival : 01.57 p.m.

Start of Analysis: 03.03.20

End of Analysis : 04.06.20

Journal Number EBHD 03-20-24b

Sample Identification	<i>E. coli</i> (cfu/1g) Method: APHA 9260F
WK1	16
WK2	1
AZ1	5
AZ2	2
G0I-G0I 2	2
AK1	10
AK2	6
Ghana Standards GS 175-1	0
WHO Guidelines	0

REMARKS: These results apply only to the samples tested.

Yours sincerely,

Dr. Gloria Addico  
Head, Environmental Biology & Health Division

Head Office: P. O. Box AH 38, Achimota, Ghana Or P. O. Box M 32 Accra  
Tel: (+233-302) 775352, 779514/5  
Fax: (+233-302) 777170. Email: [info@csir-water.com](mailto:info@csir-water.com)

Location: CSIR Premises, Airport Res. Area  
Behind Golden Tulip  
Off 37 - Achimota Road



**COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH**  
**WATER RESEARCH INSTITUTE**

Our Ref:

13th March, 2020

**ANALYTICAL REPORT**

SENYO ADZAH

Tel:

Attn:

Date of Arrival : 03.03.20  
Time of Arrival : 01.57 p.m.  
Start of Analysis: 03.03.20  
End of Analysis : 04.06.20

Journal Number EBHD 03-20-24a

Sample Identification	<i>E. coli</i> (cfu/100ml) Method: APHA 9260F
DZ1	22 x10 <sup>2</sup>
DZ2	45 x10 <sup>2</sup>
A1	19 x10 <sup>2</sup>
A2	18 x10 <sup>2</sup>
AG1	6 x10 <sup>2</sup>
AG2	3 x10 <sup>2</sup>
KN1	42 x10 <sup>2</sup>
KN2	25 x10 <sup>2</sup>
DZX1	10 x10 <sup>2</sup>
DZX2	5 x10 <sup>2</sup>
G01-G01 1	6 x10 <sup>2</sup>
Agbledome	8 x10 <sup>2</sup>
Ghana Standards GS 175-1	0
WHO Guidelines	0

REMARKS: These results apply only to the samples tested.

Yours sincerely,

  
Dr. Gloria Addico  
Head, Environmental Biology & Health Division

Head Office: P. O. Box AH 38, Achimota, Ghana Or P. O. Box M 32 Accra  
Tel: (+233-302) 775352, 779514/5  
Fax: (+233-302) 777170. Email: info@csir-water.com

Location: CSIR Premises, Airport Res. Area  
Behind Golden Tulip  
Off 37 - Achimota Road





## Analysis Results

Water Research Institute, Environmental Chemistry Division

CSIR Premises, Airport Res. Area

P. O. Box M. 32

Accra, Ghana

Phone: (+233-21) 775351/52 Fax: (+233-21) 777170 E-mail: info@csir-water.com

Sample ID: Sediment Samples

Company Name: The Development Institute

Contact Name:

City: Accra

Postal Code:

Lab Code:

Site Name:

Analysis start date: 03/03/20

Analysis stop date: 20/04/19

Sample ID	Copper (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
Akplabanya (AK1)	7.98	<0.002	<0.500	3.17
Akplabanya (AK2)	14.9	<0.002	18.1	<0.001
Azizanya (A21)	6.97	<0.002	22.7	<0.001
Azizanya (A22)	8.45	<0.002	6.11	<0.001
Wokumasbe (WK1)	8.17	<0.002	<0.005	<0.001
Wokumasbe (WK 2)	11.0	<0.002	<0.005	<0.001
G0I-G0I-2	24.5	<0.002	<0.005	0.071

Approved by:



Dr. Anthony Yaw Karikari, Head (ECSED)

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Sample ID	Phosphate (mg/l)	Nitrate (mg/l)	Ammonia (mg/l)	Copper (mg/l)	Cadmium (mg/l)	Lead (mg/l)	Mercury (mg/l)	BOD (mg/l)
Agorkodzi (AG2)	0.298	0.018	<0.001	<0.010	<0.002	<0.005	<0.001	0.680
Aititi (A1)	0.604	0.240	1.18	<0.010	<0.002	<0.005	<0.001	28.2
GOI-GOI-1 (10:53am)	12.8	<0.001	<0.001	<0.010	<0.002	<0.005	<0.001	85.8
Agbledomi (AM) 4:50pm	0.612	0.076	<0.001	<0.010	<0.002	<0.005	<0.001	7.78

Approved by:



**Dr. Anthony Yaw Karikari, Head (ECSED)**



## ANNEX E

### RECOMMENDED SEDIMENT QUALITY GUIDELINES

D.1: Recommended Sediment Quality Guidelines for the Protection of Aquatic Biota in Freshwater Ecosystems (TEC = Threshold Effect Concentration, PEC = Probable Effects Concentration, DW = dry weight)

Substance	TEC	PEC	Notes
<i>Metals (in mg/kg - ppm DW)</i>			
Arsenic	9.79	33.0	1,2
Cadmium	0.99	4.98	1,2
Chromium	43.4	111	1,2
Copper	31.6	149	1,2
Lead	35.8	128	1,2
Mercury	0.18	1.06	1,2,4
Nickel	22.7	48.6	1,2
Zinc	121	459	1,2
<i>Polycyclic Aromatic Hydrocarbons (in µg/kg - ppb DW)</i>			
Anthracene	57.2	845	1,3
Fluorene	77.4	536	1,3
Naphthalene	176	561	1,3
Phenanthrene	204	1,170	1,3
Benz(a)anthracene	108	1,050	1,3
Benzo(a)pyrene	150	1,450	1,3,4
Chrysene	166	1,290	1,3
Dibenz(a,h)anthracene	33	1,3	
Fluoranthene	423	2,230	1,3
Pyrene	195	1,520	1,3
Total PAHs	1,610	22,800	1,3
<i>Polychlorinated Biphenyls (in µg/kg – ppb DW)</i>			
Total PCBs	59.8	676	1,3,4
<i>Organochlorine Pesticides (in µg/kg – ppb DW)</i>			
Chlordane	3.24	17.6	1,3,4
Dieldrin	1.90	61.8	1,3,4
Sum DDD	4.88	28.0	1,3,4
Sum DDE	3.16	31.3	1,3,4
Sum DDT	4.16	62.9	1,3,4
Total DDTs	5.28	572	1,3,4
Endrin	2.22	207	1,3
Heptachlor Epoxide	2.47	16.0	1,3
Lindane (gamma-BHC)	2.37	4.99	1,3



ANNEX F

PAH MONITORING RESULTS



GHANA STANDARDS AUTHORITY  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1099/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	...08/2020....
Lab. No.: 1099 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Azizanya – AZ-2

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	<10		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	<10		-
ANT	Anthracene	µg/kg	<10		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	<10		-
PYR	Pyrene	µg/kg	<10		-
BAA	Benzo(a)anthracene	µg/kg	<10		-
CHR	Chrysene	µg/kg	<10		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	<10		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	<10		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10		-
BGP	Benzo(g,h,i)perylene	µg/kg	<10	-	

Lab No. 1099/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1098/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1098 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Azizanya – AZ1

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	Not detected		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	Not detected		-
ANT	Anthracene	µg/kg	<10		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	<10		-
PYR	Pyrene	µg/kg	<10		-
BAA	Benzo(a)anthracene	µg/kg	12		-
CHR	Chrysene	µg/kg	<10		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	15		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	<10		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	<10	-	

Lab No. 1098/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1097/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1097 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Wokumagbe – WK2

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	<10		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	Not detected		-
ANT	Anthracene	µg/kg	Not detected		-
PHE	Phenanthrene	µg/kg	Not detected		-
FLT	Fluoranthene	µg/kg	16		-
PYR	Pyrene	µg/kg	12		-
BAA	Benzo(a)anthracene	µg/kg	25		-
CHR	Chrysene	µg/kg	11		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	33		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	15		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	14	-	

