



The Cape Coast Metropolitan Assembly Climate Adaptation Plan: Ghana

August 2025



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Executive Summary

The Cape Coast Metropolitan Assembly Climate Action Plan (CCMA-CAP) is a strategic framework developed to address the escalating climate risks facing the Cape Coast Metropolitan Assembly. The metropolis, with its rich historical heritage and diverse socio-economic profile, is highly exposed to hazards such as tidal flooding, coastal erosion, saltwater intrusion, extreme heat, and erratic precipitation. These threats endanger critical infrastructure, public health, livelihoods, and ecosystems.

While Cape Coast Metropolitan Assembly's location as an administrative, educational, and tourism hub offers significant advantages, its proximity to the Atlantic Ocean also renders it vulnerable to sea-level rise and storm surges. These challenges are further exacerbated by rapid urbanization, informal settlements, land-use changes, and inadequate infrastructure. In response, the CCMA, in collaboration with national and international partners, has initiated this Climate Action Plan to enhance urban resilience, safeguard development gains, and chart a sustainable path forward.

The CCMA-CAP builds directly on the findings of the Cape Coast Climate Vulnerability Assessment (CCVA), which identified sector-specific vulnerabilities, community-level risks, and spatial hotspots of climate exposure. It also aligns with Ghana's National Adaptation Plan (NAP) process, the updated Nationally Determined Contributions (Ministry of Environment, Science, Technology and Innovation [MESTI], 2021) under the Paris Agreement, and the Sustainable Development Goals (SDGs), particularly those related to climate action, sustainable cities, and reduced inequalities.

The plan identifies eight core thematic sectors requiring targeted adaptation interventions:

1. Water and sanitation
2. Health
3. Agriculture
4. Gender and livelihoods
5. Infrastructure and human settlements
6. Tourism and cultural heritage
7. Trade, industry, and finance
8. Forestry, biodiversity, and ecosystems

Each sector-specific adaptation action was co-developed through multistakeholder consultations, incorporating the voices of fisherfolk, women traders, youth organizations, public servants, traditional authorities, and academic institutions. A rigorous multi-criteria decision-making tool was used to rank and prioritize the most impactful, feasible, and inclusive adaptation options.

Key adaptation priorities include:

- Upgrading drainage systems and enforcing urban zoning to reduce urban flooding

- Promoting climate-smart agriculture and small-scale irrigation in peri-urban farms
- Protecting heritage tourism sites through coastal infrastructure and eco-based buffers
- Enhancing public health readiness through resilient clinics and water safety programs
- Supporting women's cooperatives and youth enterprises with green finance tools
- Restoring mangroves, wetlands, and urban forests to provide natural climate buffers

To ensure successful and sustainable implementation, the CCMA-CAP integrates a strategic funding and investment framework. This framework outlines a mix of financial pathways—including government allocations, international climate funds, public-private partnerships, and innovative tools like green bonds and micro-finance. It sets clear prioritization criteria focused on impact, equity, feasibility, urgency, and co-benefit potential.

The plan is further strengthened by a detailed monitoring, evaluation, and learning framework that ensures ongoing data collection, stakeholder feedback, and adaptive management. Indicators span infrastructure performance, gender equity, environmental health, and community engagement—ensuring that interventions remain accountable, responsive, and transparent.

The CCMA-CAP represents a shared vision and strategic commitment to reimagining Cape Coast as a resilient, inclusive, and future-ready coastal metropolis. The plan aligns the metropolitan assembly's local aspirations with Ghana's national development objectives and the broader principles of global climate justice.

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Abbreviations and Acronyms

AfDB	African Development Bank
CCMA	Cape Coast Metropolitan Assembly
CCMCAP	Cape Coast Metropolitan Climate Action Plan
CCVA	Cape Coast Vulnerability Assessment
CSOs	Civil Society Organizations
DACF	District Assemblies Common Fund
EPA	Environmental Protection Authority
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
GIIF	Ghana Infrastructure Investment Fund
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoG	Government of Ghana
IPCC	Intergovernmental Panel on Climate Change
MCDM	multi-criteria decision making
MEL	monitoring, evaluation, and learning
MESTI	Ministry of Environment, Science, Technology, and Innovation
MoFA	Ministry of Food and Agriculture
MTDP	Medium-Term Development Plan
NAP	national adaptation plan
NCCP	National Climate Change Policy
NDPC	National Development Planning Commission
NDC	nationally determined contribution
NGO	non-governmental organization
PES	Payments for Ecosystem Services
PPP	public-private partnership
SDGs	Sustainable Development Goals
UNFCCC	United Nations Framework Convention on Climate Change
WRC	Water Resources Commission

1.0 About the Cape Coast Metropolitan Assembly Climate Adaptation Plan

1.1 Introduction

Cape Coast Metropolis, located in Ghana’s Central Region, is distinguished by its rich colonial legacy, bustling coastal communities, and diverse economic activities. However, its geographic setting and socio-economic composition make the metropolis particularly vulnerable to the adverse effects of climate change. As with many urban coastal zones across West Africa, Cape Coast Metropolis faces a compounding array of climate-related risks, including sea-level rise, increasing temperatures, accelerated coastal erosion, saltwater intrusion, and a heightened frequency of extreme weather events.

These climatic pressures extend beyond environmental degradation, posing systemic threats to public health systems, food security, housing infrastructure, cultural heritage, and local livelihoods. Vulnerable populations—particularly women, children, and low-income households—disproportionately bear the brunt of these impacts, exacerbating existing inequalities. The intersection of these challenges underscores the need for integrated, evidence-based, and participatory climate adaptation strategies that align with sustainable development priorities.

The Cape Coast Metropolitan Assembly Climate Action Plan (CCMA-CAP) is a strategic framework developed to address the distinct vulnerabilities and climate risks confronting the Cape Coast Metropolis. Situated along Ghana’s central coastline and renowned for its historical landmarks, thriving tourism, and educational institutions, the Metropolis occupies a unique socio-ecological corridor where urban pressures and coastal fragility intersect. However, this dynamic urban fabric is increasingly threatened by a suite of climate-induced hazards—including coastal erosion, tidal flooding, rising temperatures, saltwater intrusion, and intense rainfall events—which jeopardize livelihoods, public health, infrastructure, and the preservation of cultural heritage.

The formulation of this plan is grounded in the findings of the Cape Coast Metropolitan Assembly Climate Change Vulnerability Assessment (CCMA-CCVA). Employing a multidisciplinary methodology that integrates climate data analysis, geospatial mapping, and community-based participatory tools, the CCMA-CCVA identified critical exposure hotspots, mapped sectoral vulnerabilities, and assessed the adaptive capacities of institutions and communities. The action plan design further draws on robust stakeholder consultations, capturing diverse perspectives from local authorities, fisherfolk associations, youth groups, academia, traditional leaders, and private sector actors, ensuring that proposed interventions are inclusive, context-specific, and socially legitimate.

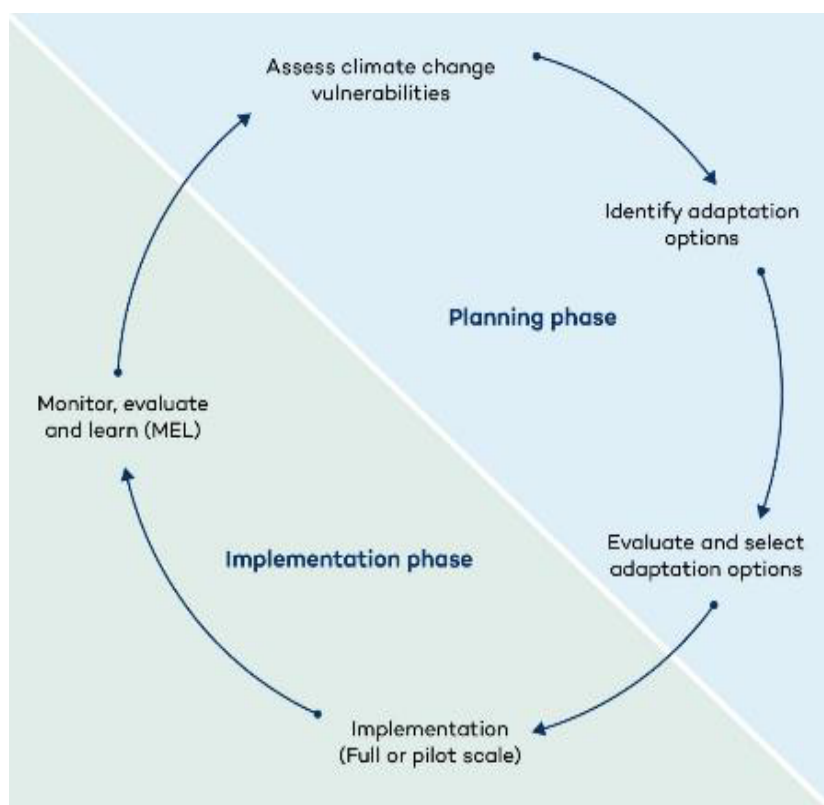
Anchored within Ghana’s broader climate policy architecture and aligned with the National Adaptation Plan (NAP) framework, the CCMA-CAP offers strategic direction to mainstream climate resilience into Cape Coast Metropolitan Assembly’s development priorities. It also provides a roadmap for leveraging national climate funds, international climate finance mechanisms, and blended investments—positioning the metropolis to build long-term resilience through partnerships and

innovation. Above all, the plan champions equity, sustainability, and participatory governance as guiding principles to confront the accelerating challenges of climate change.

The CCMA-CAP is structured around four core focus areas (See Figure 1):

1. **Risk assessment and vulnerability analysis:** This section presents a comprehensive overview of climate hazards affecting Cape Coast—such as sea-level rise, urban flooding, and heat stress—and analyzes their impacts on critical sectors including infrastructure, tourism, water, sanitation, health, fisheries, and agriculture. The assessment serves as the evidence base for identifying priority interventions.
2. **Stakeholder engagement:** Recognizing the importance of collective action, the plan emphasizes inclusive engagement with local stakeholders. Special attention is given to the needs and voices of vulnerable populations, including women, youth, and informal workers, ensuring that adaptation efforts are equitable and grounded in lived realities.
3. **Implementation of adaptation measures:** The plan outlines practical, locally driven solutions such as coastal protection initiatives, drainage rehabilitation, climate-resilient urban planning, and nature-based solutions. It also proposes early warning systems and public awareness programs to enhance adaptive behaviour.
4. **Monitoring and evaluation (M&E):** A robust M&E framework is embedded in the plan to track progress, evaluate effectiveness, and enable adaptive management. This ensures that the CCMA-CAP remains responsive to evolving climate scenarios and socio-economic conditions, and that successes and lessons are shared across scales.

Figure 1. Approach to the Cape Coast Metropolitan Assembly adaptation planning



Source: Authors.

1.2 Identification and Compilation of Sector-Specific Adaptation Actions

The Cape Coast Metropolitan Climate Action Plan presents a locally grounded and evidence-based framework for strengthening the city's capacity to adapt to climate change. Given the increasing threats of flooding, coastal erosion, water stress, heatwaves, disease outbreaks, and the vulnerability of economic sectors like tourism and agriculture, a deliberate and participatory process was used to identify and prioritize adaptation actions that are technically feasible, socially acceptable, environmentally sound, and gender responsive.

The process was underpinned by the Cape Coast CCVA, which provided critical insight into the sectors most exposed to current and future climate risks. Through a multi-criteria assessment (MCA) involving community stakeholders, technical experts, and government institutions, specific adaptation options were evaluated across parameters such as effectiveness, affordability, institutional and technical feasibility, traditional and social acceptance, gender responsiveness, equity, and replicability.

The outcome of this process is a set of sector-specific adaptation actions that align with both district development priorities and national climate strategies, particularly Ghana's National Adaptation Plan (NAP). These measures form the backbone of the Cape Coast climate resilience agenda.

1.2.1 Agriculture Sector

While agriculture is not the metropolis' dominant economic activity, it remains critical for peri-urban food security and vulnerable livelihoods. Climate variability threatens crop yields, post-harvest quality, and market access.

Priority adaptation options include:

- climate-smart agriculture practices
- capacity building and farmer organizations
- improved market access and connectivity
- livelihood diversification for resilience
- water management and irrigation systems

1.2.2 Water and Sanitation Sector

Cape Coast's growing water insecurity and sanitation challenges are worsened by flooding, pollution, aging infrastructure, and saltwater intrusion. Stakeholders prioritized actions that protect water ecosystems, diversify supply sources, and improve governance.

Priority adaptation options include:

- community water management and education
- environmental regulation and monitoring

- watershed protection and restoration
- integrated waste and sanitation systems
- rainwater harvesting and storage

1.2.3 Health Sector

Climate change has increased the incidence of vector-borne diseases, heat-related illnesses, water contamination, and nutritional deficiencies in vulnerable communities. Adaptation priorities were selected to strengthen public health systems and preventive care.

Priority adaptation options include:

- water safety and pollution control
- nutrition and food security initiatives
- climate-resilient health infrastructure
- emergency preparedness and mental health support
- community-based health programs

1.2.4 Gender and Livelihoods Sector

Gendered vulnerabilities are evident across Cape Coast's informal economies, fishing communities, and domestic care systems. Adaptation strategies were selected to address systemic inequalities while strengthening women's and youth livelihoods.

