GOVERNMENT OF GHANA

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CLIMATE RISK ASSESSMENT AND INVESTMENT PRIORITIZATION IN ACCRA, GHANA COASTAL ZONE: BUILDING RESILIENCE FOR A SUSTAINABLE FUTURE

JOHN KISSI

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Outline of Presentation

- HYDRO INTRODUCTION
- COASTAL REGIONS OF GHANA
- LOCAL RISKS & CHALLENGES
- COASTAL PROTECTION WORKS
- CLIMATE ADAPTATION INVESTMENT PRIORITIES IN ACCRA
- PRIORITY 1: GAMA COASTAL PROTECTION AND CLIMATE RESILIENCE
- PRIORITY 2: FLOOD FORECASTING AND MANAGEMENT TO CREATE CLIMATE RESILIENCE
- CONCLUSION

Introduction

- Ghana Hydrological Authority (HYDRO) is the state institution established by an ACT of Parliament (ACT 1085) in 2022 under the Ministry of Works and Housing (MWH) with the responsibility for monitoring all rivers and surface water bodies in Ghana; providing engineering consultancy services in hydrology, water resources, drainage engineering, coastal engineering and related fields for the Government of Ghana.

Technical Sections of Hydro:

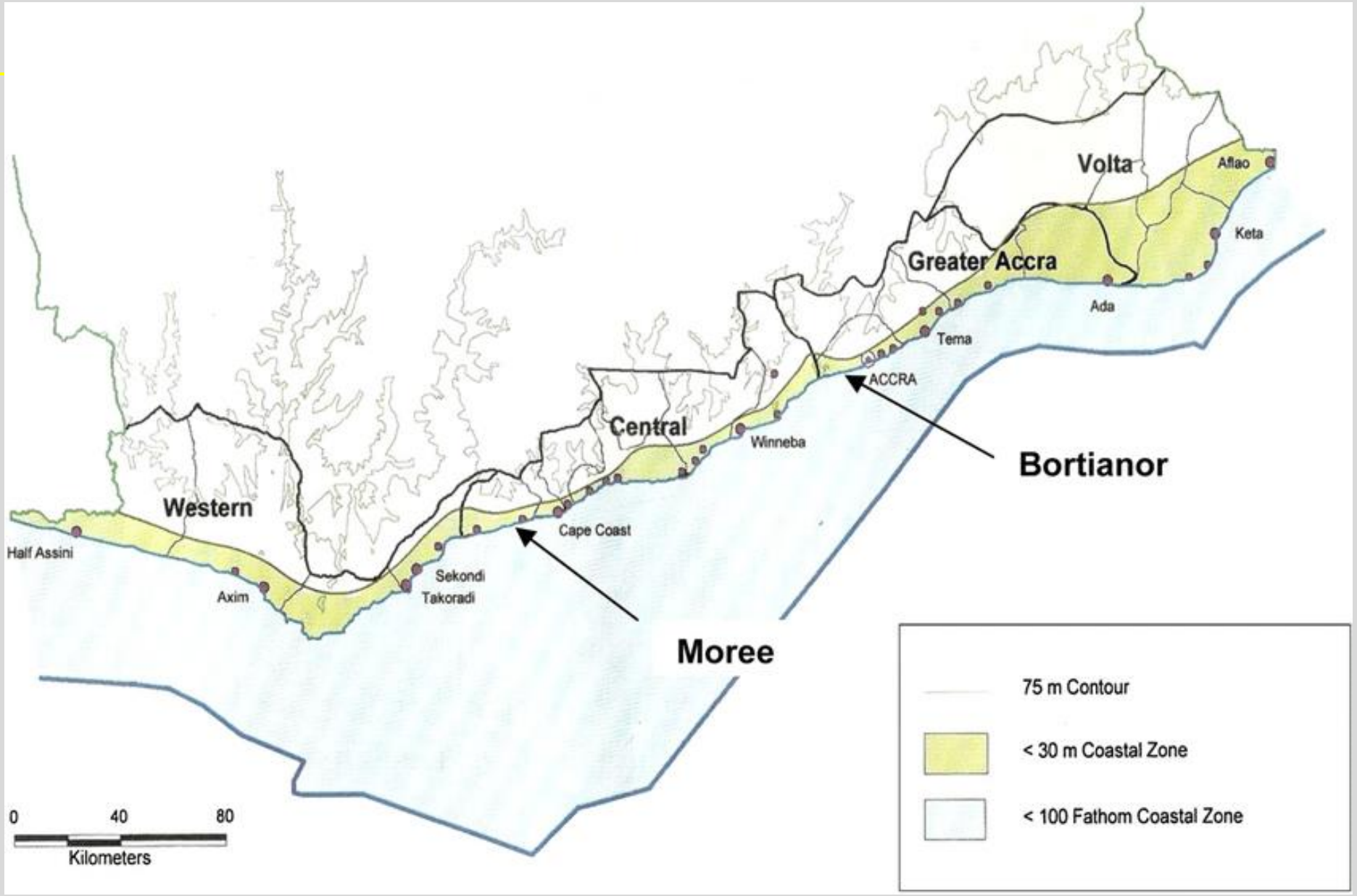
- *Drainage and Flood Control Works*
- *Coastal Protection Works*
- *Operational and Applied Hydrology*
- *Land and Hydrographic Survey*
- *Quantity Survey*