Lab No. 1097/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1096/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1096 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Wokumagbe –WK1

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	Not detected		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	Not detected		-
ANT	Anthracene	µg/kg	Not detected		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	13		-
PYR	Pyrene	µg/kg	12		-
BAA	Benzo(a)anthracene	µg/kg	15		-
CHR	Chrysene	µg/kg	<10		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	32		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	14		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	14	-	

Lab No. 1096/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1095/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI 1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1095 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Akplabanya – AK2

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	<10		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	<10		-
ANT	Anthracene	µg/kg	<10		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	21		-
PYR	Pyrene	µg/kg	15		-
BAA	Benzo(a)anthracene	µg/kg	30		-
CHR	Chrysene	µg/kg	15		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	<10		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	<10	-	
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	<10	-	

Lab No. 1095/PES2/20





**GHANA STANDARDS AUTHORITY  
FORM**

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1094/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1094 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – Akplabanya – AK1

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	Not detected		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	Not detected		-
ANT	Anthracene	µg/kg	<10		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	13		-
PYR	Pyrene	µg/kg	<10		-
BAA	Benzo(a)anthracene	µg/kg	18		-
CHR	Chrysene	µg/kg	<10		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	<10		-
BEP	Benzo(e)pyrene	µg/kg	<10		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	<10		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	<10	-	

Lab No. 1094/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

**TITLE: Analytical Test Report**

**Doc. No.: GSA-FM-T09-E**

**Your Ref.:**

**Our Ref.: 1112/PES2/20**

**TO: THE COORDINATOR**  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	...08/2020....
Lab. No.: 1112 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE: Water – G01-G01-1 (10:53 am)**

**SAMPLE SIZE: 500 mL**

**DATE RECEIVED: 2020-07-10**

**DATE(S) OF PERFORMANCE: 2020-07-23 to 2020-08-07**

**SOURCE/PURPOSE: THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) ANALYSIS**

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	1		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected		-
BGP	Benzo(g,h,i)perylene	µg/L	Not detected		-

Lab No. 1112/PES2/20





**GHANA STANDARDS AUTHORITY  
FORM**

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1100/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....SO.....
Specific Product Code	.....SA.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1100 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Soil – G01-G01 – 2

**SAMPLE SIZE:** 450 g

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-16 to 2020-07-24

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/kg	<10	MRM by GC-MS GSA-SM-T24*	-
ACA	Acenaphthylene	µg/kg	<10		-
ACE	Acenaphthene	µg/kg	Not detected		-
FLU	Fluorene	µg/kg	Not detected		-
ANT	Anthracene	µg/kg	<10		-
PHE	Phenanthrene	µg/kg	<10		-
FLT	Fluoranthene	µg/kg	12		-
PYR	Pyrene	µg/kg	10		-
BAA	Benzo(a)anthracene	µg/kg	<10		-
CHR	Chrysene	µg/kg	<10		-
BAP	Benzo(a)pyrene	µg/kg	<10		-
BBF	Benzo(b)fluoranthene	µg/kg	34		-
BEP	Benzo(e)pyrene	µg/kg	12		-
PYL	Pyrene	µg/kg	<10		-
BKF	Benzo(k)fluoranthene	µg/kg	<10		-
IND	Indeno(1,2,3-c,d)pyrene	µg/kg	14		-
DAA	Dibenzo(a,h)anthracene	µg/kg	<10	-	
BGP	Benzo(g,h,i)perylene	µg/kg	<10	-	

Lab No. 1100/PES2/20







**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1101/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1101 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – KEWUNOR – KNI

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2		-
ACA	Acenaphthylene	µg/L	Not detected	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected		-
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1101/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1102/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

Codes	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1102 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – KEWUNOR – KN2

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	4	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1102/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Doc. No.: GSA-FM-T09-E

**TITLE:** Analytical Test Report

**Your Ref.:**

**Our Ref.:** 1103/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

**LABORATORY CONDUCTING TEST**  
PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1103 Dept. PES Source Code 2 Yr 2020	

**NAME OF SAMPLE:** Water – ATITETI – A1

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	4	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected	-	
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1103/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Doc. No.: GSA-FM-T09-E

**TITLE:** Analytical Test Report

**Your Ref.:**

**Our Ref.:** 1104/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

Codes	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1104 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – ATITETI – A2

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	4	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1104/PES2/20





**GHANA STANDARDS AUTHORITY  
FORM**

Page 1 of 2

**TITLE: Analytical Test Report**

**Doc. No.: GSA-FM-T09-E**

**Your Ref.:**

**Our Ref.: 1105/PES2/20**

**TO: THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.**

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	...08/2020....
Lab. No.: 1105 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

**PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.**

**NAME OF SAMPLE: Water – DZITA – DZ1**

**SAMPLE SIZE: 500 mL**

**DATE RECEIVED: 2020-07-10**

**DATE(S) OF PERFORMANCE: 2020-07-23 to 2020-08-07**

**SOURCE/PURPOSE: THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS**

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1105/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1109/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1109 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – DZITA – DZX-1

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1109/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1110/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1110 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – DZITA – DZX2

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1110/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1111/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1111 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – AGBLEDOMI – AM

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	2		-
ACA	Acenaphthylene	µg/L	Not detected	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1111/PES2/20







**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1106/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
AN11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1106 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – DZITA – DZ2

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC  
HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	1	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	1		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1106/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1107/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI1613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1107 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – AGORKEDZI – AG1

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	3	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected	-	
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	

Lab No. 1107/PES2/20





**GHANA STANDARDS AUTHORITY**  
FORM

Page 1 of 2

**TITLE:** Analytical Test Report

**Doc. No.:** GSA-FM-T09-E

**Your Ref.:**

**Our Ref.:** 1108/PES2/20

**TO:** THE COORDINATOR  
THE DEVELOPMENT INSTITUTE  
ANI 11613 – ACCRA NORTH  
GHANA.

<u>Codes</u>	
Generalised Product Codes	.....WA.....
Specific Product Code	.....OT.....
Officer Responsible for Report	.....EA.....
Code of Approving Officer	.....PO.....
Period of Report	....08/2020....
Lab. No.: 1108 Dept. PES Source Code 2 Yr 2020	

**LABORATORY CONDUCTING TEST**

PESTICIDE RESIDUES LABORATORY  
SHIASHIE (LEGON – MADINA ROAD)  
GHANA STANDARDS AUTHORITY  
P. O. BOX MB 245  
ACCRA.

**NAME OF SAMPLE:** Water – AGORKEDZI – AG2

**SAMPLE SIZE:** 500 mL

**DATE RECEIVED:** 2020-07-10

**DATE(S) OF PERFORMANCE:** 2020-07-23 to 2020-08-07

**SOURCE/PURPOSE:** THE DEVELOPMENT INSTITUTE /POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) ANALYSIS

TEST CODE	TEST CONDUCTED	UNIT	RESULTS	TEST METHODS	SPECIFICATIONS
NAP	Naphthalene	µg/L	1	MRM by GC-MS GSA-SM-T09* (2013-08)	-
ACA	Acenaphthylene	µg/L	Not detected		-
ACE	Acenaphthene	µg/L	Not detected		-
FLU	Fluorene	µg/L	Not detected		-
ANT	Anthracene	µg/L	Not detected		-
PHE	Phenanthrene	µg/L	Not detected		-
FLT	Fluoranthene	µg/L	Not detected		-
PYR	Pyrene	µg/L	Not detected		-
BAA	Benzo(a)anthracene	µg/L	Not detected		-
CHR	Chrysene	µg/L	Not detected		-
BAP	Benzo(a)pyrene	µg/L	Not detected		-
BBF	Benzo(b)fluoranthene	µg/L	Not detected		-
BEP	Benzo(e)pyrene	µg/L	Not detected		-
PYL	Pyrene	µg/L	Not detected		-
BKF	Benzo(k)fluoranthene	µg/L	Not detected		-
IND	Indeno(1,2,3-c,d)pyrene	µg/L	Not detected		-
DAA	Dibenzo(a,h)anthracene	µg/L	Not detected	-	
BGP	Benzo(g,h,i)perylene	µg/L	Not detected	-	