Priority adaptation options include:

- financial inclusion and support for women
- social protection and targeted support
- climate-resilient livelihoods for women and youth
- education and skills development for women and girls
- community training and capacity building

1.2.5 Infrastructure and Human Settlements Sector

Cape Coast's rapid urbanization, inadequate drainage, and unregulated development have heightened its exposure to flooding, erosion, and infrastructure failure. Stakeholders emphasized risk-sensitive planning and resilient construction.

Priority adaptation options include:

- urban planning and zoning enforcement
- community awareness and preparedness

- transportation network resilience
- drainage system upgrades and maintenance

1.2.6 Tourism and Cultural Heritage Sector

Cape Coast’s cultural monuments, coastal attractions, and tourism economy are under severe threat from sea level rise, coastal erosion, and extreme weather events. Stakeholders prioritized heritage-sensitive and community-centred responses.

Priority adaptation options include:

- flood-resilient tourism infrastructure
- community engagement and education on climate risks
- coastal protection for heritage sites

1.2.7 Trade, Industry, and Finance Sectors

Trade, industry, and finance sectors play a vital role in CCMA’s economy, particularly through its vibrant informal trading networks, fish processing hubs, small-scale agro-processing, and hospitality-linked commerce. However, climate change poses growing risks to this sector, including damage to market infrastructure from flooding and storms, spoilage of goods due to heat stress, and disruptions in business continuity caused by tidal surges and unreliable energy supply.

Market centres such as Kotokuraba, Abura, and Pedu experience recurrent flood damage, affecting both formal and informal traders. Additionally, the lack of climate-resilient storage facilities, especially for perishable goods like fish and vegetables, compounds economic losses. Financial exclusion—especially among women, youth, and micro-enterprises—limits the ability of local businesses to adapt, expand, or insure against future shocks.

Stakeholders emphasized the urgent need to secure livelihoods, protect market assets, and enable climate-resilient economic development.

Priority adaptation options include:

- solar-powered cold storage and energy systems to reduce post-harvest losses and improve resilience of perishable goods trade
- flood-resilient market infrastructure and drainage upgrades in key trading areas like Kotokuraba and Abura New Town
- financial inclusion and microinsurance products tailored for informal traders and market women
- climate risk literacy and business continuity planning for small- and medium-sized enterprises and street vendors

1.2.8 Forestry (Biodiversity and Ecosystems) Sector

Cape Coast's remaining green spaces, urban trees, sacred groves, and wetlands form an ecological backbone that is rapidly weakening under the weight of urban expansion, pollution, and climate stress. The CCVA identified significant biodiversity loss, tree cover decline, and wetland degradation, especially in peri-urban and low-lying areas such as Nkanfoa, Abura, and the Kakum River buffer zones.

Deforestation—driven by charcoal production, sand winning, and informal housing—has left soils bare, increased runoff, and worsened urban heat and flooding. These pressures not only threaten local flora and fauna but also the ecosystem services vital for clean air, water regulation, and cultural identity.

Stakeholders, including community leaders, traditional custodians of sacred groves, and environmental non-governmental organizations (NGOs), called for urgent, nature-based solutions to restore ecological balance and buffer the city against climate extremes.

Priority adaptation options include:

- Urban afforestation and tree planting programs to reduce heat stress, stabilize soils, and enhance carbon sequestration
- Wetland restoration and buffer protection zones to improve water retention and biodiversity
- Community-based biodiversity education and stewardship initiatives, especially targeting schools and faith groups
- Integration of green infrastructure (e.g., nature parks, green corridors) into urban planning frameworks

Below are the key inputs informing the adaptation planning process for the Cape Coast Metropolitan Assembly.

- **Vulnerability assessment recommendations:** The CCMA-CCVA provided the foundation for identifying adaptation measures. It highlighted specific climate risks affecting key sectors such as agriculture, water resources, health, and infrastructure. These recommendations were central to the planning process, ensuring that identified actions directly addressed the municipality's most pressing challenges.
- **Literature review:** A detailed review of relevant documents, including government policies, municipal reports, scientific publications, and grey literature, was conducted. This step focused on identifying best practices and adaptation strategies that have proven effective in addressing similar climate impacts elsewhere. The literature review provided critical insights to shape innovative and practical solutions for CCMA.
- **Stakeholder consultation:** Stakeholder engagement was integral to the process, ensuring inclusivity and local relevance. Representatives from local communities, traditional authorities, government agencies, NGOs, and private sector actors participated in participatory workshops. These consultations facilitated open discussions on adaptation options, validated findings, and prioritized actions based on feasibility and impact.



Photocall after the discussion and validation of adaptation options workshop with stakeholders. Credit: Authors

1.3 Methodological Approach for Ranking Adaptation Options

In response to the complex climate vulnerabilities identified across the Cape Coast Metropolitan Assembly, a structured and inclusive methodology was employed to identify, evaluate, and prioritize a set of feasible and impactful adaptation actions. These actions were informed by the CCMA- CCVA and developed through a combination of desk-based research, literature reviews, and stakeholder engagement processes.

Initial options were drawn from existing national policies, municipal development frameworks, previous climate assessments, and global adaptation best practices. This longlist was then validated and refined through stakeholder workshops designed to capture the experiential knowledge, sectoral expertise, and local priorities of participants.

During the stakeholder workshops, participants were grouped into six key thematic areas, each reflecting the major climate-sensitive sectors and vulnerabilities specific to the Cape Coast Metropolis. The groupings facilitated focused dialogue, sector-specific insights, and collaborative evaluation of proposed adaptation strategies. The final sector groupings were:

1. Agriculture sector
2. Water and sanitation sector
3. Health sector
4. Gender and livelihoods sector
5. Infrastructure and human settlements sector
6. Tourism and cultural heritage sector
7. Trade, industry, and finance
8. Forestry (biodiversity and ecosystems) sector

This thematic grouping allowed for deep sectoral analysis while ensuring coherence across the wider urban resilience strategy. Participants in each group included representatives from municipal departments, traditional councils, local communities, academia, NGOs, women's groups, youth organizations, and the private sector.

The prioritization of adaptation options was carried out using a multi-criteria decision-making (MCDM) framework. This participatory and structured approach allowed stakeholders to assess each adaptation option across a set of predefined criteria that reflect both the technical and social dimensions of climate adaptation in Cape Coast.

The evaluation criteria included (Table 1):

- Effectiveness in reducing vulnerability
- Affordability and cost-efficiency
- Alignment with district development goals
- Institutional and technical feasibility
- Traditional and social acceptance
- Flexibility and scalability
- Environmental efficiency and climate resilience
- Gender responsiveness and equity
- Replicability across other communities or sectors

Each adaptation option was scored against these criteria on a standardized scale (Table 2). The total composite scores were then used to rank the options within each sector, ensuring that the highest-priority measures were those that combined impact, feasibility, inclusiveness, and sustainability.



Sector group ranking and prioritizing adaptation options during the adaptation prioritization workshop with stakeholders. Credit: Authors



Sector group ranking and prioritizing adaptation options during the adaptation prioritization workshop with stakeholders. Credit: Authors

Table 1. Criteria for the assessment of the climate change adaptation options

S/N	Dimension	Indicators	Description
1	Technological	Effectiveness	Effectiveness refers to how well an adaptation option can mitigate the impacts of climate damage. In essence, an effective option yields considerable benefits in terms of avoided consequences, albeit potentially at a high cost.
2	Economic	Affordability (cost efficiency)	This refers to the cost of implementing the adaptation option
3	Institutional	Institutional feasibility Alignment with municipal and/or national priorities	Institutional feasibility refers to institutional and legal capacity. The preferred adaptation option aligns with laws, regulations, and institutional structures. The extent to which the measure supports other development priorities of the municipal or the country
4	Technological	Technical feasibility	Technical feasibility focuses on evaluating the technological expertise and the availability of necessary human, financial, and administrative resources for a specific option
5	Social	Traditional acceptance of adaptation	Traditional acceptance refers to the degree of acceptability of an adaptation strategy aligning with the context of traditional values
6	Social	Social co-benefits	This entails evaluating whether the proposed adaptation aligns with existing social practices and customs and whether it is likely to be embraced by the affected community or population

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S/N	Dimension	Indicators	Description
7	Environmental	Flexibility	Flexibility refers to the ability to change behaviour in response to changing conditions
8	Environmental	Environmental considerations	This evaluates the potential of the intervention to improve greenhouse gas emissions, biodiversity, human health, soil quality, water quality, air quality, climate, and landscape
9	Social	Gender responsiveness	This evaluates the extent to which the adaptation options address gender-related issues
10	Social	Equity	The extent to which the adaptation option will benefit vulnerable groups and communities
11	Technological	Replicability or scalability	This defines the ability or possibility of the intervention to be replicated elsewhere in the country or scaled up
12	Technological/economic/institutional/environmental or social	Barriers to implementation	This identifies potential institutional, economic, technological, and social barriers to the implementation of the adaptation option

Source: Adapted from Dixit & McGray, 2013.



Group photocall with participants of the adaptation prioritization workshop. Credit: Authors

After ranking the different indicators, it was essential to assign appropriate weights to them. An unequal weighting system was applied to reflect the relative importance of each indicator. (Zobeidi et al., 2024; Antwi-Agyei et al., 2013; UNFCCC, 2011). To determine these weights, a five-point Likert Scale (Table 11) was used, where climate change experts, as well as agricultural and food experts, ranked the indicators based on their perceived importance, similar to the method used by Antwi-Agyei

et al. (2013). The frequency with which each indicator was cited was used to develop the weighting system (Zobeidi et al., 2024; Antwi-Agyei et al., 2013; UNFCCC, 2011).

Table 2. Ranking of adaptation options

Number	Interpretation
1	Low
2	Neutral
3	Medium
4	High
(...)	Enclose a number in a bracket to show high uncertainty

Source: Authors

2.0 Climate Risks and Vulnerabilities in the Cape Coast Metropolitan Assembly

2.1 Introduction

The Cape Coast Metropolis, known for its scenic coastline, historical significance, and thriving coastal economy, faces escalating threats from the multifaceted impacts of climate change. The CCVA conducted for the metropolis delineates critical exposure points, system sensitivities, and adaptive capacities across key sectors and communities.

This chapter synthesizes the CCVA's principal findings, presenting a comprehensive analysis of the most acute climate risks and their cascading effects on socio-economic and ecological systems.

2.2 Overview of the Climate Risks in Cape Coast

The Cape Coast Metropolis is increasingly vulnerable to a spectrum of climate-induced hazards, many of which have intensified in frequency and severity due to global climate change and local environmental degradation. These hazards disrupt economic activities, damage infrastructure, and pose significant risks to public health and human security.

The CCMA-CCVA identifies seven principal climate hazards affecting the metropolis. These hazards vary in their geographic spread and impact severity but are all deeply interwoven with the city's ecological, socio-economic, and spatial realities.



Cape Coast Castle, a major tourism and cultural heritage site in the metropolis. Credit: Y.A. Boafo, 2022.

2.2.1 Flooding of Settlements

Flooding is the most widespread and recurrent climate hazard in the Cape Coast Metropolis, particularly in the southern parts of the city. It is driven by a combination of intense rainfall, a heavily built environment, inadequate drainage systems, and poor town planning.

- Impacts: Damage to homes, roads, bridges, schools, and hospitals; increased health risks from waterborne diseases; disruption of sanitation and drainage systems; temporary displacement of residents.
- Vulnerable communities: Mempeasem, Academy, Abura New Town, Kwaprow, Tseukyir, Interbeton (near Cape Coast Teaching Hospital [CCTH]), Cape Tech, Interberton Junction.
- Affected assets: Schools, hospitals, homes, farms, road networks.

2.2.2 Flooding of Farms

In the northern parts of the metropolis, agricultural lands are increasingly prone to flooding, particularly due to heavy rains and the degradation of vegetation cover from small-scale mining and deforestation. This jeopardizes local food production and rural livelihoods.

- Impacts: Destruction of crops and farmland, economic losses for smallholder farmers, heightened food insecurity.
- Vulnerable communities: Efutu, Ewusikrom, Dehia.

2.2.3 Landslides

Though less frequent, landslides are a growing concern in hilly or unstable zones, especially following heavy downpours. These events are often linked to deforestation and poor construction on unstable slopes.

- Impacts: Damage to homes and community infrastructure, risk to lives and livelihoods.
- Vulnerable communities: Nkanfoa, Ekon.

2.2.4 Tidal Waves and Coastal Flooding

With much of Cape Coast's population, infrastructure, and heritage located along the coast, the threat of tidal waves and storm surges is severe. These events are becoming more frequent and destructive due to sea-level rise and weakened coastal defences.

- Impacts: Inundation of coastal settlements; destruction of homes, schools, and tourism infrastructure like Cape Coast Castle; erosion of beaches; saltwater intrusion.
- Vulnerable communities: Abakam, Brofoyedro—particularly areas without sea defence structures.

2.2.5 Storms

Intense rainstorms, especially during the wet season, are causing damage across both rural and urban zones. These storms have become more erratic and forceful in recent years, often leading to temporary but significant disruptions.