COASTAL REGIONS

Coastal Regions

WESTERN REGION approx. 195km coastline length	CENTRAL REGION approx. 142km coastline length	GREATER ACCRA approx. 131km coastline length	VOLTA REGION approx. 79km coastline length
Coastal towns: • *Axim* • *Sekondi – Takoradi* • *Dixcove* • *Busua* • *Half Assini* • *Akwidaa*	*Coastal towns:* • *Cape Coast* • *Elimina* • *Winneba* • *Apam* • *Anomabo* • *Senya Beraku* • *Gomoa Fetteh*	*Coastal towns:* • *Accra* • *Ada* • *Ningo – Prampram* • *Teshie* • *Tema* • *Osu* • *Nungua* • *Labadi* • *Dansoman*	*Coastal towns:* • *Keta* • *Ada Foah* • *Aflao* • *Keta-Angaw* • *Anyanui* • *Denu*

MAP OF COASTAL ZONE OF GHANA



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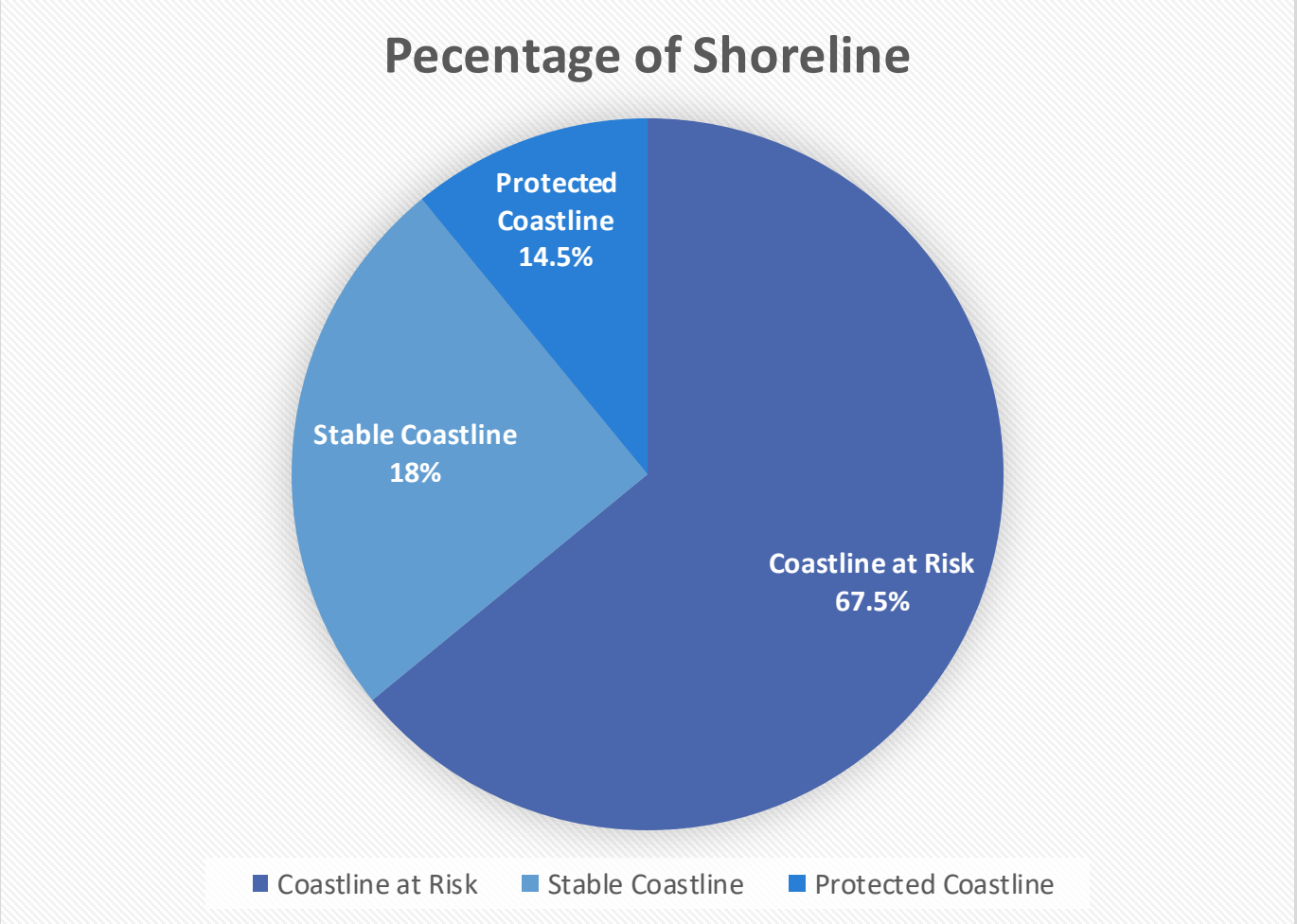
Details of coastal protection works in coastal regions

Protected Coastline	Stable Coastline	Coastline at Risk
80km	100km	370km



COASTAL PROTECTION

Local Risks & Challenges

- Inadequate funding for Coastal Protection works and research
- Inadequate emergency response and
- Lack of coastal floods early warning systems
- Natural Challenges: Storm surge, sea level rise, high tidal wave
- Inadequate sensitization of local communities on human activities causing coastal erosions. Eg illegal sand winning
- Loss of lives, properties and livelihoods in coastal communities
- Environmental degradation of coastal areas

Local Risks & Challenges

- Interaction between Surface Water, Riverine and Tidal Flooding.

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Coastal Protection Activities

- Monitors the country's coastline
- Investigating coastal erosion problems.
- Design and supervision of coastal protection schemes.
- Measures: Revetments, Groynes, Breakwater, Gabions and Jetties

Hard Engineering measures

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Armour Rock Breakwater and Revetment Protection at Axim coastline - **Completed**

Dansoman Sea Defense Project

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Anomabo Coastal Protection Project

- *82% COMPLETE*

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New Takoradi Coastal Protection Project (Phase III) at Elmina