Lab No. 1108/PES2/20




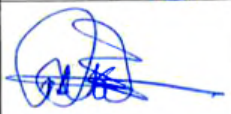
ANNEX G

LIST OF CONSULTEES


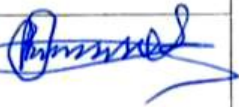






LOCATION: Accra  
 ✓

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
9	HOPENYATSIKPA	FARMER	0246240604	
10	NEWTON GAKPO KLOVE	FARMER	0245680291	
11	AHO KALAZEY ADUGBA	FISHMONGER	0245520764	AHO
12	GBEDA ATASI	FISHMONGER	0557219362	
13	AGNES VIASHIE ABLA	TRADER UNIT COMM. CHAIR PERSON	0240902416	
14	SELINA AGBOKPA	TRADER	0544782461 0593198518	
15	REJOICE ADZATTO	TRADER	0245602079	Re
16	ALBERT DAGBUI	YOUTH LEADER	024277731	




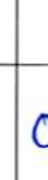


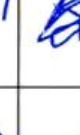

\* LOCATION : ACUSIE BOMI

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
17	NICHO DEMOUS A LORBU	FARMER	0548369826	
18	AGBOTA DUA ATHEVI	Agbota Dua Athevi Tongbi Sabab IV bupa of Dzita	0244116528	

Locamex

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1	JASPER AGIBANATOR	ASSEMBLY MEMBER	0548302123	
2	HON. GABRIEL K. AHHANYO	FORMAL ASSEMBLY MEMBER	0548670443	
3	TORBOKOR AMUZU KEDZE	CHIEF FISHERMAN	0246703079	
4	JOHN ZOKU	NET OWNER	0542374264	
5	DANIEL DEYNU APETORGBOR	SECRETARY TO CHIEF FISHERMAN	0545873739	
6	GODWIN AHEDOR	CHIEF REPRESENTATIVE	0246676287	
7	GARRY AKPAGLO	OPINION LEADER	0246172093	
8	AMUZU AWUDZA	FISHERMAN	0554948489	

Mark









FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1.	Togbi Asigye	Chief	0547734822	
2.	Hon. Joseph Kwaku Ali	Assembly Member, Kumbungu-Sargolua FTA	0545165409	
3.	Torgbiri Niyabo Komolafe Duncan Yao Fiase	Regent	0245656602	
4.	Christine Hagleku	Retired Nurse	0248145732	
5.	Edwan Awuku	Regent of Dodzatsa	0540548407	
6.	Dr. C. C. Adzaho	Regent	0244125219	
7.	Kwovor Bishop	Farmer	0240747351	
8.	Shirishua Tevy	Farmer	0247639960	

Amibi









FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
	Modzakah Ben	Carpenter	0543365483	
	Amudzi Agba	Manson	0249064323	
	Eric Kagbani	Fisherman	0248870955	
	Sharmatey Sena	Farmer		
	Abla Kartah	Trader	02490863225	
	Rita Dovuw	Fish monger	0248653275	
	Shwasthe Bridget	Fish monger	0548869241	
	Dunyo abenwa	Fisher monger		
	James Katakwa Adigbe Kustan	farmer signe officer	0243121794 0246229081	



*note*

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
	Mikado Joseph	Chief-Fisherman	0540899063	
	James Abotshi	Fisherman	0544916273	
	Frase Believe	Farmer	0249621416	
	AKPAKPANI Besah	Fisherman	0249780010	
	Abi Kormetsi Seth	Farmer	0249629965	
	Galley Edward	Fisherman	0247945230	
	Agbenyegah Michael	Fisherman	0541026237	
	Agbenyegah Kwaku	Fisherman		

*Atsfoacti*



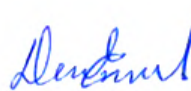
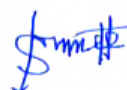
FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1	Agbottah Ernest Xorlalingam P.O. Box 3 Anloga	Farmer	0240989717	
2	Akley Stephen	Farmer	0543896563	
3	Lumor George	Farmer	0243245770	
4	Yevuga Beatrice	Trader/ Farmer	0554710842	Her + Mark  R T P
5	Agboba Patricia	Trader/ Farmer	0555524634	Her + Mark  R T P
6	Sorkpor Mercy	Trader	0248963905	Her + Mark  R T P
7	Wormenor Rose	Fishmonger/ Trader	0548644092	Her + Mark  R T P
8	Adzraku Dzibodi Patience	Trader	0549940706	Her + Mark  R T P

staple

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
9	Mensah Eric	Farmer / Tailor	0244012225	
10	Abotsi Happy	Farmer	0242160061	
11	Kokosu Gershen	Farmer / Mason	0246409557	
12	Mamah Joshua	Farmer	0542975943	
13	Goku Christian	Farmer	0240372220	
14	Blebu Theodore	Farmer	0544534512	
15	Sukah Wisdom	Farmer	0249050252	
16	Amenonovi Gloria	Trader / Farmer	0543228538	








**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

*Alafanti*








FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
17	<i>Kotosu Kwamivi</i>	<i>Farmer</i>	<i>0540610648</i>	<i>H's T</i>  <i>R T P</i>
18	<i>Demueme Klu</i>	<i>Farmer</i>	<i>0542453509</i>	
19	<i>Demueme Emmanuel</i>	<i>Farmer/ Teacher</i>	<i>0242653711</i>	
20	<i>Amegashie Vincent</i>	<i>Farmer</i>	<i>0242507429</i>	





AKPLABANTA

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1	Nana Moses Akiikwa Labis VI	Chief	0243167926	
2	Hon Frederick Tetteh Labis	Assembly Member	0246779145	
3	Esakey Korkley Clement	Fisherman	0245134494	
4	Joseph Tetteh Akplehey	fisherman	0243329082	
5	Adibari Abomam	fishmonger	0240999974	
6	John Ametepay Kakey	Opinion leader Water and Sanitation Committee	0244440586	
7	K.k. Tamul	fishsmoker	024413344	





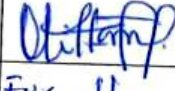


AKPLABANTA

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
8	NOAH TETIET KATEY	PASTOR	/	
9	AJERTHENOR TAMAHU	FISH SMOKER	/	
10	DAKIS KITCHER	YOUTH	/	
11	ATHUMA HUNEKPEKU	FISHERMAN	0242070455	
12	GORLEKU ABLORNEY	STOOL <del>LEADER</del> ELDER	/	
13	AKLER KATEY	FISHSMOKER	/	
14	ALIHANOR C.K. AKUE	UNIT COMMITTEE CHAIRMAN	0557543279	
15	CAMARA TETIET LABIA	STOOL <del>LEADER</del> ELDER	0543526137	

AKPLABANYA









FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
16	Hon Numotey Kitcher	Unit Committee	0245207519	
17	Nantun Kuntu Labea	Stool elder	0541007820	

Co:









FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1	Nomo Jeremiah Otu Otipeseku	Chief Rep	0247266003	
2	Nomo Henry Doebe Ahuakesey	Stool Elder	0249561526	for 
3	Nomo Telleh Ruben Aborchie	Otsiame	0242608822	for 
3	Francis Amanor Aborchie	Nene Secretary	0244371963 abochieffrancis54@gmail.com	
4	Nomo James H. Otipeseku	Elder of the stool	0201297434 0547705832 0246602757	
	Mr. John Sottie Kwabla	Chief fisherman Messenger	0551334637	for 
5	Nene Woliatse Joseph Agamoh	Chief Fisherman	0244894667	
6	Enoch Teye Otipeseku	Unit Comm. Secretary	0246404875 eotipeseku191@gmail.com	