- Impacts: Destruction of rooftops and building structures, disruption of academic and economic activities, potential injuries and fatalities.
- Vulnerable communities: University of Cape Coast environs, areas near Saint Monica School.

2.2.6 Heat Stress

Although less immediately visible, heatwaves and elevated ambient temperatures are on the rise in Cape Coast. Urban areas suffer from urban heat island effects, exacerbated by the loss of vegetation and increasing concretization.

- Impacts: Heat-related illnesses (e.g., dehydration, heatstroke), reduced worker productivity, and increased energy demand.
- Vulnerable populations: Children, the elderly, outdoor workers, and informal vendors operating under open skies.



Coastal erosion and sea-level rise in Cape Coast. Credit: Boafu, YA., 2024.

2.2.7 Water Insecurity and Pollution

Climate variability, urban sprawl, and land degradation have strained the Metropolis' water supply systems, especially during dry seasons. The Kakum River and Brimsu Dam—the city's main water sources—are under increasing pressure from pollution, siltation, and overuse.

- Impacts: Intermittent water supply, poor water quality, increased reliance on expensive or unsafe water sources.
- Vulnerable areas: Peri-urban and informal settlements with limited access to potable water, women and children who bear the brunt of household water collection.

2.2.8 Forests (Ecosystems and Bioiversity)

Cape Coast's natural ecosystems—including urban forests, wetlands, sacred groves, and coastal vegetation—are experiencing rapid degradation due to land conversion, sand winning, deforestation, and encroachment. Urban expansion, coupled with weak enforcement of land-use regulations, has led to the fragmentation and loss of critical habitats, particularly around the Kakum River Basin, Ewusikrom wetlands, and peri-urban green spaces.

- Impacts: Reduced ecosystem services (e.g., flood buffering, air purification), loss of flora and fauna, increased vulnerability to erosion and heat stress, diminished cultural and recreational value of natural areas.
- Vulnerable areas: Degraded wetland and riparian zones near Ewusikrom, sacred groves in Nkanfoa, deforested buffer zones around Kakum tributaries, informal settlements expanding into ecologically sensitive areas.

2.3 Sectoral Vulnerability Analysis

Climate change affects different sectors of the CCMA economy and society in varied but interrelated ways. While some sectors—such as health, water, and infrastructure—face immediate and visible impacts, others, including tourism, agriculture, and livelihoods, endure slower but equally disruptive shifts.

This section provides a focused analysis of how key sectors in the CCMA are vulnerable to climate risks. It draws on data from the CCVA, stakeholder consultations, and spatial observations to identify the nature of exposure, underlying sensitivities, and existing adaptive capacities within each sector.

2.3.1 Agriculture

- Highly vulnerable to erratic rainfall, shortened growing seasons, heat stress.
- Key risks: Reduced yields, pest outbreaks, food insecurity.
- Adaptation needs: Climate-smart agriculture, improved irrigation, farmer cooperatives.

2.3.2 Water and Sanitation

- Critical infrastructure is aged and insufficient
- Risks include contaminated water supply, sewer overflows, and water rationing during dry spells
- Adaptation needs: Diversified water sources, rainwater harvesting, watershed restoration

2.3.3 Health

- Vulnerable to climate-sensitive diseases such as malaria, cholera, heatstroke, and mental health stress
- Health care facilities face flooding and heat exposure
- Adaptation needs: Early warning systems, resilient health infrastructure, public health education

2.3.4 Infrastructure and Human Settlements

- Drainage systems are poorly maintained or undersized
- Informal settlements on floodplains are especially at risk
- Adaptation needs: Zoning enforcement, upgraded drainage, flood-proof housing

2.3.5 Tourism and Cultural Heritage

- Coastal heritage sites (e.g., Cape Coast Castle) are exposed to erosion and sea spray
- Beach erosion and flooding deter tourism revenue
- Adaptation needs: Coastal buffer restoration, heritage-safe infrastructure, eco-tourism alternatives

2.3.6 Livelihoods and Gender

- Climate change amplifies existing social and gender inequalities
- Women, particularly in the fisheries and informal trade sectors, are disproportionately affected
- Adaptation needs: Livelihood diversification, gender-responsive finance, inclusive planning

2.3.7 Trade, Industry, and Finance

- Climate change disrupts trade flows, damages goods, and reduces business operating hours due to extreme heat, flooding, and coastal storms.
- Informal traders, market women, and micro-enterprises are especially vulnerable due to limited access to credit, insurance, and resilient infrastructure.

- Adaptation needs: Climate-proof market infrastructure, access to micro-finance, business continuity training, and inclusion of micro-, small, and medium-sized enterprises (MSMEs) in urban resilience planning.

2.3.8 Forests (Ecosystems and Biodiversity)

- Climate change is accelerating the degradation of Cape Coast's ecosystems, including wetlands, sacred groves, mangroves, and urban green spaces—reducing their capacity to buffer climate impacts such as flooding, heatwaves, and coastal erosion.
- Biodiversity loss undermines food systems, cultural heritage, and natural resource-based livelihoods, particularly for communities dependent on fuelwood, medicinal plants, or ecotourism.
- Adaptation needs: Restoration of degraded ecosystems, enforcement of green buffer zones, community-led tree planting, and integration of biodiversity into urban planning.

2.4 Vulnerable Populations and Spatial Hotspots

The impacts of climate change in Cape Coast are not distributed equally. Certain populations—due to their location, livelihood, gender, age, or socio-economic status—face heightened exposure and lower adaptive capacity. These groups are more likely to suffer disproportionately from climate hazards such as flooding, tidal waves, heat stress, and water insecurity.

This section identifies the most vulnerable populations and geographic hotspots within the metropolis based on findings from the Climate Vulnerability Assessment, community consultations, and spatial risk mapping. It highlights where the convergence of hazard exposure, socio-economic disadvantage, and infrastructural neglect creates conditions of acute climate vulnerability.

2.4.1 Vulnerable Populations

Based on the CCVA report for the metropolis, the following demographic groups were identified as most vulnerable to the impacts of climate change:

- **Women and girls**
Women—especially those engaged in informal trading, coastal fishing-related activities, and caregiving roles—are disproportionately affected by water insecurity, flooding, and the loss of livelihoods. Their limited access to land, finance, and decision-making platforms further restrict adaptive capacity.
- **Children and youth**
Children face increased health risks from heat exposure, poor sanitation, and waterborne diseases during floods. School closures during storms and damage to educational infrastructure affect learning continuity.
- **Elderly and persons with disabilities (PWDs)**
These groups are less mobile and often more reliant on community or family support during

emergencies. They are more susceptible to heat stress, lack access to adaptive infrastructure, and face higher health risks.

- **Informal workers and low-income households**
Many operate in exposed environments (open markets, roadside stalls) and live in flood-prone informal settlements with inadequate drainage, sanitation, and housing.
- **Fishing and farming households**
These groups are highly dependent on climate-sensitive natural resources and face reduced yields, damaged assets, and disrupted livelihoods from coastal erosion, saltwater intrusion, and erratic rainfall.

2.4.2 Spatial Hotspots of Vulnerability

Spatial analysis from the CCVA revealed distinct zones within the metropolis that experience recurrent or compound climate risks. These are areas where vulnerable populations and exposed infrastructure coincide with high hazard frequency.

Several cross-cutting features define the most vulnerable spatial zones in the Cape Coast Metropolitan Assembly (Figures 2 and 3):

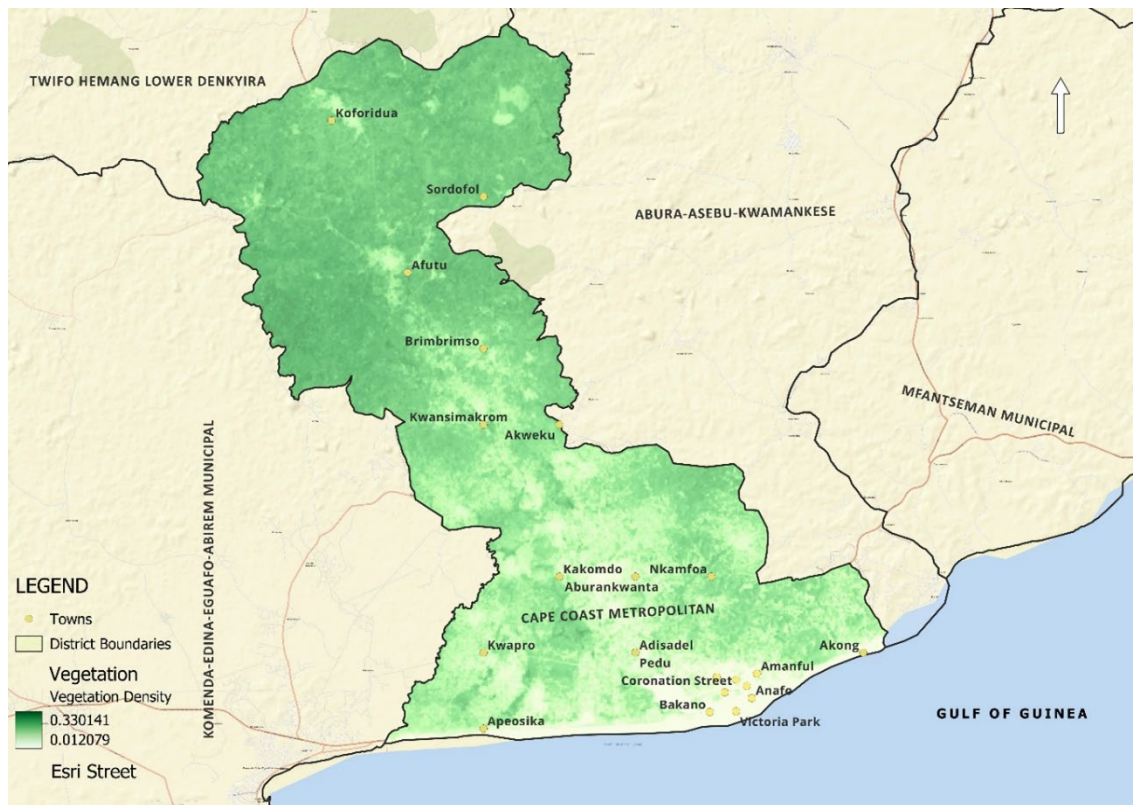
- Located in low-lying, unplanned, or informal settlements
- Inadequate stormwater drainage, sanitation, and solid waste management
- Presence of coastal or riparian systems without natural or engineered defences
- High concentration of youth and informal workers
- Limited access to early warning systems, health care, and financial services

Table 3. Spatial analysis of vulnerability in the Cape Coast Metropolitan Assembly

Hotspot community	Main climate risks	Exposed assets and populations
Mempeasem, Academy, Abura New Town	Urban flooding, poor drainage	Schools, low-income housing, informal vendors
Kwaprow, Tseukyir, Interbeton (near CCTH)	Urban flooding, sanitation challenges	Hospitals, road networks, residential areas
Cape Tech, Interberton Junction	Flooding, stormwater overflow	Educational institutions, market zones
Efutu, Ewusikrom, Dehia	Flooding of farmlands, loss of vegetation	Smallholder farmers, youth labourers
Nkanfoa, Ekon	Landslide risk during heavy rainfall	Hilly settlements, informal housing
Abakam, Brofoyedru	Tidal waves, sea-level rise	Coastal dwellers, fisherfolk, beach resorts
University of Cape Coast area, near St. Monica	Intense rainstorms, wind damage	Students, staff housing, public facilities
Amamoma, Duakor	Flood-prone zones, poor waste disposal	Peri-urban informal settlements, youth groups