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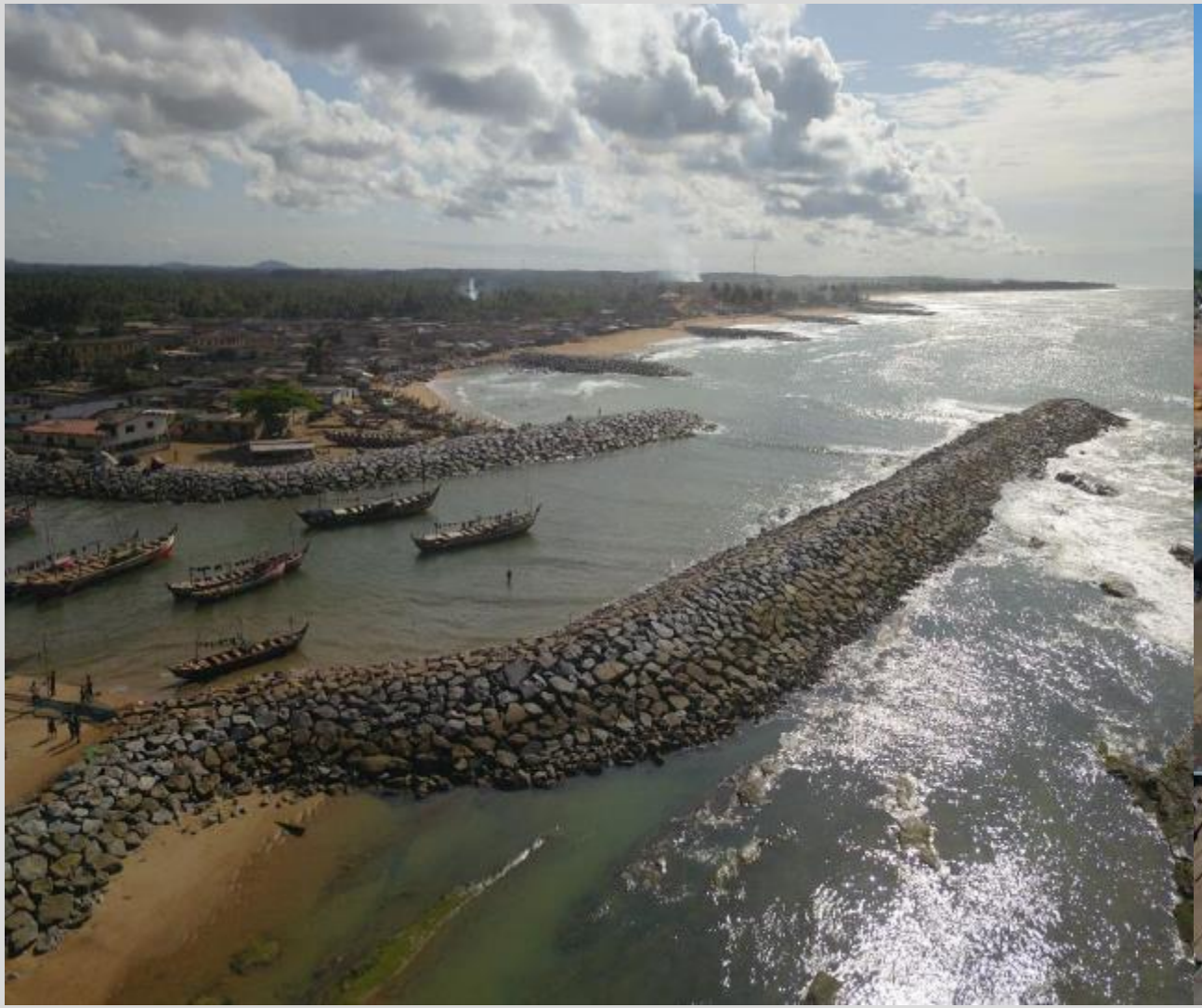
The **5km** project is currently **85% complete**

Komenda Coastal Protection Project



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The **3km** project is currently **95% complete.**