Cioi

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
7	Mr. Douglas Sododzi	Youth	0241032992	
8	Tege Pekiako	Youth	0247693456	
9	Mr. Bouortey J. Okutu	Fisherman	0245801697	
10	Ga Tetteh Okutu	Fisherman	0547989607	
11	Nono Emmanuel Osabutey	Openion Leader	0245946980	
12	Ahuakesey Victoria	Fishmonger	0553433118	
13	Awisi Okutu	Fishmonger	0554478880	
14	Tege Busia Okutu		054898875 0548988075	




Cioi

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
7	Mr. Douglas Sododzi	Youth	0241032992	
8	Tege Pekiako	Youth	0247693456	
9	Mr. Bouortey J. Okutu	Fisherman	0245801697	
10	Ga Tetteh Okutu	Fisherman	0547989687	
11	Nomo Emmanuel Osabutey	Openion Leader	0245946980	
12	Ahuakesey Victoria	Fishmonger	0553433118	
13	Awisi Okutu	Fishmonger	0554478880	
14	Tege Busia Okutu		0548988075 0548988075	









*Agbeko  
Akroli*

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
1	PATRICK AITASI	STUDENT	055195171 0248142749	<i>[Signature]</i>
2	KUZORLI SAMUEL	STUDENT	0241078159	<i>[Signature]</i>
3	MIHEBO WILSON	FARMER	0245030956	<i>[Signature]</i>
4	AKORLI MAWULI	FISHERMAN	0551333860	<i>[Signature]</i>
5	KUZORLI JOHN	FISHERMAN	0540363503	<i>[Signature]</i>
6	AKORLI SIMON	UNIT COMMITTEE MEMBER		
7	KWADZA KWADZA JONATHAN	FISHERMAN	0547745164	<i>[Signature]</i>
8	AGBEKE ETSEY	FISHERMAN		









AKA / Awarade

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
9	BUABASHAH VICTOR	CARPENTARY	0246015338	
10	BUABASHAH ESI	FISH MONGAN	0245050291	
	HOVOR MAWULI	FISHERMAN	0543584557	

JK

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
	Sedohun Tradeja	Trader	0549684089	
	Mamami Kulevome	fish monger	0553685948	
	Affidley Elias	farmer	0245218871	
	Aghonvitor Frednuel	farmer	0558730798	
	Fremly Aghonvitor	fish monger	0242708012	
	Shwastie Veronica	fish monger	024744339	
	Shushie Aguel	fish monger	024744339	
	Simon Doku	Retired Educator	0243338355	

JK

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
	Sedohun Tradeja	Trader	0549684089	
	Mamami Kulevome	fish monger	0553685948	
	Affidley Elias	farmer	0245218871	
	Aghonvator Fredence	farmer	0558730798	
	Fremly Aghonvator	fish monger	0242708012	
	Shwastie Veronica	fish monger	024744339	
	Shwastie Aguel	fish monger	024744339	
	Simon Doky	Retired Educator	0243338355	

FEASIBILITY STUDY & ENVIRONMENTAL AND SOCIAL RISKS SCREENING AND IMPACT ASSESSMENT OF PROPOSED CONCRETE CLIMATE CHANGE ADAPTATION MEASURES / INTERVENTIONS UNDER THE ADAPTATION FUND PROJECT				
CONSULTEES INFORMATION DETAILS				
No.	Name and Address of Consultee	Position	Telephone and Email Address	Signature
	Tettey Agor Yewu	Fish monger	0248653275	T
	Tettey Agor Tegbaki	Fish monger	0248653275	022
	Apebungbor Bernice	Fish monger	0249716797	A.
	Aku Kattah	Fish monger	0548869241	Jim
	Agbovwor Vicentia	Fish monger	0240863225	Jim
	Kokoro Vicky	Fish monger	054984089	Jim
	Janet Duro	Fish monger	0553685948	Janet
	<del>Janet</del> Gubator Agbovwor Gawor	Fish monger	0558730798	Gubator
	Abulbe Evelyn	Fish monger	0249716797	

**Focus Group Discussions held at Agbledomi on 03/07/2020**

NAME	AGE	SEX	OCCUPATION	TEL
Agbotadua Ahevi Torgbi Sabah IV		Male	Dufia Of Dzita	0244116528
Jasper Agbanator		Male	Assembly Man	0548302123
Hon. Gabriel K.Ahiany		Male	Formal Assemblyman	0548670443
Torbokor Amuzu Kedze		Male	Chief Fisherman	0246703074
John Zouku		Male	Net Owner	0542374264
Daniel Deynu Apetorgbor		Male	Secretary Of Chief Fisherman	0545873739
Godwinahedor		Male	Chief Representative	0246676287
Garry Akpaglo		Male	Opinion Leader	0246177093
Amuzu Awuzda		Male	Fisherman	0554948489
Hope Nyatsikah		Male	Farmer	0246210604
Newton Gapko Klove		Male	Farmer	0245680291
Aho Kaplazey Adugba		Male	Fishmonger	0245520764
Gbeda Atatsi		Male	Fishmonger	0557219362
Agnes Vitashie Abla		Female	Trader Unit Chairperson	0240902416
Selina Agbokpa		Female	Trader	0544782461/ 0593198518
Rejoice Adzaho		Female	Trader	0245602079
Albert Dagbu		Male	Youth Leader	024277731
Nichodemous Alorbu		Male	Farmer	0548369826

**Focus Group Discussions held at Akplabanya on 03/07/2020**

NAME	AGE	SEX	OCCUPATION	TEL
Numo Moses Akitkor Labia VI		Male	Chief	0243167926
Hon. Frederick Tetteh Labia			Assembly Member	0246779145
Esakey Korley Clement			Fisherman	0255134494
Joseph Tetteh Aklehey			Fisherman	0243329082
Adikii Abanam			Fishmonger	0240999974
John Ametepey Kutey		male	Opinion Leader; Water & Sanitation Committee	0244440586
K.K Tahuru			Fisherman	0247413344
Noah Tettey Katey			Pastor	-
Ajerhenor Tanihu			Fish Smoker	-
David Kitcher			Youth	-
Ahuma Hunekpeku			Fisherman	0242070455
Gorleku Ablorney			Stool Elder	-
Akler Katey			Fish Smoker	-
Alihanor C.K Aklie			Unit Committee Chairman	0557543279
Camara Tetteh Labia			Stool Elder	0543526137
Hon Numotey Kitcher			Unit Committee	0245207519
Nutur Kortey Labia			Stool Elder	0541007820



**Focus Group Discussions held at Lagbati on 03/07/2020**

NAME	AGE	SEX	OCCUPATION	TEL
Agbottah Ernest			Farmer	0240989717
Akley Stephen			Farmer	0543896563
Lumor George			Farmer	0243245770
Yevuga Beatrice			Trader/ Farmer	0554710842
Agboba Patience			Trader/ Farmer	0555524634
Sorkpor Mercy			Trader	0248963905
Wormenor Rose			Fishmonger/ Trader	0548644092
Adzraku Dzigbordi Patience			Trader	0549940706
Mensah Eric			Farmer/ Tailor	0244012225
Abotsi Happy			Farmer	0242160061
Kokosu Gershon			Farmer/ Mason	0246409554
Mamah Joshua			Farmer	0542975943
Blebu Theodore			Farmer	0544534512
Sukah Wisdom			Farmer	0249050252
Amewonorvi Gloria			Trader/ Farmer	0543228538
Kokosu Kwamivi			Farmer	0540610648
Denueme Klu			Farmer	0542453509
Denueme Emmanuel			Farmer/ Teacher	0242653711
Amegashie Vincent			Farmer	0242507429
Goku Christian			Farmer	0240372220

**WOMENS GROUP, GOI**

NAME	AGE	SEX	OCCUPATION	TEL
Awisi Okutu	65	Female	Fishmonger	
Ahuakesy Dzinyame	62	Female	Fishmonger	0553433118
Gifti Esi Anim	60	Female	Fishmonger	0554790671
Hoyobi Otipeseku	30	Female	Fishmonger	0547890686
Mery Lakumi	50	Female	Fishmonger	0545484737
Aborchie Sikoryo	52	Female	Fishmonger	0546401722
Ashaingmor Greac	45	Female	Fishmonger	05459446270
Elizabeth Okutu	46	Female	Fishmonger	
Lotsah Florence	45	Female	Fishmonger	0242848664
Eunine Nane Anim	40	Female	Fishmonger	0241247093