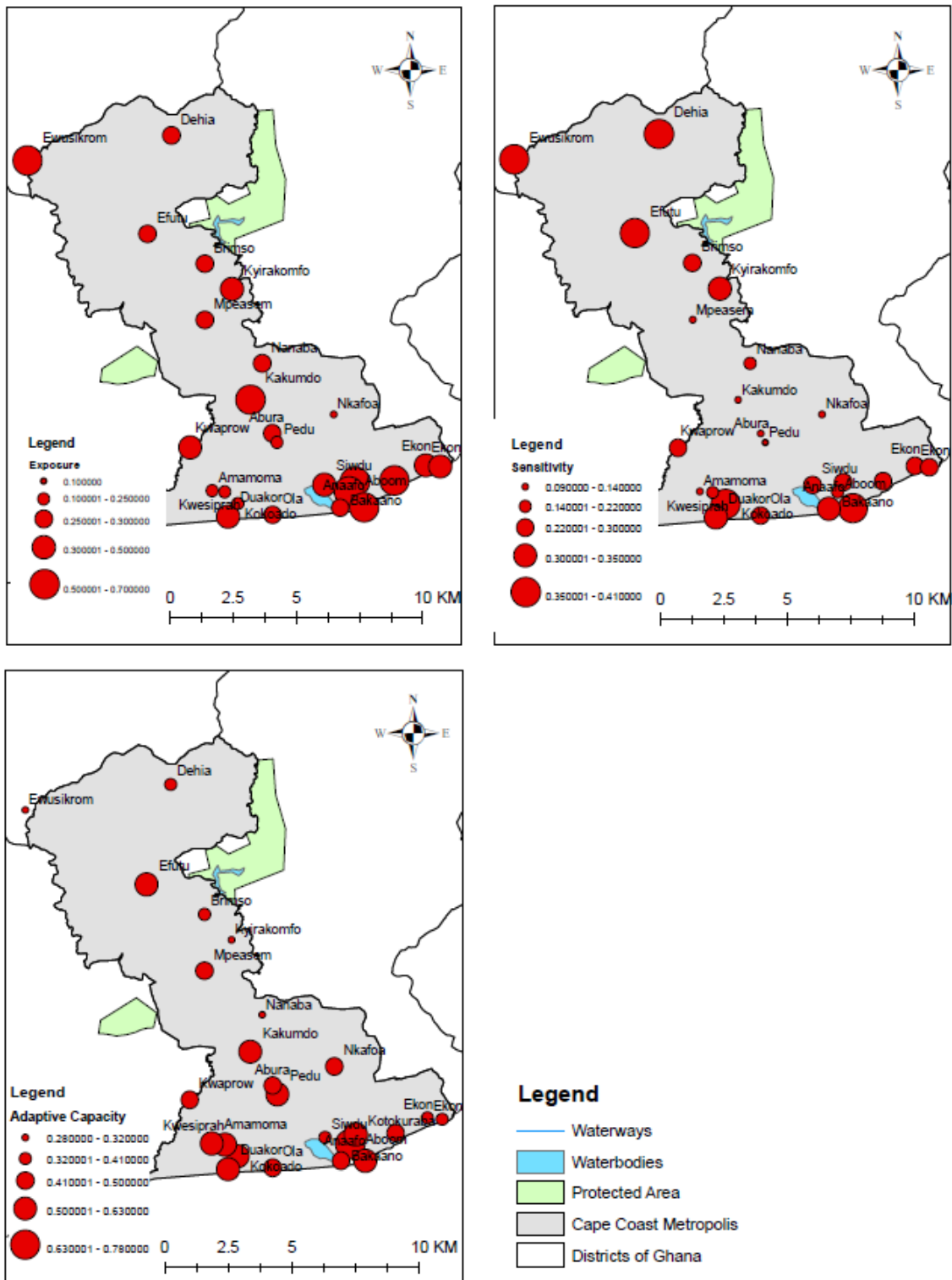
Source: CCMA CCVA, 2022.

Figure 2. Map of CCMA showing some major towns



Source: Authors

Figure 3. Exposure (a), sensitivity (b), and adaptive capacity (c) distribution across selected communities in the CCMA



Source: Cape Coast CCVA Report, 2022.

3.0 Adaptation Options for the Cape Coast Metropolitan Assembly

3.1 Introduction

The adaptation options for the CCMA have been developed in response to the unique vulnerabilities and climate risks identified through the Cape Coast Climate Vulnerability Assessment and extensive stakeholder consultations. These options are grounded in the socio-economic and ecological realities of a rapidly urbanizing coastal city and aim to strengthen resilience across key sectors including water and sanitation, health, agriculture, infrastructure, tourism, forestry, livelihoods, gender, and trade and finance.

Each adaptation measure has been designed to address specific risks such as coastal erosion, urban flooding, heat stress, water scarcity, and disease outbreaks, while supporting the broader goals of sustainable urban development, social equity, and climate justice.

The development of these adaptation options followed a participatory process involving local government officials, sectoral departments, traditional leaders, women and youth groups, researchers from the University of Cape Coast, and private sector actors. These stakeholders contributed to the identification, evaluation, and prioritization of actions using an MCA framework. This ensured that proposed measures were not only technically sound but also socially acceptable, environmentally sustainable, and aligned with both metropolitan development priorities and Ghana's National Adaptation Plan.

The adaptation time frames were categorized as short-term (0 to 2 years), medium-term (2 to 5 years), and long-term (more than 5 years) to align interventions with their complexity, resource requirements, and expected implementation duration. This phased approach ensures that urgent and low-cost actions can be deployed quickly, while more complex or capital-intensive measures are planned and resourced over time. It also allows for gradual capacity building, integration into development planning cycles, and adaptive learning as projects scale.

The estimated costs presented in this report were generated by breaking down each adaptation action into its core resource components (e.g., training, equipment, construction materials, personnel). These components were then assigned indicative cost ranges in Ghana Cedis (GH¢), informed by prevailing market prices in Ghana and the provided exchange rate of USD 1 ≈ GH¢ 10.25. It is crucial to understand that these figures are broad estimates and serve primarily as a guide for initial planning and conceptualization. They do not account for real-time market fluctuations, specific regional variations within Ghana beyond general averages, or the precise scope and scale of individual interventions. Factors such as detailed engineering designs, specific procurement processes, unforeseen logistical challenges, and inflation over the project's time frame can significantly impact actual expenditures. Therefore, these estimates should be interpreted with caution and necessitate comprehensive feasibility studies, detailed budgetary planning, and local market assessments before any financial commitments are made.

Unlike more agrarian districts, the adaptation needs of Cape Coast focus on urban systems, coastal assets, and socio-economic diversity, including a large informal economy and historically significant infrastructure. Adaptation options have thus been organized according to Cape Coast's distinct sectoral structure.

Through this holistic and inclusive process, the Cape Coast Metropolitan Climate Action Plan (CCMCAP) seeks to:

- reduce systemic vulnerabilities to climate shocks,
- strengthen institutional and community adaptive capacity, and
- secure the long-term sustainability of urban ecosystems and livelihoods.

The following sections present the prioritized adaptation actions grouped under key thematic sectors, each supported by the MCA evaluation and ranked according to local relevance and impact.

3.2 Agriculture Sector Adaptation Options

Agriculture in the metropolis—though not the city's primary economic driver—plays a vital role in peri-urban food security and livelihoods, particularly in communities such as Efutu, Ewusikrom, and Dehia, where smallholder farming persists. However, this sector is increasingly under threat from erratic rainfall patterns, prolonged dry spells, and occasional flooding of farmland challenges that are exacerbated by land degradation, poor drainage, and limited access to climate-resilient inputs.

To respond to these threats, the CCVA and stakeholder consultations identified a range of adaptation measures (Tables 4 and 5). These were evaluated through a MCA and prioritized based on their technical feasibility, environmental benefit, social acceptance, and alignment with Cape Coast's development priorities.

Climate-smart agriculture practices, ranked first, emerged as the most effective intervention for transforming vulnerable agricultural systems. These practices include intercropping, composting, use of organic fertilizers, and drought-tolerant crops, which together promote soil fertility, reduce dependence on chemical inputs, and enhance resilience to unpredictable weather. Some farmers in Dehia and Ekusi have already begun piloting such techniques, reporting lower production costs and better crop performance under water stress conditions.

Capacity building and farmer organizations, ranked joint second, was identified as a key strategy to empower smallholder farmers—particularly women and youth—through access to knowledge, cooperative structures, and extension services. In communities like Ewusikrom, where many farmers work in isolation and lack reliable market information, strengthening local farmer networks could significantly improve adaptive capacity and bargaining power.

Market access and connectivity, also ranked joint second, responds to the challenge of perishable goods and limited transportation links to urban markets. Poor road infrastructure, especially during the rainy season, often leads to post-harvest losses. Enhancing logistics, storage facilities, and market linkages was seen as critical to ensure farmers can sell their produce at fair prices and invest in adaptation measures.

Livelihood diversification, ranked third, offers an important pathway for resilience by promoting non-farm income opportunities such as small-scale poultry, aquaculture, and agro-processing. These options are especially relevant for young people and women in flood-prone or dryland zones where farming is increasingly unreliable.

Water management and irrigation systems, though ranked fifth, remain crucial in dry-season farming areas. Stakeholders emphasized the need for small-scale drip systems and rainwater harvesting to supplement rainfall and support year-round vegetable production—already practised on a small scale in peri-urban gardens around Pedu and Abura.

Table 4. Ranked and prioritized adaptation actions for the agriculture sector

Adaptation option	Total score	Rank
Climate-smart agriculture practices	48	1st
Capacity building and farmer organizations	45	2nd
Market access and connectivity	45	2nd
Livelihood diversification and resilience	43	4th
Water management and irrigation systems	41	5th
Digital and e-commerce platforms	40	6th
Financial support for farmers	39	7th
Climate information and early warning systems	38	8th
Post-harvest management	35	9th
Access to climate-resilient technologies	29	10th

Source: Adaptation options prioritization workshop, 2025.

Table 5. Cape Coast Metropolis agriculture sector adaptation plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Climate-smart agriculture practices	To enhance crop resilience through sustainable practices such as intercropping, composting, drought-tolerant crops, and mulching. Improves productivity while conserving soil and water	Increase in yields under climate stress Uptake of sustainable farming practices Improved soil fertility and water use	Short to medium term	Training manuals, demo plots, organic input supply Agricultural extension support Farmer incentives	CCMA (lead), Agriculture Department., NGOs, farmer groups	150,000 – 400,000
Capacity building and farmer organizations	To strengthen the knowledge, cooperation, and organizational capacity of farmers—especially women and youth—for better access to resources and collective adaptation planning	Number of trained farmer groups Inclusion of women and youth in cooperatives Improved knowledge on climate-smart methods	Short term	Farmer education materials Capacity-building workshops Partnerships with local NGOs	CCMA (lead), Agric Dept., University of Cape Coast (UCC), youth and women’s networks	100,000 – 300,000
Market access and connectivity	To improve transportation, storage, and logistics to reduce post-harvest losses and ensure timely access to markets, particularly during the rainy season	Reduction in crop spoilage post-harvest Improved market prices received by farmers Increased volume of produce reaching urban markets	Short to medium term	Storage infrastructure Transportation improvements ICT market information systems	CCMA, Ministry of Trade and Industry, Transport Union, market associations	500,000 – 1,500,000

The Cape Coast Metropolitan Assembly Climate Adaptation Plan: Ghana

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Livelihood diversification and resilience	To create alternative income streams through poultry, aquaculture, and agro-processing, reducing sole dependence on rain-fed agriculture	Number of households with diversified incomes Participation in non-farm climate-resilient activities Reduction in climate-related income shocks	Medium term	Business incubation support Equipment/tools for agro-processing Livelihood training programs	CCMA, livelihoods NGOs, community-based organizations	300,000 – 800,000
Water management and irrigation systems	To ensure year-round farming by introducing small-scale irrigation and rainwater harvesting systems in dry-season and peri-urban farming zones	Area under irrigation or rainwater harvesting Improved dry-season vegetable output Reduction in crop failure due to drought	Medium term	Irrigation kits Rainwater storage tanks Technical support for design and maintenance	CCMA, Water Resources Commission (WRC), agricultural extension services, local engineers	400,000 – 1,200,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.3 Water and Sanitation Sector Adaptation Options

Water and sanitation systems in the Cape Coast Metropolis are increasingly under stress from a combination of climate change, urban growth, and infrastructure deficits. Seasonal flooding, dry-season water shortages, and the pollution of surface water sources like the Kakum River and Brimsu Dam threaten both the quantity and quality of water available to residents. Poor sanitation infrastructure compounds these challenges, particularly in low-lying, densely populated neighbourhoods. Through stakeholder consultations and the CCVA, several priority adaptation options were identified to strengthen the resilience of the city’s water and sanitation systems. These were evaluated using an MCA and ranked based on their effectiveness, affordability, institutional feasibility, environmental benefit, and social equity (Tables 6 and 7).

Table 6. Ranked and prioritized adaptation actions for the water and sanitation sector

Adaptation option	Total score	Rank
Community water management and education	47	1st
Environmental regulation and monitoring	45	2nd
Watershed protection and restoration	44	3rd
Integrated waste and sanitation systems	42	4th
Rainwater harvesting and storage	39	5th
Diversified and resilient water sources	38	6th
Sustainable agriculture and water use	37	7th
Climate-resilient water infrastructure	32	8th

Source: Adaptation options prioritization workshop, 2025.

Community water management and education, ranked first, emerged as the cornerstone intervention. This strategy focuses on building community knowledge, participation, and ownership of water systems. It includes hygiene education, participatory governance, and maintenance training, especially in flood-prone and peri-urban communities.

Environmental regulation and monitoring, ranked second, was highlighted as essential for safeguarding the ecological health of water sources. Participants emphasized the need for stronger enforcement of environmental laws and improved data collection on pollution sources, especially around watersheds like Kakum and forest buffer zones.

Watershed protection and restoration, ranked third, offers a long-term strategy to improve water availability and quality. This includes reforestation, community-led conservation efforts, and buffer zone management to reduce erosion and siltation.

Integrated waste and sanitation systems, ranked fourth, addresses the pressing issue of inadequate sanitation and open defecation. The integration of waste collection, treatment, and disposal—particularly through decentralized systems—was seen as crucial in areas prone to floods and overflows.

Rainwater harvesting and storage, ranked fifth, is a practical and cost-effective solution for households and institutions facing water shortages during the dry season. While already used in some parts of Cape Coast, its wider adoption is limited by affordability and system design challenges.