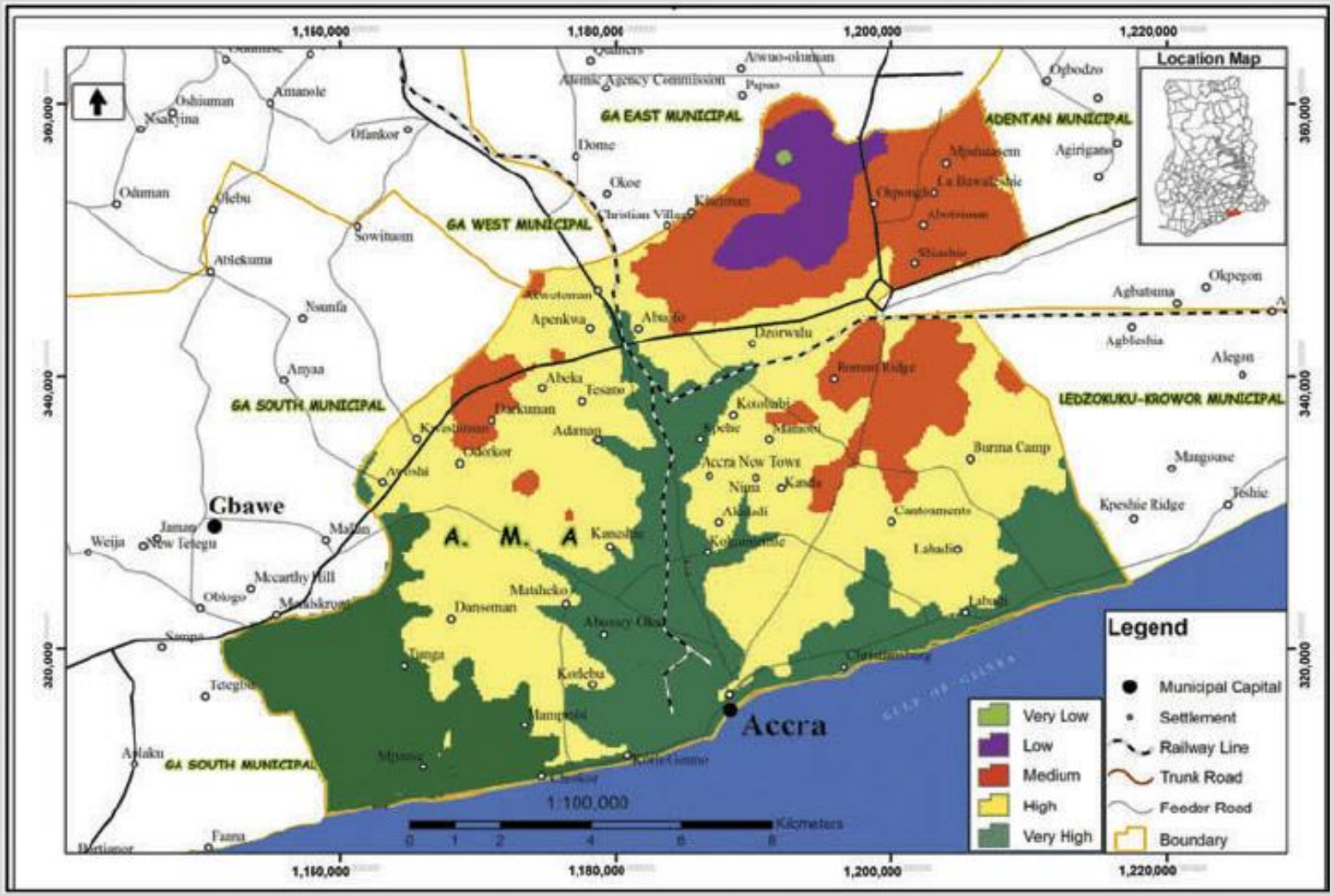
CLIMATE RISK ASSESSMENT AND INVESTMENT PRIORITIZATION

OVERVIEW OF ACCRA COASTAL ZONE

GREATER ACCRA approx. 131km coastline length

Some Coastal towns include: Accra, Ada, Ningo – Prampram, Teshie, Tema, Osu, Nungua, Labadi and Dansoman

Area of focus is the Greater Accra Metropolitan Assembly (GAMA)



Flood risk map of Accra Metropolitan Area (City of Accra). Source: Centre for Remote Sensing and GIS (CERSGIS), University of Ghana, Accra, July – August 2013.