**Focus Group Discussions held at Atiteti on 03/07/2020**

NAME	AGE	SEX	OCCUPATION	TEL
Patrick Ahatsi			Student	055195171/ 0248147749
Kuzorli Samuel			Student	0241078159
Miheso Wilson			Farmer	0245030956
Akorli Mawuli			Fisherman	0551333860
Kuzorli John			Fisherman	0540363503
Akorli Simon			Unit Committee Member	-
Kwade Jonathan			Fisherman	0547745164
Agbeke Etsey			Fisherman	-
Buabasah Victor			Carpenter	0246015338
Buabasah Esi			Fishmonger	0245050291
Hovor Mawuli			Fisherman	0543584557
Nomo Jeremiah Otu Otipeseku			Chief Representative	0247266003
Nomo Nenry Doetse Ahuakesey			Stool Elder	0249561526
Nomo Tetteh Ruben Aborchie			Otsiame	024608822
Francis Amanor Aborchie			Nene Secretary	0244371963
John Sottie Kwabla			Chief Fisherman Messenger	0201297434/ 0547705832
Enoch Teye Otipeseku			Stool Elder	0551334637
Nene Woliatse Joseph Agamah			Chief Fisherman	0244894667
Enoch Teye Otipeseku			Unit Committee Secretary	0244894667
Douglas Sododzi			Youth	0241032992
Teye Petiafo			Youth	0247693497
Bouortey J.Okutu			Fisherman	0245801697
Ga Tettey Okutu			Fisherman	0547989687
Nono Emmanuel Osabutey			Opinion Leader	0245946980
Ahuakesey Victoria			Fishmonger	0553433118
Awisi Okutu			Fishmonger	0554478880
Teye Busia Okutu			-	0548988095

**Focus Group Discussions held at Whuti on 03/07/2020**

NAME	AGE	SEX	OCCUPATION	TEL
Togbi Asiga			Chief	0547734322
Hon. Joseph Kweku Ali			Assembly Member	0545165409
Duncan Yaw Fiase			Regent	0245656622
Christine Hoflelu			Retired Nurse	0248145732
Edwin Awuku			Regent Of Dodzata	0540548407
Dr. C.C Adzaho			Regent	0244175219
Shashie Agnes			Fishmonger	0247443339
Simon Doku			Retired Educationist	0243338355
Tettey Agor Yawo			Fishmonger	0248653275
Tettey Agor Tegboku			Fishmonger	0248653275
Apetugbor Bernice			Fishmonger	0249716797
Aku Kattah			Fishmonger	0548869241
Agboyobu Victoria			Fishmonger	0240863225
Kkoroko Vicky			Fishmonger	0549684089
Janet Davo			Fishmonger	0553685948
Gobotor Gavor			Fishmonger	0558730798
Abube Evenly			Fishmonger	0249716797
Sedohia Hadeffa			Trader	0549684089
Mamavi Kulevome			Fishmonger	0553685948
Afladey Elias			Farmer	0245218871
Agbonyivor Frederick			Farmer	0558730798
Evenly Agbotor			Fishmonger	0242708012
Shashie Veronica			Fishmonger	0247443339
Kuvor Bishop			Farmer	0247639960
Shashie Yevu			Farmer	0247639960
Modzakah Ben			Carpenter	0543305483
Amedzi Agba			Maison	0249064323
Eric Kadzani			Fisherman	0248870955
Shiamatey Sena			Farmer	-
Abla Kattah			Trader	0240863225
Rita Dovulo			Fishmonger	0248653275
Shashie Bridget			Fishmonger	0548869241
Dunyogbevorbi			Fishmonger	-
James Nutakor			Farmer	0243121794
Adiaba Wisdom			Agric Officer	0246229081
Mikado Joseph			Chief Fisherman	0540899063
Fiase Believe			Farmer	0249621416
James Abortsi			Fisherman	0544916273
Akakpavi Besah			Fisherman	0249780010
Atikormeti Seth			Farmer	0249629965
Galley Edward			Fisherman	0247945230
Agbenyegah Michael			Fisherman	0541026237
Abgenyegah Kwaku			Fisherman	-

**WOMEN'S GROUP (VEGETABLES /FISH PROCESSORS) at Lagbati- Anloga**

NAME	AGE	SEX	OCCUPATION	TEL
Badzi Mary Xorve	44	Female	Fish Processors/Monger	0248982607
Davordzi Banini	86	Female	Fish Processors/Monger	0543356703
Agboada Peace	34	Female	Vegetables	0246547497
Badzi Mary	38	Female	Vegetables	0249728309
Agbonyo Peace	53	Female	Fish Processors/Monger	0240084841
Yevuga Beatrice	53	Female	Fish Processors/Monger	0554710842
Zoiku Charity	52	Female	Vegetables	0246671536
Womernor Rose	46	Female	Fish Processors/Monger	0548644092
Adzraku Dzigbordi	51	Female	Fish Processors/Monger	0549940706
Nkornu Mawusi Irene	43	Female	Fish Processors/Monger	0245147922
Kraku Grace	46	Female	Fish Processors/Monger	0242602003
Agboado Gloria Worlanyo	60	Female	Vegetables	0243746896
Abotsi Happy	34	Female	Vegetables	0242160061
Dziekora Kafui	54	Female	Fish Processors/Monger	0542622800
Azidor Abigail	46	Female	Fish Processors/Monger	0550437949
Fianyeku Lucia	44	Female	Fish Processors/Monger	0545003955
Fiagbedzi Mawusi	53	Female	Fish Processors/Monger	0241149141
Agbanyo Evelyn	52	Female	Fish Processors/Monger	0246896370
Amewonorvi Gloria	40	Female	Vegetables	0543228538
Gave Rejoice	44	Female	Fish Processors/Monger	0241838957
Kwawukume Aku	70	Female	Fish Processors/Monger	0555120381
Wemegah Mary	44	Female	Vegetables	0541845947

**NATIONAL FISH PROCESSOR AND TRADERS (NAFPTA) KETA MUNICIPAL ASSEMBLY  
DEKA WORWOR CO-OP FISH PROCESSORS & MARKETING ASSOCIATION-DZITA**

NAME	AGE	SEX	OCCUPATION	TEL
Madam Dzanyiekpor	50	Female	Fish Processors/Monger	0242806099
Mama Afahedo	65	Female	Fish Processors/Monger	0249551209
Aklika Wugbagba	58	Female	Fish Processors/Monger	0559421299
Peace Akorli	24	Female	Vegetables	0558369311
Rita Kpordorlor	40	Female	Vegetables	0541900757
John Wutsikah	35	Male	Fish Processors/Monger	0248614364
Yayra Adedzashie	58	Female	Fish Processors/Monger	0247170598
Yawo Amedeke	40	Female	Fish Processors/Monger	0542797237
Ernestina Dzameshie	34	Female	Fish Processors/Monger	0244125183
Mawushie Seade	24	Female	Fish Processors/Monger	0247962107
Abotsigah Faustina	27	Female	Vegetables	0544230810
Tsoenamawu Kpogo	50	Female	Fish Processors/Monger	0542362960
Nanashie Ngorgbawoshie	56	Female	Fish Processors/Monger	0248614364
Comfort Agbledu	50	Female	Trader	-
Babynayoka Dorah	60		Trader	0246586759

**ANNEX H**

**FEASIBILITY STUDY, RISK SCREENING AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE ADAPTATION FUND PROJECT: « IMPROVED RESILIENCE FOR COASTAL COMMUNITIES IN GHANA »**

**FIELD CONSULTATION QUESTIONNAIRE**

Dear Respondent

The Government of Ghana through the Ministry of Environment, Science Technology and Innovation is implementing a UN HABITAT – ADAPTATION FUND Project for Coastal Communities in Ghana. The overall objective of the project is to address the challenges posed by the combination of climate change and unsustainable urbanization (increasing erosion and coastal flooding) by proposing a comprehensive approach towards reinforcing resilience of coastal communities. It also addresses coastal protection at larger scale ensuring consistency with government’s priorities and action plans.