Table 7. The Cape Coast Metropolis water and sanitation sector adaptation plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Community water management and education	To empower local communities with knowledge and tools for sustainable water use, sanitation hygiene, and infrastructure maintenance	Number of community training sessions Improved hygiene practices Increased community ownership of systems	Short term	Education campaigns Training toolkits Community facilitators	CCMA (lead), Environmental Health Department, local NGOs	80,000 – 250,000
Environmental regulation and monitoring	To protect water resources from pollution and overuse by strengthening environmental enforcement and monitoring systems	Enforcement actions taken Water quality improvements Number of pollution audits conducted	Medium term	Monitoring equipment Field staff Legal support	CCMA, Environmental Protection Agency, WRC, NGOs	200,000 – 600,000
Watershed protection and restoration	To improve water quality and quantity through afforestation, buffer zone restoration, and community-based natural resource management	Area of watershed restored Reduction in sedimentation Community participation levels	Medium term	Tree seedlings Technical support Local labour mobilization	CCMA, Forestry Commission, UCC, community groups	350,000 – 1,000,000
Integrated waste and sanitation systems	To upgrade and integrate waste disposal, drainage, and sanitation systems in flood-prone communities to reduce health risks and pollution	Households with improved sanitation Reduction in open defecation Drainage infrastructure upgraded	Short to medium term	Decentralized treatment systems Sanitation kits Construction teams	CCMA, environmental health, local contractors, NGOs	600,000 – 1,800,000

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Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Rainwater harvesting and storage	To supplement municipal water supply and reduce seasonal water shortages through household and institutional rainwater systems	Number of rainwater systems installed Water storage capacity increased Reduction in dry-season water stress	Short term	Storage tanks Roofing and gutter systems Technical designs	CCMA, CWSA, UCC, local plumbers and artisans	250,000 – 750,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.4 Health Sector Adaptation Options

The Cape Coast Metropolis’s health sector faces growing stress from climate-related threats, including flood-induced disease outbreaks, heat-related illnesses, poor water quality, and nutritional deficiencies. The CCVA identified that low-income neighbourhoods, informal settlements, and schools are particularly exposed to climate-sensitive health risks due to poor drainage, inadequate health care infrastructure, and limited public awareness.

As sea levels rise and rainfall patterns become more unpredictable, there is an urgent need to invest in climate-resilient health systems that protect vulnerable populations from both direct and indirect climate impacts.

Stakeholder consultations revealed strong community interest in disease prevention, water safety, mental health services, and nutrition support, particularly for children, women, the elderly, and PWDs. The prioritized adaptation actions for the health sector were assessed using MCA based on technical feasibility, environmental impact, gender responsiveness, and social acceptance (Tables 8 and 9).

Water safety and pollution control, ranked first, was identified as the most urgent and cost-effective intervention. Recurrent flooding and poor waste management have led to the contamination of drinking water sources, contributing to outbreaks of cholera, typhoid, and other waterborne illnesses. Measures such as water treatment, pollution source control, and education campaigns were widely supported.

Nutrition and food security, ranked second, aims to address the rising risk of malnutrition and food insecurity, particularly among children and pregnant women. This includes the promotion of home gardens, climate-resilient foods, and school-based nutrition programs.

Climate-resilient health infrastructure and emergency preparedness and mental health support, both ranked third, focus on improving the physical and institutional capacity of health care facilities to withstand extreme weather events and provide timely services during disasters. These include constructing flood-safe clinics, training staff, and integrating psychosocial care.

Table 8. Ranked and prioritized adaptation actions for the health sector

Adaptation option	Total score	Rank
Water safety and pollution control	36	1st
Nutrition and food security	33	2nd
Climate-resilient health infrastructure	32	3rd
Emergency preparedness and mental health support	32	3rd
Vector control and disease prevention	31	5th
Community-based health programs	31	5th
Education and training for health professionals	30	7th
Heat and climate-induced health management	24	8th

Source: Adaptation options prioritization workshop, 2025.

Table 9. The Cape Coast Metropolis health sector adaptation plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Water safety and pollution control	To reduce the spread of waterborne diseases through improved water treatment, waste control, and pollution monitoring	Decrease in reported waterborne disease cases Increase in number of water testing campaigns Improved water quality indicators	Short to medium term	Water purification tools Monitoring equipment Public education materials	CCMA (lead), Ghana Health Service, EPA, NGOs	200,000 – 550,000
Nutrition and food security	To enhance nutritional resilience through urban agriculture, school gardens, and food diversification campaigns	Number of nutrition outreach programs Home gardens established Improved child and maternal nutrition indexes	Short term	Gardening kits Nutrition education Local food support systems	CCMA, MOFA, health centres, school authorities	120,000 – 350,000
Climate-resilient health infrastructure	To build and retrofit health facilities to withstand flooding, heatwaves, and storms while ensuring continuity of care	Clinics protected from flood risk Facilities with improved ventilation or backup power Continuity of health services during climate events	Medium term	Engineering designs Construction materials Technical consultancy	CCMA, Ghana Health Service, Infrastructure Dept., donor agencies	800,000 – 2,500,000
Emergency preparedness and mental health support	To improve the capacity of health systems to respond to climate disasters, including providing psychosocial support	Number of trained emergency responders Community mental health workshops held Availability of emergency care protocols	Short term	Training toolkits Emergency supplies Community health facilitators	CCMA, Ghana Health Service, National Disaster Management Organization (NADMO), NGOs	150,000 – 400,000

The Cape Coast Metropolitan Assembly Climate Adaptation Plan: Ghana

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Vector control and disease prevention	To reduce climate-sensitive vector-borne diseases through community spraying, awareness, and habitat control	Reduction in malaria and dengue incidence Community cleanup campaigns Increased use of treated nets	Short to medium term	Insecticides and sprayers Health outreach teams Sanitation support	CCMA, Ghana Health Service, Zoomlion, community leaders	250,000 – 700,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.5 Gender and Livelihood Sector Adaptation Options

Climate change intersects deeply with gender and livelihood inequalities in Cape Coast, where women, youth, and low-income groups are often on the frontline of environmental and economic shocks. Many rely on climate-sensitive informal activities such as trading, artisanal fishing, and food processing, with limited access to credit, skills training, and legal protection over resources. In times of disaster or slow-onset events like drought, these groups bear the brunt of income loss, caregiving burdens, and reduced access to essential services.

During the Cape Coast Vulnerability Assessment and stakeholder consultations, participants emphasized that mainstreaming gender and social equity into adaptation planning is not optional—it is essential. The MCA helped prioritize actions that are both transformative and locally grounded, aimed at building dignity, resilience, and opportunity (Tables 10 and 11).

Social protection and targeted support and financial inclusion and support for women were ranked highest. These actions aim to create social safety nets, ensure access to financial services, and reduce vulnerability for informal workers, widows, youth, and persons with disabilities.

Table 10. Ranked and prioritized adaptation actions for the gender and livelihood sector

Adaptation option	Total score	Rank
Social protection and targeted support	48	1st
Financial inclusion and support for women	48	1st
Climate-resilient livelihoods for women and youth	46	3rd
Education and skills development for women and girls	45	4th
Community training and capacity building	45	4th
Gender-sensitive disaster preparedness & response	38	6th
Land ownership and resource access for women	37	7th

Source: Adaptation options prioritization workshop, 2025.

Climate-resilient livelihoods for women and youth, ranked third, highlights the importance of income diversification—from small-scale fish processing and agro-enterprises to digital and service-based livelihoods.

Education and skills development for women and girls, along with community training and capacity building, both ranked fourth, are viewed as foundational enablers of adaptive capacity and long-term resilience.

Table 11. The Cape Coast Metropolis gender and livelihood sector adaptation plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Social protection and targeted support	To provide safety nets and social welfare services to vulnerable groups including women, youth, and PWDs affected by climate change	Number of beneficiaries enrolled Reduction in climate-induced poverty Uptake of support during disasters	Short term	Cash transfer systems Beneficiary targeting tools Welfare officers and community monitors	CCMA (lead), Ministry of Gender, Children and Social Protection, Livelihood Empowerment Against Poverty, NGOs	400,000 – 1,200,000
Financial inclusion and support for women	To expand access to credit, savings, and insurance products tailored to women-led micro-enterprises and climate-sensitive sectors	Number of women with active accounts or loans Business survival and recovery rates Participation in group savings initiatives	Short to medium term	Mobile money platforms Loan guarantee funds Financial literacy programs	CCMA, MASLOC, microfinance institutions, women's groups	300,000 – 900,000
Climate-resilient livelihoods for women and youth	To diversify income sources through training and investment in sectors like agro-processing, aquaculture, and digital services	Number of new climate-resilient enterprises started Income stability indicators Youth and women participation	Medium term	Business startup kits Incubation hubs Skills trainers	CCMA, youth authority, NGOs, private sector	450,000 – 1,300,000
Education and skills development for women and girls	To improve future adaptive capacity by increasing education access and technical training for girls and young women	School retention rates for girls Enrollment in technical and vocational education and training (TVET) programs Female employment in skilled sectors	Medium term	Scholarships Vocational equipment Mentorship programs	CCMA, GES, TVET service, civil society organizations (CSO)	350,000 – 1,000,000

The Cape Coast Metropolitan Assembly Climate Adaptation Plan: Ghana

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Community training and capacity building	To empower local leaders, women’s groups, and youth clubs with climate knowledge, leadership, and planning skills	Number of training sessions held Participants applying new skills Community-led initiatives implemented	Short term	Training manuals Local facilitators Monitoring and evaluation support	CCMA, CBOs, UCC, NGOs	100,000 – 300,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.6 Infrastructure and Human Settlements Adaptation Options

Cape Coast’s urban fabric is increasingly vulnerable to the cascading effects of climate change. From tidal surges and coastal erosion to intensifying rainfall and inadequate drainage, infrastructure systems across the metropolis—particularly in low-income and informal settlements—are under pressure. Weak zoning enforcement, aging stormwater networks, and high population density have left large sections of the city exposed to recurrent flooding, building collapse, and mobility disruption.

Stakeholder consultations conducted as part of the CCVA identified key priority actions to strengthen urban resilience. These adaptation options were evaluated using an MCA, and ranked based on their effectiveness, feasibility, environmental benefit, and contribution to social equity (Tables 12 and 13).

Table 12. Ranked and prioritized adaptation actions for the infrastructure and human settlements sector

Adaptation option	Total score	Rank
Urban planning and zoning enforcement	41	1st
Community awareness and preparedness	40	2nd
Transportation network resilience	36	3rd
Drainage system upgrades and maintenance	31	4th
Coastal defence and erosion control	27	5th
Risk-sensitive land use and climate audits	24	6th
Flood-resilient infrastructure	20	7th
Green infrastructure solutions	18	8th
Relocation and alternative livelihoods	18	8th
Climate-resilient building codes	16	10th

Source: Adaptation options prioritization workshop, 2025.

Urban planning and zoning enforcement, ranked first, emerged as a fundamental intervention. Weak enforcement has allowed building on floodplains, wetlands, and buffer zones. Stakeholders stressed the need to revise land use plans, enforce zoning by-laws, and support climate-informed urban design, especially in rapidly urbanizing peripheries.

Community awareness and preparedness, ranked second, was identified as a cost-effective and socially accepted strategy to reduce risk. Informal settlements and vulnerable groups often lack access to early warnings or preparedness training. Empowering communities with climate information and local response strategies can reduce losses and enhance adaptive behaviour.

Transportation network resilience, ranked third, responds to the challenge of road and drainage failures that isolate communities during heavy rainfall. The construction of elevated roads, culverts, and climate-sensitive transport infrastructure is critical for maintaining movement and access during emergencies.

Drainage system upgrades and maintenance, ranked fourth, is essential to address urban flooding in hotspots such as Abura, Kwaprow, and Interbeton. Aging and undersized drains are unable to handle extreme rainfall, often leading to waste overflow and waterlogging.

Table 13. The Cape Coast Metropolis infrastructure and human settlements adaptation action plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Urban planning and zoning enforcement	To prevent development in high-risk zones and guide climate-resilient spatial growth through effective enforcement of zoning laws	Updated land use plans Reduction in encroachment cases Increased compliance with zoning regulations	Medium term	Geographic Information System (GIS) tools Urban planning staff Community sensitization	CCMA (lead), TCPD, UCC Department of Geography and Regional Planning, Lands Commission	300,000 – 800,000
Community awareness and preparedness	To increase public knowledge and preparedness for extreme weather events through education and early warning systems	Number of communities trained Climate awareness levels Response time during flood events	Short term	Information, education and communication materials Community training sessions Early warning devices	CCMA, NADMO, NGOs, UCC, assembly members	150,000 – 450,000
Transportation network resilience	To upgrade roads and transport infrastructure vulnerable to flooding to ensure mobility and economic continuity	Length of road rehabilitated Reduced transport disruptions Increased flood resilience in transport network	Medium to long term	Engineering assessments Climate-resilient road materials Drainage designs	CCMA, Dept. of Urban Roads, Ministry of Transport, local contractors	5,000,000 – 20,000,000+
Drainage system upgrades and maintenance	To expand and maintain drainage infrastructure to reduce urban flooding, particularly in hotspots and informal settlements	Kilometers of drains cleared or constructed Reduction in flood incidents Community reports on improved drainage	Short to medium term	Construction teams Drainage maps Heavy equipment	CCMA, Waste Management Department, NADMO, Zonal Councils	3,000,000 – 10,000,000+

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Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Coastal defence and erosion control	To protect vulnerable coastal communities and assets through sea defence structures and nature-based solutions	Coastal protection structures installed Stabilized shoreline Reduced property damage along the coast	Long term	Engineering expertise Rock revetments, groynes Community mobilization	CCMA, Hydrological Services Department, Ghana Ports and Harbours Authority	10,000,000 – 50,000,000+

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.7 Tourism and Cultural Heritage Adaptation Options

Cape Coast is a beacon of historical memory and cultural heritage, home to globally recognized landmarks like the Cape Coast Castle, Fort William, and vibrant festivals and crafts traditions. However, this rich tourism and heritage economy is highly vulnerable to climate change. Sea-level rise, coastal erosion, and extreme rainfall events threaten the very assets that draw visitors from across the world.