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VULNERABILITY OF ACCRA

- Accra's low-lying topography;
- High levels of seasonal rainfall and occasional high intensity rainfall within the city;
- Rising sea levels due to climate change;
- Increased incidence in tidal waves and storm surges
- Increasing rate of coastal erosion.

FLOOD AND EROSION MANAGEMENT

Flood Management:

- The GAMA+ area is projected to see an increase in floods due to torrential rains, storm surges, coastal erosion and sea-level rise.
- Need to establish a pro-active and integrated approach to managing flood hazards and risks

Erosion:

- Coastal erosion arising from sea-level rise due to climate change is affecting coastal and delta communities in GAMA+.
- Soil erosion in GAMA+ watersheds is increasing due to high climate variability with intense rainfall, and land-use and cover change.
- Addressing erosion hot-spots, particularly on the coast, will be important to build resilience and adapt to climate change.

CLIMATE CHANGE IMPLICATIONS

- **Sea-level rise** – Inundation and displacement of wetlands, lowlands coastal erosion, increased storm flooding, shorelines changes, salinization, rising water tables and impeded drainage.
- **Precipitation intensity** – increased flood risks in coastal lowlands
- **Physical Impacts:** damage to critical infrastructure, interrupted access for emergency services, degradation of building materials and structures
- **Social Impacts:** threat to life, decreased agricultural production, health risk,
- **Economic impacts:** loss of livelihoods/income, loss of employment in marine industries, depleted resources
- **Environmental Impacts:** damage to ecosystem, pollution, impact on biodiversity

FLOOD AND EROSION MANAGEMENT

CURRENT STATUS:

- Coastal erosion and sea level rise has led to the loss of coastal infrastructure
- Estimated sea level rise rate of 3.32 mm/year
- The ocean claims between 1.5 to 4 meters of the national coastline annually.
- Historically, the Accra shoreline has been eroding in most places at an average rate of -1.11 m/year (1974-2014).

FUTURE OUTLOOK:

- With global warming sea level rise is projected to increase by up to ca. 35 mm per year, leading to further coastal erosion and flooding.
- Based on recent modelling, the Ghana shoreline position will have receded inland by an average of 52 m by 2080 .
- This implies an average rate of inland advance of the shoreline of 2.7 m/year: more than double the past baseline rate of erosion.

MEDIUM TERM NATIONAL DEVELOPMENT POLICY FRAMEWORK (2022 – 2025) OF GHANA

Medium-term policy objective: **"Improve coastal and marine management".**

Relevant Climate adaptation strategies include:

- Promote investment in hard control structures including gabions and boulders;
- Promote an integrated approach to reducing coastal floods, erosion and degradation involving all relevant stakeholders;
- Facilitate effective inter-agency coordination of coastal management programmes;
- Support the development of comprehensive coastal development, planning and regulatory frameworks.

CLIMATE ADAPTATION INVESTMENT PRIORITIES

- World Bank financed Greater Accra Resilient and Integrated Infrastructure Development Project (GARID)
- African Development Bank-financed Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP)
- West Africa Coastal Areas Resilience Investment Program (WACA) – Sustainable measures
- Initial stages for West Africa Coastal Inundation Forecasting Initiative (WA-CIFI)
- Initiation of the Ghana Delta program to build a long-term, solid multi scale, multi stakeholder, multi sector framework to deal with present and upcoming delta issues.

CLIMATE ADAPTATION INVESTMENT PRIORITIES

	Project Costs		Investment Opportunity	
	Development Phase	Full Project	Development Phase	Full Project
	million USD	million USD	Million USD	million USD
Priority 1: GAMA coastal protection and climate resilience	6.2	156.2	6.2	130.0
Priority 2: Flood forecasting and management to create climate resilience	0.3	12.9	0.3	8.0
Priority 3: Densu river basin and delta adaptation to climate change	1.1	72.6	1.1	60.0
Priority 4: GAMA climate resilient water supply	2.7	103.5	2.7	80.0
Priority 5: LIUC revitalisation and climate adaptation program	1.7	57.4	1.7	45.0
Priority 6: A climate resilient Accra through improved urban drainage	0.4	64.0	0.4	55.0
Total (million USD)	**12.4**	**466.6**	**12.4**	**378.0**