You have been selected as one of the key stakeholders to volunteer information for the completion of the study to the best of your ability. You are however assured that information provided to complete this study will be treated with the strictest confidentiality.

Thanks in Advance for Participating

Start of Interview (Time).....

End of Interview (Time).....

**A: BACKGROUND INFORMATION**

No.	Question	Answer	No.	Question	Answer
	Name Community Leader/ Individual or Organisation			Town/Village	
	Contact Details and Photo			District	
	Assessment Date			Region	
	Phone number/ Email			Digital Address or Geo-coordinate (if any)	

**B: CHARACTERISTICS OF STAKEHOLDERS/VULNERABLE GROUPS**

**Community profile / group profile**

Stakeholders		Male	Female
Total population (number)			
Number or percentage	< age 14 (children)		
	age 15-24 (youth)		
	age 25-60		
	> age 60 (elderly)		
	People living with disabilities		
	People living with HIV/AIDS		
	Displaced / refugees		
	Indigenous people		
Tribal / ethnic groups			



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

	Other relevant		
Households (number) + average per household			
Poverty rate (%) / average income per month			
Living in informal area or informal status (%)			
Main livelihoods / income type in community			

**C. CLIMATE CHANGE – TRENDS ANALYSIS**

Expected outcome: Agreement on at least one or two climatic hazards, which have most impacted the community / area (Please Tick ✓)

<b>Climate Change hazards</b>	<b>a) In the last 10 years, has the community been affected by:</b>	<b>Has this issue been getting:</b>
Droughts (affecting agriculture, water availability, livestock, etc.)	i) Yes, a Lot, ii) Yes, a Little, iii) No, iv) Not Relevant. v) Can't Say.	i) A Lot Worse, ii) Little Worse, iii) Same, iv) Better, v) Not Relevant, vi) Can't Say
Less rain (affecting agriculture, water availability, livestock, etc.)	i) Yes, a Lot, ii) Yes, a Little, iii) No, iv) Not Relevant. v) Can't Say.	i) A Lot Worse, ii) Little Worse, iii) Same, iv) Better, v) Not Relevant, vi) Can't Say
Extreme heat (affecting agriculture, water availability, livestock, health, etc.)	i) Yes, a Lot, ii) Yes, a Little, iii) No, iv) Not Relevant. v) Can't Say.	i) A Lot Worse, ii) Little Worse, iii) Same, iv) Better, v) Not Relevant, vi) Can't Say
Diseases (e.g. dengue, malaria, diarrhoea)	i) Yes, a Lot, ii) Yes, a Little, iii) No, iv) Not Relevant. v) Can't Say.	i) A Lot Worse, ii) Little Worse, iii) Same, iv) Better, v) Not Relevant, vi) Can't Say
Flooding	i) Yes, a Lot, ii) Yes, a Little, iii) No, iv) Not Relevant. v) Can't Say.	i) A Lot Worse, ii) Little Worse, iii) Same, iv) Better, v) Not Relevant, vi) Can't Say

What problems / effects does your community face because of the one or two most problematic climatic hazards (drought / less rain, heat, health, flood) and how do these affect children, women and girls, the elderly, indigenous people, tribal groups, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS.

**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

Most Problematic Climatic Hazard (See Above)	Problems / Effects (E.G. On Agriculture Food Availability, Domestic Water Use, Income, Etc.)	Who (What Groups: Are Most Affected?)	How Does Hazard Impact The Most Affected Groups?

What stops your community or groups from coping with current impacts of the most problematic climatic hazards (drought / less rain, heat, health, flood)? These can be e.g. lack of knowledge / education, gender roles, lack of skills, lack of money, lack of land tenure, lack of drinking water supply, health issues, bad infrastructure, lack of natural resources like forests, etc.).

.....  
 .....  
 .....

What activities / interventions should take place in order to improve your adaptive capacity to drought / less rain, heat, health, flood (and the effects of these on the community or group and barriers to address these problems)? What is most important for the community or your group?

Most Problematic Climatic Hazard (See Above)	Effect Of Hazard On Community / Group (See Above)	Barriers To Adapt (See Above)	Activity / Intervention (E.G. Training, Technique And / Or Infrastructure (E.G. Water Harvesting))	Ranking Most Important Activity / Intervention

What is the group good at doing or what are the strengths? (e.g. committees, successful projects working together, construction or organizing skills, good connections outside community). 1) How can this be used for addressing issues. 2) Who will be the leader for making this happen? (what community committees can help with this?). If possible project activities / interventions are implemented, what would be possible issues and your main concerns?

.....  
 .....  
 .....  
 .....



**D. POTENTIAL ESP RISKS SCREENING AND IMPACT ASSESSMENT – MISSEN GAPS**

QUESTION	ANSWER/ RESPONSE
Land ownership (private; public), land use (also informally and consent with intervention given?	
Are there vulnerable / critical natural habitats in the target area? If so, describe	
Is there vulnerable biodiversity in the target area? If so, describe	
Are there any fragile soils in the target area? If so, describe Soils that may be impacted by the project/programme; Activities that may lead to loss of soils; Reasons why soil loss is unavoidable and Measures that will be taken to minimize soil loss	
Are there lands that provide ecosystem services in the target area? What are the possible exo-systemic services?	
How will equal access / benefits be ensured?	
What are the benefits of proposed measures to the community, marginalized and vulnerable groups and women and youth?	
Who are responsible for maintenance for each step? What are the arrangements agreed upon by the government and the communities? What is the frequencies of maintenance?	
Description of the environmental context and the main potential environmental issues on the site / in the area (see detailed requirements in questions below)	
Have rivals, disputants and concerns related to equal access of project beneficiaries been identified and are measures in place to avoid these?	
Has the process of allocating and distributing benefits equally (fair and impartial access) been described?	
Have potential adverse impacts that each marginalized and vulnerable group may experience from the activity been identified and have the groups been consulted on specific needs, limitations, constraints and requirements?	
Has the cultural, traditional, religious, or any other grounds that might result in differential allocation of benefits between men and women of the activity been analyzed?	
Has it been determined whether physical or economic displacement is required by the activity and if it is voluntary or involuntary (through identification of land ownership and use (also informally) and consultations on consent to the activity?	
Is awareness building of involuntary resettlement and the applicable principles and procedures of the activity / project part of the project activities?	



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

If it is involuntary: has justification for the need for involuntary resettlement been provided by demonstrating any realistic alternatives that were explored, and how the proposed involuntary resettlement has been minimized and is the least harmful solution.	
If it is involuntary: have details of the extent of involuntary resettlement been described, including the number of people and households involved, their socio-economic situation and vulnerability, how their livelihoods will be replaced, and the resettlement alternatives and/or the full replacement cost compensation required whether the displacement is temporary or permanent?	
If it is involuntary: have the details of the involuntary resettlement process that the activity will apply be described, and the built-in safeguards to ensure that displaced persons will be informed of their rights in a timely manner, made aware of the grievance mechanism, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation? This also should include an overview of the applicable national laws and regulations.	
If it is involuntary: has it been justified that the involuntary resettlement is feasible?	
If it is involuntary: has the adequacy of the activity / project organisational structure to successfully implement the involuntary resettlement as well as the capacity and experience of the project/program management with involuntary resettlement been described?	
Has the potential of activity to impact directly, indirectly, or cumulatively upon natural habitats been identified?	
If such habitats exist, has the location of the critical habitat in relation to the project and why it cannot be avoided, as well as its characteristics and critical value been described?	
If such habitats exist, for each affected critical natural habitat, has an analysis on the nature and extent of the impact including direct, indirect, cumulative, or secondary impacts been provided?	
Has the presence in or near the project/program area of important biological diversity been identified?	
Has the potential of a significant or unjustified reduction or loss of biological diversity, and the potential to introduce known invasive species been identified?	
If important biological diversity exists (Biological diversity), have the elements of known biological diversity importance in the project/program area been described?	
If important biological diversity exists (Biological diversity), has it has been described why the biological diversity cannot be avoided and what measures will be taken to minimize impacts?	
If important biological diversity exists (Invasive species), has it been described the invasive species that either may or will be introduced and why such introduction cannot be avoided?	