Stakeholders from the Ghana Museums and Monuments Board, local tourism businesses, tour guides, hoteliers, and community groups were engaged during the CCVA. They identified a range of adaptation needs, evaluated using an MCA and ranked based on feasibility, environmental benefit, and socio-economic impact (Tables 14 and 15).

Flood-resilient tourism infrastructure, ranked first, was viewed as a critical step toward protecting facilities such as beach resorts, museums, and tourist roads. Stakeholders emphasized elevated structures, improved drainage, and backup energy systems as immediate needs.

Tourism diversification and livelihood support, ranked second, reflects the importance of expanding livelihood opportunities beyond conventional heritage tourism. Participants pointed to opportunities in eco-tourism, cultural crafts, and gastronomy as climate-resilient alternatives for youth and women.

Community engagement and education, ranked third, underscores the power of inclusive storytelling and local stewardship in protecting heritage. Community members are both custodians and beneficiaries of cultural assets and must be empowered to participate in their conservation and promotion.

Financial assistance and risk management, also ranked third, was proposed to help small-scale tourism operators and cultural entrepreneurs recover from shocks, invest in resilient design, and access micro-insurance products.

Table 14. Ranked and prioritized adaptation actions for the tourism and cultural heritage sector

Adaptation option	Total score	Rank
Flood-resilient tourism infrastructure	42	1st
Tourism diversification and livelihood support	38	2nd
Community engagement and education	37	3rd
Financial assistance and risk management	37	3rd
Coastal protection for heritage sites	33	5th
Eco-friendly tourism and environmental restoration	33	5th
Resilient tourism planning and emergency preparedness	32	7th
Climate-resilient heritage preservation	31	8th
Sustainable tourism promotion	31	8th

Source: Adaptation options prioritization workshop, 2025.

Table 15. The Cape Coast Metropolis tourism and cultural heritage sector adaptation action plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Flood-resilient tourism infrastructure	To safeguard tourism facilities from flood damage through resilient design, drainage improvements, and structural retrofits	Number of facilities upgraded Reduced flood damage reports Increased tourist satisfaction during rainy season	Short to medium term	Engineering expertise Construction teams Flood risk assessments	CCMA, Ghana Tourism Authority (GTA), Hotels Association, NADMO	700,000 – 2,500,000
Tourism diversification and livelihood support	To promote alternative tourism models and build local capacities for eco-tourism, crafts, gastronomy, and community-led experiences	Increase in tourism product diversity Growth in non-heritage tourism revenues Number of women and youth employed	Medium term	Training workshops Business support services Equipment and branding support	CCMA, GTA, UCC, local entrepreneurs, women’s groups	250,000 – 800,000
Community engagement and education	To empower communities to steward and promote local heritage through education, storytelling, and participatory planning	Number of community-led heritage initiatives Increased local tourism participation Improved cultural asset care	Short term	IEC materials Training modules Outreach events	CCMA, Ghana Museums and Monuments Board, local chiefs, youth clubs	100,000 – 300,000
Financial assistance and risk management	To provide recovery support and risk protection for small-scale tourism operators through grants, loans, and micro-insurance schemes	Number of businesses receiving support Uptake of climate risk insurance Business recovery after climate shocks	Short to medium term	Financial literacy programs Insurance tools Recovery fund establishment	CCMA, MASLOC, microfinance institutions, tourism NGOs	300,000 – 1,000,000

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Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Coastal protection for heritage sites	To shield heritage structures from coastal erosion through sea walls, sand nourishment, and integrated coastal management	Linear meters of coast protected Stability of at-risk heritage sites Reduced erosion rates	Long term	Sea defence structures Coastal engineers Monitoring systems	CCMA, Hydrological Services, UNESCO, MESTI	15,000,000 – 60,000,000+

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.8 Trade, Industry, and Finance Sectors Adaptation Options

Cape Coast's trade and finance ecosystem is deeply interwoven with the city's informal economy—markets hum with the energy of women traders, youth artisans, and itinerant vendors, all of whom are disproportionately vulnerable to climate impacts. Flooded markets, damaged road networks, power outages, and rising temperatures interrupt daily commerce, compromise goods, and erode fragile financial stability.

The CCMA-CCVA pointed to the urgent need for climate-proofed economic infrastructure, financial inclusion, and digitally enabled adaptive capacities. While this sector was not covered in the original MCA scoring, a hypothetical ranking (Tables 16 and 17) based on expert consultations and practical experience highlights the most transformative adaptation pathways.

Climate-proofing market infrastructure and trading spaces (ranked first): Markets like Kotokuraba, Abura, and Pedu are lifelines of urban livelihoods, yet they frequently suffer from drainage blockages, roof damage, and heat stress. Upgrading stalls with flood-resistant flooring, shade systems, and secure storage units, alongside improved sanitation, will ensure that daily trade continues even in extreme weather. The move toward climate-resilient open-air vending zones is not just about safety—it is about dignity and continuity for everyday business owners.

Inclusive access to microfinance and green investment capital (ranked second): Many small traders lack the collateral or networks needed to access formal finance. Creating targeted green loan products, climate insurance schemes, and start-up grants for eco-enterprises—especially those led by women and youth—will empower vulnerable groups to adapt and thrive. Collaboration with institutions like Microfinance and Loans Centre (MASLOC), GN Bank, and local fintech start-ups can drive this initiative.

Business continuity training and financial literacy (ranked third): Adaptation is not only structural—it is strategic. Small and informal businesses require skills in record-keeping, inventory management, risk planning, and climate-responsive business models. Training programs, developed with input from UCC Business School and local NGOs, can strengthen adaptive capacity and reduce post-disaster economic loss.

Early warning integration into trade networks (ranked fourth): Climate information is power. Embedding weather alerts and disaster forecasts into trader associations, market notice boards, and mobile platforms can enable timely decisions to move goods, shelter assets, or reroute deliveries. This action is especially critical for perishable goods traders and urban transporters, who operate on tight margins and tight schedules.

Digital and circular economy platforms (ranked fifth): Looking ahead, Cape Coast must not only adapt—it must innovate. Investing in digital trade platforms, mobile payments, and circular economy enterprises (e.g., plastic waste upcycling, agro-waste energy conversion) will generate green jobs while reducing environmental pressure. Training youth and artisans in these fields can unlock new value chains and deepen local resilience.

Table 16. Ranked and prioritized adaptation actions for the trade, industry, and finance sectors

Adaptation option	Total score	Rank
Climate-proofing market infrastructure and trading spaces	45	1st
Inclusive access to microfinance and green investment capital	43	2nd
Business continuity training and financial literacy	42	3rd
Early warning integration into trade networks	39	4th
Digital and circular economy platforms	37	5th

Source: Adaptation options prioritization workshop, 2025.

Table 17. The Cape Coast Metropolis trade, industry, and finance sector adaptation action plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Climate-proofing market infrastructure and trading spaces	To enhance resilience of markets and vendor spaces to climate hazards such as flooding and heat stress through structural upgrades	Number of market stalls upgraded Reduction in flood-related vendor losses Improved vendor satisfaction and safety	Short to medium term	Construction materials Local contractors Urban design support	CCMA, Ghana Markets Federation, Department of Urban Roads, local engineers	1,500,000 – 5,000,000
Inclusive access to microfinance and green investment capital	To increase financial resilience of MSMEs and informal traders through tailored green loans, micro-insurance, and start-up capital	Number of beneficiaries accessing credit Increase in climate-smart investments Uptake of micro-insurance products	Medium term	Microfinance platforms Investment capital Credit unions and financial advisors	CCMA, MASLOC, fintech partners, women's groups	500,000 – 1,800,000
Business continuity training and financial literacy	To strengthen adaptive capacity of informal businesses through training in risk planning, digital finance, and bookkeeping	Number of traders trained Adoption of continuity plans Post-disaster recovery rates improved	Short term	Training modules Business mentors Support staff	CCMA, UCC Business School, trade associations, NGOs	50,000 – 450,000
Early warning integration into trade networks	To provide real-time weather and disaster alerts to traders and transporters to reduce losses and improve safety	Functioning alert systems in markets Increased awareness and response Reduction in goods lost to climate events	Short term	ICT infrastructure SMS platforms Weather data integration	CCMA, NADMO, Ghana Meteorological Agency, market leaders	100,000 – 300,000

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Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Digital and circular economy platforms	To support youth and MSMEs in adopting e-commerce, mobile trade, and sustainable production practices	Increase in digital transactions Number of green start-ups launched Participation of women and youth	Medium term	Digital tools Tech facilitators Circular economy incubators	CCMA, Ghana Enterprise Agency, UCC Tech Hub, private sector partners	200,000 – 700,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

3.9 Forestry (Biodiversity and Ecosystems) Adaptation Options

The Cape Coast Metropolis, though urban in character, retains key fragments of peri-urban forests, wetlands, coastal groves, and sacred ecological spaces that provide irreplaceable ecosystem services. Yet, these ecological anchors are under siege—from rapid urban expansion, sand winning, pollution, and increasingly erratic climate patterns. The degradation of green spaces threatens not only biodiversity but also the CCMA’s ability to regulate floods, maintain air quality, and buffer coastal erosion.

Stakeholders consulted during the CCVA recognized that urban biodiversity is not a luxury—it’s a necessity. From restoring the Kakum River catchment to reforesting degraded coastal buffer zones, there is growing urgency to integrate nature into the heart of Cape Coast’s adaptation strategy (Tables 18 and 19).

Table 18. Ranked and prioritized adaptation actions for the forestry, biodiversity, and ecosystems sector

Adaptation option	Total score	Rank
Urban reforestation and afforestation campaigns	46	1st
Restoration of wetlands and riparian buffers	44	2nd
Coastal ecosystem conservation and mangrove rehabilitation	42	3rd
Community green spaces and sacred grove protection	40	4th
Biodiversity education and ecotourism integration	38	5th

Source: Adaptation options prioritization workshop, 2025.

Urban reforestation and afforestation campaigns (ranked first): The loss of tree cover in Cape Coast’s urban and peri-urban zones has exacerbated the urban heat island effect and flash flooding. Community-led reforestation of degraded slopes, roadsides, and buffer lands—especially with indigenous, drought-tolerant species—can restore ecological integrity and shade livelihoods. Neighbourhoods like Abura, Ola, and Nkanfoa stand to benefit greatly from increased tree canopy.

Restoration of wetlands and riparian buffers (ranked second): Wetlands around the Brimso catchment and Kakum River tributaries serve as natural sponges for runoff and biodiversity hotspots. Their restoration through planting native wetland vegetation, enforcing no-dumping zones, and pollution control will improve water regulation, bird habitat, and community resilience.

Coastal ecosystem conservation and mangrove rehabilitation (ranked third): In low-lying coastal areas like Brofoyedru and Abakam, mangroves and vegetated dunes once provided natural protection. Restoration programs combining community planting, awareness campaigns, and scientific monitoring are critical for storm surge mitigation and carbon sequestration.

Community green spaces and sacred grove protection (ranked fourth): Urban parks, cultural groves, and school gardens are important not just for cooling and biodiversity but also for spiritual and cultural continuity. Protecting these spaces requires zoning tools, cultural heritage alliances, and education initiatives that place green back at the heart of the city.

Biodiversity education and ecotourism integration (ranked fifth): By blending biodiversity awareness with ecotourism and educational programming, Cape Coast can promote environmental stewardship while creating jobs. Schools, nature clubs, and tour operators can collaborate to create trails, nature interpretation sites, and green cultural itineraries.