CLIMATE ADAPTATION INVESTMENT PRIORITIES

GAMA COASTAL PROTECTION AND CLIMATE RESILIENCE

Investment Opportunity

Project Type:	**Coastal defense against climate change induced sea-level rise and coastal erosion**
Size:	Floods: 75 km coastline (GAMA) protection; Projected erosion due to sea level rise: 2.7 meters / year
Location:	Coastal areas along GAMA's coast line, Ghana
Initial Estimated Total Project Costs:	CAPEX: USD 156 million
	Development Costs: USD 6.2 million
Total External Funding Required:	CAPEX: USD 130 million
	Development Phase: USD 6.2 million
Sector:	Floods & Erosion
Development Status:	Early
Potential Financing Sources:	Existing project, Government budget, Bilateral donor, Multilateral donor, Foundation/grant & Climate finance
Potential beneficiaries	2.3 million people
Lead Government Agency	Ghana Hydrological Authority with GAMA RCC and Ministry of Works and Housing
SDG focus:	11. Make cities and human settlements inclusive, safe, resilient and sustainable.
Development and Poverty Reduction Potential:	Coastal protection from sea-level rise and erosion supports the development of Low-Income Urban Communities (LIUCs) in GAMA.

GAMA COASTAL ZONE PROTECTION AND CLIMATE RESILIENCE

Key Components

- Component 1. Hydrodynamic model for GAMA coast and Pre-feasibility Study report to underpin decision for GAMA coastal defence project
- Component 2. Feasibility study, detailed design, RFP documentation, tender and contractor(s) selection
- Component 3. Operational Sand-Motor, mangroves, and other infrastructure for GAMA coastal defence and resilience
- Component 4. Ghana Hydrological Authority to develop and use its full capacity to monitor the effectiveness of the constructed measures in the GAMA coastal area

CLIMATE ADAPTATION INVESTMENT PRIORITIES

FLOOD FORECASTING AND MANAGEMENT TO CREATE CLIMATE RESILIENCE

Investment Opportunity

Project Type:	**Hydro-Met network, Early Warning System, Flood Disaster Response and Resilience Platform**
Size:	Floods – Early warning for ca. 3,000km2
Location:	GAMA
Initial Estimated Total Project Costs	Full Project: USD 12.9 million
	Development Costs: USD 300,000
Total External Funding Required:	Full Project : USD 130 million
	Development Phase: USD 6.2 million
Sector:	Water Resources & Floods
Development Status:	Mid
Potential Financing Sources:	Existing project, Government budget, Bilateral donor, Multilateral donor & Climate finance
Potential beneficiaries	2.27 million people
Lead Government Agency	Ghana Hydrological Authority, NADMO, Water Resources Commission, Ghana Meteorological Services
SDG focus:	11.b Substantially increase holistic disaster risk management at all levels 13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disaster
Development and Poverty Reduction Potential:	Early warning systems and disaster response reduce the impact of flood disasters on downstream vulnerable communities living in flood prone areas

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FLOOD FORECASTING AND MANAGEMENT TO CREATE CLIMATE RESILIENCE

Key Components

- Component 1. Operational Hydro-Met network and DTM for Upper Densu basin and GAMA
- Component 2. Hydro-Meteorological models and set-up commercial hydro-met services
- Component 3. Flood forecasting & early warning system for GAMA+
- Component 4. Flood emergency response system for GAMA+
- Component 5. Flood Resilience Platform and Media 'climate-urbanisation-resilience

Conclusion

- Enhanced resilience and reduced vulnerability to climate-related impacts.
- Protection of vulnerable communities, infrastructure, and economic activities.
- Ghana Hydrological Authority to have enhanced capacity to engage other stakeholders in implementing climate-resilient strategies, and
- Focus on seeking funding for investment in coastal and climate adaptations and management strategies.

Thank You.