**Environmental and Social Impact Assessment for the Adaptation Fund Project: Improved Resilience for Coastal Communities in Ghana (AFB/PPRC.22-23/10)**

<p>If important biological diversity exists (Invasive species), has evidence that this introduction is permitted in accordance with the existing regulatory framework and the results of a risk assessment analyzing the potential for invasive behavior been provided?</p>	
<p>If important biological diversity exists (Invasive species), has it been described the measures to be taken to minimize the possibility of spreading the invasive species?</p>	
<p>When reporting, has a risk-based assessment of resulting increases in the emissions of greenhouse gasses or in other drivers of climate change being conducted?</p>	
<p>Has it been shown how the concept of minimization of resource has been applied in the activity design and how this will be effective during implementation? Are the possible inefficiencies in energy and material resource use and waste and pollution due to project activity?</p>	
<p>Does the activity include preventing waste and pollution by e.g. preparing a waste and pollution prevention and management plan for the activity or whole project/program?</p>	
<p>Has it been demonstrated that the activity will not cause potentially significant negative impacts on public health by screening for possible risks/impacts (related to safe water, clean air, healthy workspace, safe house, communities and roads, employment and working conditions, etc. and including the results of the screening in the Proposal including general project measures to avoid risks?</p>	
<p>Has the presence of heritage in or near the activity been identified? If heritage exists, has the cultural heritage, the location and the results of a risk assessment analyzing the potential for impacting the cultural heritage been described?</p>	
<p>If heritage exists, have the measures to be taken to ensure that heritage is not impacted, and if it is being accessed by communities, how this access will continue described?</p>	
<p>Soil conservation: Has the presence of fragile soils (e.g. soils on the margin of a desert area, coastal soils, soils located on steep slopes, rocky areas with very thin soil) within the activity area been identified?</p>	
<p>Soil conservation: Have activities that could result in the loss of otherwise non-fragile soil been identified. If such soils exist and potential soil loss activities will take place:</p>	
<p>Has the following been Identified and described? Soils that may be impacted by the activity Activities that may lead to loss of soils; Reasons why soil loss is unavoidable Measures that will be taken to minimize soil loss.</p>	

**ANNEX I**

**SAMPLE GRIEVANCE AND RESOLUTION FORM**

**Name (Filer of Complaint): ID Number:**

**Contact Information :** \_\_\_\_\_

**Nature of Grievance or Complaint:**

\_\_\_\_\_ (PAPs ID number) (Village ; mobile phone) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Date** \_\_\_\_\_ **Individuals Contacted** \_\_\_\_\_ **Summary of Discussion** \_\_\_\_\_

Signature \_\_\_\_\_

Date: \_\_\_\_\_

Signed (Filer of Complaint): \_\_\_\_\_

Name of Person Filing Complaint : \_\_\_\_\_ ( if different from Filer)

Position or Relationship to Filer: \_\_\_\_\_

**Review/Resolution**

Date of Conciliation Session: \_\_\_\_\_

Was Filer Present? : \_\_\_\_\_ Yes \_\_\_\_\_ No Was field  
verification of complaint conducted? Yes \_\_\_\_\_ No Findings of field  
investigation: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Summary of Conciliation Session Discussion:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was agreement reached on the issues? Yes \_\_\_\_\_ No \_\_\_\_\_

If agreement was reached, detail the agreement below:

If agreement was not reached, specify the points of disagreement below:

\_\_\_\_\_

Signed (Conciliator): \_\_\_\_\_

Signed (Filer): \_\_\_\_\_

Signed: \_\_\_\_\_

Independent Observer

ANNEX: J

ADAPTATION FUND (AF) PRINCIPLES

2 PRINCIPLES OF THE ENVIRONMENTAL AND SOCIAL POLICY

The diagrams that follow provide a brief overview of the requirements of the 15 Principles of the ESP that projects/programmes funded by the AF must comply with.

1. COMPLIANCE WITH THE LAW



• This principle always applies to a project/programme to ensure that it is compliant with applicable law. Relevant South African legislation must be identified, and necessary permits, licenses, assessments, etc. conducted or obtained.

2. ACCESS AND EQUITY



• The benefits generated by the project/programme should be equitably allocated and distributed among stakeholder groups. A stakeholder mapping should be undertaken to identify groups and existing access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights. Existing inequities should not be exacerbated by the project/programme.

3. MARGINALISED AND VULNERABLE GROUPS



• A process must be undertaken to identify marginalized and vulnerable groups (i.e. children, women and girls, the elderly, indigenous people, tribal groups, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS). Potential negative impacts on groups must be established and managed/mitigated by the project/programme.

4. HUMAN RIGHTS



• This principle always applies to a project/programme to ensure that it observes the requirements of the Bill of Rights in Chapter 2 of the South Africa Constitution. Awareness must be created around human rights during the course of the project/programme.

5. GENDER EQUITY AND WOMEN'S EMPOWERMENT



• A process must be undertaken to identify and disaggregate stakeholders and beneficiaries according to gender. The project/programme should continually ensure that men and women have equal opportunities to participate, receive comparable social and economic benefits, and do not suffer disproportionate adverse effects during the process. The allocation of roles between men and women should also be understood and considered.

6. CORE LABOUR RIGHTS



• This principle always applies to a project/programme to ensure its compliance with national and international labour laws and standards, and that labour rights have been incorporated into the design and implementation.

7. INDIGENOUS PEOPLE



• Identify the presence of indigenous groups that use or have rights to the project/programme area. If present, agreements must be reached with affected community/ies, and incorporated into the design and implementation.

#### 8. INVOLUNTARY RESETTLEMENT



• Involuntary physical and/or economic loss or resettlement must be avoided or mitigated to minimize negative impacts generated by the project/programme. Those affected must be consulted, well informed and offered alternatives or compensation that is fair, equitable and feasible.

#### 9. PROTECTION OF NATURAL HABITATS



• The project/programme must avoid negatively impacting directly, indirectly and/or cumulatively natural habitats. This includes habitats that are legally protected, officially proposed for protection, **recognised** by authoritative sources for their high conservation value, or **recognised** as protected by traditional or indigenous local communities.

#### 10. CONSERVATION OF BIOLOGICAL DIVERSITY



• The project/programme must avoid negatively impacting directly, indirectly and/or cumulatively biological diversity, critical biodiversity areas and/or species of special concern. Impacts include significant or unjustified reduction or loss of biological diversity and the introduction of known invasive species. The relevant national **authorisation/s** must be obtained.

#### 11. CLIMATE CHANGE



• Projects/**programmes** must not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change. If the potential risk is high or moderate, the project/programme cannot proceed and should therefore be redesigned.

#### 12. POLLUTION PREVENTION & RESOURCE EFFICIENCY



• Maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants must be incorporated into the project/programme design. Mitigation and management must be defined to avoid inefficient resource use and water generation.

#### 13. PUBLIC HEALTH



• A rapid assessment and systematic public health screening must be undertaken to assess potential negative impact/s arising from the project/programme. Mitigation or management of identified impacts must be incorporated into the project/programme design and implementation.

#### 14. PHYSICAL AND CULTURAL HERITAGE



• A process must be undertaken to identify the presence of physical and/or cultural resources, cultural sites, and/or sites with unique natural values recognized at local community, national or international level been assessed. The project/programme should also not permanently interfere with existing access and use of such resources.