Table 19. The Cape Coast forestry, biodiversity and ecosystems sector adaptation action plan

Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Urban reforestation and afforestation campaigns	To increase urban green cover and reduce heat stress through large-scale planting of indigenous, drought-tolerant trees	Number of trees planted and surviving Reduction in urban temperatures Increased green space per capita	Short to medium term	Seedlings and nursery supplies Community volunteers Urban forestry expertise	CCMA, Forestry Commission, UCC Department of Botany, community associations	250,000 – 750,000
Restoration of wetlands and riparian buffers	To protect water bodies and reduce flooding by restoring degraded wetlands and vegetated buffer zones	Hectares of wetland restored Reduction in surface runoff Biodiversity indicators improved	Medium term	Native wetland plants Restoration tools Community monitoring teams	CCMA, Environmental Protection Agency (EPA), WRC, conservation NGOs	400,000 – 1,200,000
Coastal ecosystem conservation and mangrove rehabilitation	To strengthen natural coastal defences and carbon sinks through mangrove planting and dune stabilization	Area of mangroves restored Reduced coastal erosion Local participation rates	Short to long term	Mangrove seedlings Coastal mapping Climate-smart planting guides	CCMA, Hydrological Services, local fisherfolk unions, coastal NGOs	500,000 – 1,800,000
Community green spaces and sacred grove protection	To conserve cultural and ecological heritage sites by protecting sacred groves and creating community parks	Number of groves legally protected New green spaces developed Community engagement in conservation	Short term	Legal support Park design inputs Cultural partnerships	CCMA, traditional councils, heritage NGOs, school clubs	150,000 – 450,000

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Adaptation actions	Objectives	Indicators of success	Time frame	Resources (finance, human, technology)	Implementing partners	Estimated cost (GH¢)
Biodiversity education and ecotourism integration	To promote awareness of local biodiversity through eco-trails, nature education, and green livelihoods	Number of eco-education programs held Visitor numbers at eco-sites Youth employment in green tourism	Short to medium term	Educational signage Guide training Promotional materials	CCMA, Ghana Tourism Authority, UCC, environmental NGOs	100,000 – 300,000

Source: Adaptation options prioritization workshop, 2025. Estimated cost (GH¢) figures are approximate and subject to change based on fluctuating exchange rates (USD 1 ≈ GH¢ 10.25 at time of estimation) and local market prices (June 10, 2025).

4.0 Strategic Funding and Investment Framework

4.1 Introduction

The successful implementation of Cape Coast Metropolitan Assembly’s Climate Action Plan hinges on a robust and context-sensitive funding strategy. As a coastal city historically rooted in tourism, fishing, trade, and education, Cape Coast faces intensifying climate risks—tidal surges, coastal erosion, urban flooding, heatwaves, and ecosystem degradation—that demand urgent and sustained investment.

This Strategic Funding and Investment Framework aims to achieve two core objectives:

- To mobilize a diverse array of funding sources that reflect Cape Coast’s needs and opportunities, and
- To establish fair and transparent criteria for allocating and prioritizing funds to ensure climate justice, efficiency, and sustainability.

Drawing from Ghana’s National Adaptation Plan, as well as the CCMA’s development priorities, this framework proposes an integrated mix of national, international, public-private, community-based, and innovative financing models. By doing so, it offers Cape Coast a roadmap to climate resilience that is not only financially viable, but also inclusive and forward-looking.

4.2 Potential Funding Sources for CCMA

The Cape Coast Metropolis’s path toward climate resilience depends heavily on unlocking diverse funding streams that match its unique geography, socio-economic profile, and historical vulnerabilities. From rising sea levels and heat stress in the south to flood-prone peri-urban farming zones in the north, the city’s adaptation needs span sectors such as water, sanitation, health, coastal infrastructure, livelihoods, and ecosystems.

This section outlines a comprehensive suite of funding sources, emphasizing multi-level financing mechanisms that can accelerate local adaptation while enhancing long-term economic sustainability.

4.2.1 Government Funding (National and Local)

Government funding remains the first line of defence in addressing climate adaptation across Ghana’s districts. For the CCMA, national and local budgetary allocations must support infrastructure upgrades, social safety nets, and integrated urban planning initiatives tailored to coastal risk.

Key government mechanisms relevant to the CCMA include:

a. Climate financing division in the Ministry of Finance: This national vehicle is pivotal for financing local adaptation plans. In Cape Coast, it can support:

- Coastal erosion control: Hard and soft shoreline interventions (e.g., vegetative buffers, revetments) in Brofoyedru and Abakam.

- Public health systems strengthening: Upgrading CCTH and CHPS compounds with solar cooling systems and flood-proof design.
- Drainage and wastewater upgrades: Particularly in flood hotspots like Mempeasem and Kwaprow.

b. District Assemblies Common Fund: This discretionary fund can finance smaller-scale, locally driven adaptation initiatives, including:

- Construction of climate-resilient market stalls in Kotokuraba and Abura
- Water access systems in underserved communities such as Ewusikrom and Dehia
- Training youth cooperatives in eco-enterprise development and climate services

c. Ministry of Environment, Science, Technology and Innovation (MESTI): MESTI's funding windows can back:

- Nature-based solutions: Restoration of mangroves and riparian buffers near Kakum River tributaries.
- Innovation pilots: Mobile early warning alert systems for traders and fishers.
- Data and monitoring infrastructure: GIS and weather-data tools for city-level climate decision making.

d. Ministry of Sanitation and Water Resources: To address urban sanitation and potable water access challenges in low-lying settlements:

- Rainwater harvesting infrastructure and household greywater recycling systems
- Flood-proof public toilets in coastal and market areas
- Expansion of piped water systems to peri-urban farming zones

e. Ghana Infrastructure Investment Fund: This fund supports large-scale, climate-resilient infrastructure. For CCMA:

- Rehabilitation of storm-damaged roads and bridges (e.g., Pedu–Abura corridor)
- Renewable energy integration in public buildings and schools
- Strategic drainage masterplan implementation for urban Cape Coast

4.2.2 International Aid and Grants

Global climate finance is crucial for Cape Coast, given its high vulnerability and relatively low municipal revenue. International development partners can catalyze transformational adaptation through both technical support and direct funding.

Key opportunities include:

- **Green Climate Fund (GCF):** For multi-sector adaptation investments, such as coastal greenbelt rehabilitation, climate-resilient tourism planning, and clean energy for markets and clinics.
- **Adaptation Fund (AF):** Focused on vulnerable populations; can support slum upgrading in flood-prone areas and heat-mitigation infrastructure in urban schools.
- **Global Environment Facility (GEF):** For biodiversity protection, community forest reserves, and sustainable wetland management near Brimsu and Kakum Basin.
- **Bilateral donors (e.g., GIZ, USAID, the UK Foreign, Commonwealth and Development Office):** Can fund community waste-to-energy pilots, gender-inclusive climate finance programs, and MSME capacity building.
- **Philanthropic institutions (e.g., Gates, Ford foundations):** For digital climate services, green skills training, and public education campaigns.
- **Multilateral development banks (World Bank, African Development Bank):** For large capital-intensive projects like coastal resilience infrastructure or renewable mini-grids.
- **UN agencies (UNDP, UNEP, UNICEF):** For child-focused adaptation planning, water and sanitation improvements, and ecosystem-based disaster risk reduction.

4.2.3 Public-Private Partnerships

Cape Coast's private sector—hotels, fish processors, tourism operators, traders, educational institutions—must be seen as co-investors in climate resilience. Public-private partnerships (PPPs) allow for shared responsibility in financing and innovation.

Opportunities for PPPs in CCMA:

- **Resilient tourism infrastructure:** Coastal resorts and hospitality businesses can co-finance erosion control and wastewater systems along the beach strip.
- **Solar-powered cold storage:** For fish processors and informal vendors vulnerable to heat-induced spoilage.
- **Green transport infrastructure:** PPPs for electric shuttle systems within Cape Coast city centre, linked to low-carbon urban mobility.
- **Agri-climate finance platforms:** Retailers and agri-processors can support youth-led peri-urban vegetable enterprises with irrigation and marketing solutions.
- **Community market revamps:** Formalization and climate-proofing of informal vending zones through cost-sharing between traders' associations and developers.

4.2.4 Community and Local Fundraising

Locally anchored fundraising taps into the collective strength of Cape Coast's civil society—chiefs, youth groups, religious leaders, traders, and schools.

Effective community-based mechanisms include:

- Cultural festivals as fundraisers: Leveraging events like the *Fetu Afahye* festival to crowdsource funds for tree planting or flood-mitigation works.
- Savings and loans schemes: Women’s groups in Abura or fishmongers’ cooperatives in Brofoyedru pooling savings to finance adaptive infrastructure.
- Faith-based contributions: Churches and mosques promoting environmental stewardship and offering climate tithes.
- Micro-donations via mobile money: “1 Cedi for Climate” campaigns to build decentralized solar water kiosks in underserved areas.
- Youth innovation crowdsourcing: UCC and Cape Coast Technical University students and alumni mobilizing grants for green start-ups and climate-smart apps.

4.2.5 Innovative Financing Mechanisms

Cape Coast can pioneer emerging climate finance tools to scale up investment and unlock global capital.

Innovative pathways include:

- Green bonds: Issued by CCMA in collaboration with the Ministry of Finance to finance coastal protection, green market infrastructure, and resilient public spaces.
- Payments for ecosystem services: Local businesses and water utilities paying upstream communities to preserve Kakum catchment forests.
- Blue carbon credits: Generated from mangrove restoration projects in Abakam and Brofoyedru and traded via global carbon markets.
- Blended finance facilities: Pooling grants and concessional loans to derisk climate-smart infrastructure (e.g., storm-resistant schools).
- Impact investment platforms: Attracting climate-aligned investors into waste-to-energy pilots or ecotourism incubators.
- Climate risk insurance pools: Micro-insurance tailored for market vendors and fisheries exposed to storm disruptions.

4.3 Criteria for Allocation and Prioritization of Funds

The efficient, transparent, and equitable resource allocation is essential to achieving Cape Coast’s climate adaptation vision. With limited financial resources and rising climate risks, CCMA must deploy funds to where they are most needed, where they can do the greatest good, and where they leave no one behind.

The criteria below provide a clear framework to guide funding decisions—from local infrastructure investments to major ecosystem restoration projects—anchored in principles of climate justice, community ownership, environmental sustainability, and fiscal responsibility.

4.3.1 Alignment With Cape Coast's Climate Priorities

Adaptation projects must directly address the key vulnerabilities and priority areas identified in the CCVA. These include:

- Flood mitigation and drainage (Mempeasem, Interbeton, Academy)
- Coastal erosion control (Abakam, Brofoyedru)
- Health sector resilience (CCTH and CHPS zones)
- Livelihood protection (peri-urban farmers in Efutu, traders in Kotokuraba) priority is given to interventions that support Cape Coast's broader development goals and Ghana's NAP framework

Example: Drainage system upgrades and maintenance (infrastructure sector)

This intervention responds directly to the recurring urban floods in Abura New Town, Interbeton, and Mempeasem, which the CCVA identified as flood-prone hotspots.

4.3.2 Scale and Breadth of Impact

Projects that benefit a larger portion of the population or multiple vulnerable groups and sectors will be prioritized. For example:

- Drainage improvements that reduce flood risks across multiple neighbourhoods
- Ecosystem restoration that improves biodiversity, water regulation, and food security

Example: Community water management and education (water and sanitation sector)

A city-wide campaign to enhance water conservation, hygiene, and local governance of communal systems will serve both urban and peri-urban areas, reaching youth, women's groups, and schools.

4.3.3 Inclusivity and Equity

Funds will be channeled to ensure the inclusion of:

- Women and youth, especially in fisheries, trade, and health
- Informal vendors and low-income households in flood-prone zones
- Differently abled individuals, often excluded from resilience planning. Projects must actively promote gender equity, accessibility, and empowerment of marginalized voices

Example: Financial inclusion and support for women (gender and livelihoods sector)

This action promotes access to microcredit for women traders and fishmongers in Kotokuraba Market and Brofoyedru, who face disproportionate economic risks due to climate shocks.

4.4.4 Urgency of Need

Prioritization will favour interventions that respond to immediate threats or areas of recurring loss. Examples include:

- Relocation or protection of schools frequently closed due to storm damage
- Installation of tidal warning systems where surges threaten lives and assets

Example: Coastal defence and erosion control (infrastructure and tourism sectors)

High-risk communities like Abakam and Brofoyedru face frequent tidal surges. Funding shoreline reinforcement here is time-sensitive and life-saving.

4.3.5 Cost Effectiveness

Projects must demonstrate high returns relative to cost, measured in terms of:

- Reduced climate-related losses (e.g., health costs, property damage)
- Enhanced productivity (e.g., improved water supply for peri-urban agriculture)
- Use of community labour, local materials, or technology to minimize expenses

Example: Rainwater harvesting and storage (water sector)

This intervention provides an affordable and scalable solution for peri-urban areas like Ewusikrom, enhancing water security with minimal overhead.

4.3.6 Technical Feasibility and Implementation Readiness

Priority will be given to actions that:

- Are backed by solid technical designs or pilot success
- Have institutional partners or local champions identified
- Have implementation logistics (e.g., land access, permits, staff) resolved or feasible

Example: Climate-smart agriculture practices (agriculture sector)

Already piloted in Dehia and Efutu, these practices (e.g., composting, drought-resistant seeds) are backed by CCMA's Agricultural Department and local farmer groups.

4.3.7 Environmental Co-Benefits

Funding will favour interventions that enhance biodiversity, carbon sequestration, water regulation, or pollution reduction. For instance:

- Mangrove replanting projects that protect coastlines and act as carbon sinks
- Greening of urban markets or schools that reduce urban heat and improve air quality

Example: Urban reforestation and afforestation campaigns (forestry sector)

This intervention improves urban air quality, reduces heat stress, and enhances carbon capture—particularly in Pedu and Nkanfoa, where tree cover is diminishing.