#### 15. LAND AND SOIL CONSERVATION



• An assessment must be undertaken of the potential of the project/programme to negatively directly, indirectly and/or cumulatively impact soil and productive land that provides valuable ecosystem services. Soil conservation must be promoted and degradation or conversion of productive lands or land avoided.

**ANNEX K**

**LETTER OF CONSENT – DISOPOSAL OF DREDGE MATERIAL**



**ADA EAST DISTRICT ASSEMBLY**



My Ref No.: A.E.D.A.  
Your Ref. No.:  
Tel:

Office of the District Administration  
Post Office Box 20  
Ada - Foah

**21<sup>ST</sup> AUGUST, 2020**

**LETTER OF CONSENT**

The Ada East District Assembly in partnership with the UN-Habitat / The Development Institute are working to improve resilience in coastal communities in the Volta Delta.

The intervention is to clean and restore some selected lagoons in the District and this exercise requires sites to hold and treat dredge materials or spoils for any further action.

We humbly wish to state that the District has a final refuse disposal site located at Kunyanya which could be used for such a purpose and we are fully willing to give out for the project to use towards building resilience in our District.

Counting of your usual cooperation.

A handwritten signature in black ink, appearing to be 'Ntim Gyarko', written over a dashed horizontal line.

**MR. NTIM GYARKO  
DISTRICT DEVELOPMENT PLANNING OFFICER  
FOR: DISTRICT CHIEF EXECUTIVE**

ANNEX L



**THE DEVELOPMENT INSTITUTE**  
EMPOWERING PEOPLE FOR SUSTAINABLE DEVELOPMENT

December 4, 2020.

THE CHIEF/COMMUNITY LEADER  
UN HABITAT PROTECT COMM.  
VOLTA DELTA

Dear Sir,

**LETTER OF COMMITMENT AND COMPLIANCE: "IMPROVED RESILIENCE OF COASTAL COMMUNITIES AGAINST IMPACT OF CLIMATE CHANGE IN GHANA AND COTE D'IVOIRE" PROJECT**

The UN Habitat in collaboration with The Development Institute undertook several missions to develop and elaborate on the project, titled "Improved Resilience of Coastal Communities against Impact of Climate Change in Ghana and Cote d'Ivoire" from 2017 till date. The projects seek to build resilience of coastal communities against impacts of climate change through nature-based solutions.


During several engagements with you and your communities within three selected districts (Keta Municipal, Ada East and Ada West), we received your buy-in on the interventions for the three beneficiary districts (Keta Municipal, Ada East and Ada West) that were suggested which includes; Lagoon restoration, Community based fisheries development (pen culture), mangrove restoration, salt resilient crop farming and Land use and spatial planning.

These proposed interventions necessitated series of stakeholder consultations to address issues that may arise during project implementation. This was to also ascertain the community's acceptance in relation to the various interruptions and inconvenience a particular intervention might pose during implementation. The intervention will also make use of land and its surrounding for which we will require a consent or approval from your community.

It is based on the above concerns that we seek your approval and consent to fully establish your commitment to enable the fulfilment and successful implementation of the project.

Again, thank you for your commitment and being part of the process to building resilience in your community.

Yours Sincerely,

  
Kerri Kinney,  
(Executive Director)



Post Office Box AN11613, Accra-North, Ghana. Tel: + 233(0302)541890/1. Mobile: +233-20-8192239  
E-mail: di@thedevelopinstitute.org / kkinney@thedevelopinstitute.org. Website: www.thedevelopinstitute.org  
OFFICE LOCATION: BLOCK 55A2 SSNIT FLATS, ADENTA, ACCRA-GHANA.



**Declaration:**

We understand that our role as members of the Community is significant to the success of the project.

We look forward to working with this project; "Improved Resilience of Coastal Communities against Impact of Climate Change in Ghana" and like the other districts and communities,

We hereby declare that we will;

1. Support the Mission, Vision and Goals of the "Improved Resilience of Coastal Communities against Impact of Climate Change in Ghana" project;
2. Offer all the necessary resources such as land, labour and to ensure the safety and success of the various interventions;
3. Contribute significantly to project activities and assist in achieving expected goals;
4. Work with the rest of the partnership to communicate information concerning the project to the communities at large;
5. Attend in person all meetings held in relation to the "Improved Resilience of Coastal Communities against Impact of Climate Change in Ghana" Project and will continually communicate with the Community and all Partners and the implementers to ensure we understand all affairs related to the it; and
6. Actively participate in all request for our assistance and response.

We have read and fully agree to this Letter of Commitment and look forward to assisting the partnership in this role.

Signed By: **Chief/ Community Leader of Dzita**

Name AGBOTA DUA AHEVI

Signature Agbotadua Ahevi

**Witness:**

Name FRANCIS NORMAN

Signature [Signature]

**Chief/ Community Leader of Agbledomi**

Name TORBI AZANGI

Signature [Signature]

**Witness:**

Name HON. JASPER AGBANMATE

Signature Jasper



**Witness:**

Name Hon. Joseph Kwaku Ahi

Signature 


**Chief/ Community Leader of Lagbati/Lashibi**

Name Agbottah Ernest

Signature 

**Witness:**

Name Akley Stephen

Signature 

**Chief/ Community Leader of Woe**

Name Daniel Afordoanyi

Signature 

**Chief/ Community Leader of Tegbi**

Name Hon. Noel Kokoroko

Signature 

**Witness:**

Name Daniel Asbada

Signature 

**Chief/ Community Leader of Vodza**

Name Hon. Christopher Mensah

Signature 

**Witness:**

Name Joshua Agbezutor

Signature 

**Chief/ Community Leader of Atiteti/Fuveme**

Name Moses Tana Akorli Signature 

Name Hon. Raphael Afovea Signature 

**Witness:**

Name AKORLI SIMON Signature 

**Chief/ Community Leader of Wokumagbe**

OFFICE OF THE CHIEF  
OF WOKUMAGBE  
TEL: 02401818815

Name NENE ADJURKEY SIAM VII Signature 

**Witness:**

Name MARTIN FREDERICK DODZI Signature 

**Chief/ Community Leader of Akplabanya**

Name NENE IOSES ANKREH KUCHER LARMA VII Signature 

**Witness:**

Name HON. FREDERICK I NENI Signature 


**Chief/ Community Leader of Goi**


Name NENE ISANUMETE OMPSEKUM III Signature 


**Witness:**


Name HON. JOHN AKWATE TSURI Signature 


**Chief/ Community Leader of Whuti**

Name TORGAN ASIGE IV Signature 

**Chief/ Community Leader of Kewunor**  
for Honourable Roselyn Olevkie  
Name ----- Signature ----- 

**Witness:**  
Name Amas Amesimeku ----- Signature ----- 

**Chief/ Community Leader of Azizanya**  
Name Nene Gaba Nantey III ----- Signature ----- 

**Witness:**  
Name Amas Amesimeku ----- Signature ----- 



January 15, 2021.

Executive Director  
Environmental Protection Agency  
P. O. Box M. 326  
Accra.



Dear Sir,

**ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) FOR THE ADAPTATION FUND PROJECT: IMPROVED RESILIENCE FOR COASTAL COMMUNITIES AGAINST IMPACTS OF CLIMATE CHANGE IN SOME SELECTED COMMUNITIES IN KETA MUNICIPAL, ADA EAST AND WEST DISTRICTS IN GHANA (AFB/PPRC.22-23/10)**

We refer to your letter CU 2092/01/01 dated March 23<sup>rd</sup>, 2018 on the above subject requesting us to prepare and submit the Environmental and Social Management Framework (ESMF) for proposed Adaptation Fund Project: **"Improved Resilience for Coastal Communities against Impacts of Climate Change in some selected communities in Keta Municipal, Ada East And West Districts in Ghana"**.

Please find attached two (2) bound hard copies of the ESMF for your review, comments and approval.

Thank you.

Yours Sincerely,

Ken Kinney.  
(Executive Director)