4.3.8 Long-Term Sustainability and Scalability

Proposals must demonstrate how benefits will continue beyond the funding period. Preference will be given to:

- Community-managed systems (e.g., solar irrigation or clean toilets)
- Projects designed for easy replication in other parts of the metropolis or region

Example: Solar-powered cold storage for traders (trade sector)

A prototype facility for fish traders near Kotokuraba could be scaled to other informal markets across the city once successful.

4.3.9 Community Participation and Ownership

Interventions with strong community involvement during:

- Design (e.g., participatory needs assessment)
- Implementation (e.g., local labour or co-financing)
- Monitoring (e.g., citizen-based data collection) will score higher in fund prioritization.

Example: Community-based health programs (health sector)

Programs offering climate-related health education and early disease surveillance in Academy and Abura New Town are based on grassroots mobilization and CHPS collaboration.

4.3.10 Potential for Leveraging Additional Resources

Projects that demonstrate potential to:

- attract co-funding (e.g., from the private sector, donor agencies),
- unlock technical support from academic institutions (e.g., UCC),
- build momentum for future rounds of finance (e.g., GCF readiness support) will receive strategic preference.

Example: Biodiversity education and ecotourism integration (tourism sector)

Eco-tour trails near **Kakum National Park buffer zones** can attract funding from tour operators, conservation NGOs, and CSR budgets of local enterprises.

4.4 Implementation Process for Fund Prioritization

Translating Cape Coast’s Metropolis’ Climate Action Plan from vision to action demands a robust, transparent, and participatory process for prioritizing funding across sectors and interventions. This process must ensure that limited resources are allocated efficiently, equitably, and strategically.

The following four-step implementation sequence outlines how the CCMA will assess, select, and fund the most impactful climate adaptation interventions. Examples are embedded to enhance stakeholder understanding and to illustrate real-world applications.

Step 1: Scoring and ranking of adaptation options

All proposed adaptation interventions—whether emerging from sectoral plans, community suggestions, or technical recommendations—will undergo a systematic MCA. Each project will be scored across the ten prioritization criteria.

- Scoring template: Each criterion (e.g., urgency, equity, scalability) will be assigned a numerical value (e.g., 1–5), allowing for objective comparison across projects.

Example

A solar-powered irrigation system proposed for peri-urban farms in Dehia may score highly on cost-effectiveness, alignment with local priorities, and environmental co-benefits, while a tourism-focused flood-resilient boardwalk may score better on leveraging external funding and long-term sustainability.

- Weighting option: CCMA may assign higher weights to urgent needs or equity-focused projects during extreme climate years.

The result of this step is a ranked list of adaptation actions by sector and overall impact, offering a technical basis for fund allocation.

Step 2: Stakeholder consultation forums

Before final decisions are made, inclusive consultation platforms will be convened to validate, refine, and legitimize the rankings.

Participants will include:

- Community representatives from vulnerable zones like Kwaprow and Brofoyedru
- CSOs and NGOs working on health, gender, and biodiversity
- Academic experts from UCC
- Private sector actors, especially from tourism, fisheries, and market associations

These dialogues will:

- Address any gaps in the ranking logic
- Integrate traditional and indigenous knowledge
- Confirm feasibility and community acceptance
- Identify opportunities for co-funding or in-kind contributions

Example

During a validation workshop, participants emphasize the urgency of storm-resistant market shelters, prompting an upward adjustment in that intervention's ranking despite moderate cost-effectiveness.

Step 3: Approval and budget integration

Following consultation, the highest-ranked and validated interventions will be recommended for inclusion in the CCMA's:

- Annual composite budget
- Medium-Term Development Plan (MTDP)
- Sectoral implementation frameworks (e.g., government departments of health, works, agriculture)

This ensures that prioritized adaptation actions are:

- Legally and financially committed through formal planning instruments
- Assigned to responsible departments for implementation
- Considered for local, national, and donor financing windows

Example

If community-based health programs on heat preparedness are approved, CCMA will allocate budget lines within the Environmental Health and Sanitation Directorate and explore co-financing from the Adaptation Fund.

Step 4: Monitoring, evaluation, and learning

Once implemented, funded projects will be tracked through a results-based monitoring and evaluation system that links back to the prioritization criteria.

- Key performance indicators will be defined per project (e.g., number of women supported, reduction in flood frequency, hectares reforested)
- Quarterly reports and community scorecards will be used to assess progress
- Lessons learned will feed into subsequent funding cycles and help refine scoring tools

Example

The Reforestation and Green Corridor project in Nkanfoa might be evaluated on the number of trees surviving after one year, community participation levels, and observed reductions in localized flooding.

5.0 Framework for Adaptation Monitoring, Evaluation, and Learning

5.1 Introduction

The framework for monitoring, evaluation, and learning (MEL) is a vital mechanism to ensure that climate adaptation efforts in the Cape Coast Metropolitan Assembly are effective, inclusive, and continuously improved. Cape Coast’s exposure to coastal erosion, tidal surges, heat stress, flooding, and biodiversity loss, as well as socio-economic vulnerabilities across sectors like trade, infrastructure, health, and tourism, requires an adaptive governance model driven by evidence and accountability.

This MEL framework provides a structured, participatory approach for tracking the progress of adaptation actions, assessing their long-term effectiveness, capturing lessons learned, and informing future strategies. It aligns with Ghana’s National Adaptation Plan and global frameworks such as the Sustainable Development Goals (SDGs) and the Paris Agreement, while reflecting the distinct environmental and social contours of Cape Coast.

Key objectives of the MEL framework for the CCMA

- **Track progress and performance**
Ensure that adaptation projects—such as flood-resilient markets in Kotokuraba or solar irrigation in Abura—are implemented on schedule and achieve expected milestones.
- **Assess effectiveness and equity impact**
Evaluate whether interventions (e.g., wetland restoration or urban tree planting) reduce vulnerability and enhance resilience in communities like Nkanfoa, Ewusikrom, and Brofoyedru—with a focus on benefits for women, youth, and marginalized populations.
- **Promote transparency and accountability**
Provide clear documentation and reporting to stakeholders, including communities, donors, NGOs, and government partners, with disaggregated reporting by gender and age where applicable.
- **Foster learning and innovation**
Capture and share lessons from pilot projects—such as community-based climate health programs in Mempeasem—to improve future interventions.
- **Support adaptive management**
Enable real-time project adjustments based on new data or emerging climate risks, like storm surges along the Abakam coastline.
- **Strengthen local capacity**
Build the technical, managerial, and analytical skills of municipal staff, NGOs, youth groups, traditional leaders, and women-led community associations.

- **Ensure alignment with national and global frameworks**
Align Cape Coast’s adaptation tracking system with the National Adaptation Plan (NAP), Ghana’s Gender and Climate Change Strategy, SDG targets, and Africa’s Agenda 2063.

5.2 MEL Design for the Cape Coast Metropolitan Assembly

5.2.1 Monitoring Framework

Monitoring in the CCMA will focus on both tangible outputs (e.g., kilometres of drainage upgraded, number of flood shelters built) and qualitative shifts (e.g., increased community awareness or women's participation in decision making).

Example

Monitoring the performance of the stormwater management upgrades near Pedu Junction will involve tracking reductions in localized flooding, improved traffic access, and feedback from residents and market traders.

5.2.2 Objectives of the Monitoring Framework

1. **Track implementation of key adaptation measures**
Including: construction of coastal defences in Abakam, upgrading market infrastructure in Kotokuraba, and launching heat-health campaigns in schools.
2. **Identify operational bottlenecks early**
For example, if rainwater harvesting systems installed in Dehia are underutilized due to maintenance issues, monitoring will trigger a review.
3. **Ensure inclusive reporting and participation**
Progress reports will include data disaggregated by gender and age, highlighting the involvement of market women, youth climate clubs, and fisherfolk.
4. **Inform decision making through data**
Municipal planners will use monitoring dashboards to decide whether to scale green corridor pilot sites in Nkanfoa and Academy.
5. **Assess long-term impacts**
Such as the restoration of the Kakum River buffer zones, measured by improved vegetation health and water retention.

5.2.3 Key Indicators and Metrics

To effectively track progress and evaluate the outcomes of adaptation interventions within the CCMA, a set of context-specific indicators has been developed. These indicators span across environmental, social, and infrastructural dimensions to ensure a comprehensive understanding of change over time (Table 20).

Table 20. Sample monitoring and evaluation indicators for climate adaptation in the CCMA

Indicator category	Examples of indicators
Reduction in climate hazards	% reduction in flood-related infrastructure loss in Abura or Mempeasem
Environmental recovery	Hectares of restored wetland in Ewusikrom or mangrove regeneration along coastlines
Community engagement	% of women or youth involved in early warning system trainings in Cape Coast Technical University
Infrastructure performance	Functionality rate of solar-powered boreholes in peri-urban farming zones
Knowledge sharing	Number of MEL-related workshops held and best practices shared across communities
Gender equity and empowerment	% of women-led groups participating in adaptation planning; number of women accessing climate finance

Source: Authors

5.2.4 Data Collection Methods

- Community-based reporting**
 Local actors such as market committees, school environmental clubs, and fisher associations will report changes using participatory tools, with emphasis on engaging women and youth.
- Remote sensing and GIS**
 Used to track urban sprawl, coastal land loss, and green cover decline in areas like Ekon and Interbeton.
- Household surveys and focus group discussions**
 Capture lived experiences of women vendors or flood-affected youth through interviews and participatory mapping.
- Mobile-based reporting systems**
 Traders and fisherfolk will be trained to submit simple mobile updates on climate events or system functionality.
- Environmental sensors**
 Installed in low-lying neighbourhoods (e.g., Academy, Mempeasem) to track rainfall and surface water levels.

5.2.5 Roles and Responsibilities

An effective implementation of the MEL framework depends on the active involvement and collaboration of diverse stakeholders. Each actor—ranging from government institutions to community-based organizations and private entities—plays a vital role in tracking progress, validating outcomes, and fostering continuous learning. Clearly defining roles and responsibilities ensures ownership, accountability, and sustainability of adaptation initiatives. Table 21 summarizes the core functions of key stakeholders involved in the MEL system for climate adaptation in the CCMA.

Table 21. Roles and responsibilities of MEL stakeholders in the CCMA

Stakeholder	Responsibility
CCMA planning and environment units	Lead MEL coordination, align with budget cycles, ensure gender-responsive indicators, and liaise with the National Development Planning Commission (NDPC)
Sector departments	Track and report on sector-specific indicators (e.g., Health Directorate on heat impacts), including gender-differentiated health or livelihood outcomes
Communities and CSOs	Engage in participatory tracking, ensure women’s groups are included in validation and learning exchange
UCC and academia	Provide research, data analysis, and independent evaluations
Private sector partners	Report on PPP adaptation initiatives (e.g., solar installations in markets), with a focus on gender-equitable outcomes.

Source: Authors

5.2.6 Learning and Adaptive Management

- Knowledge hubs**
 Establish a digital repository of reports, case studies, and training materials in collaboration with UCC and local libraries.
- Stakeholder learning forums**
 Annual climate review events will include sessions on gender-responsive adaptation practices (e.g., climate and culture summit hosted near Cape Coast Castle).
- Feedback loops**
 Include citizen feedback through sex- and age-disaggregated participatory scorecards, especially in areas with active community associations.

5.3 Steps in Implementing the MEL Framework

Operationalizing the MEL framework requires a phased, practical, and inclusive approach that ensures systematic tracking, feedback, and adaptation. This structured process enables the CCMA to assess whether adaptation initiatives are delivering results, responding to community needs, and improving over time. The steps outlined below reflect a cycle of learning, accountability, and continuous improvement, with context-specific examples drawn from the Cape Coast climate context (Table 22).

Table 22. Key steps in MEL implementation with contextual examples from the CCMA

Step	Activity	Example
1	Establish baselines and targets	Set baseline for urban tree coverage in Nkanfoa, target % increase by 2030
2	Develop M&E plans	Create detailed plans for tracking coastal erosion prevention near Brofoyedru
3	Build capacity	Train CSOs and CCMA staff on MEL tools, including mobile-based reporting and GPS mapping

4	Conduct participatory data collection	Youth in Cape Coast Technical University collect heat event logs from households during dry seasons
5	Analyze and validate data	Compare reported erosion reduction data from communities and satellite imagery
6	Generate reports and share findings	Present progress on heritage site protection at municipal planning meeting
7	Facilitate stakeholder feedback	Host forums in Abura and Ewusikrom to validate flood response projects
8	Apply learning to improve adaptation strategies	Adjust tourism infrastructure standards based on evaluation findings from storms in 2024
9	Establish feedback loops for continuous improvement	Regular dashboard reviews by CCMA's Climate Desk and Planning Directorate

Source: Authors

5.4 Ensuring the Sustainability of the MEL Framework

To embed the MEL framework into the DNA of CCMA's adaptation governance, the following strategies will be pursued:

1. Institutionalization

MEL will be formally included in all climate-related planning tools, budgets, and project proposals (e.g., inclusion in CCMA's composite budget guidelines).

2. Capacity development

CCMA staff, UCC interns, and youth volunteers will receive MEL training, with refresher workshops held annually.

3. Financing for MEL

Budget allocations will be earmarked for MEL in adaptation project lines, with funding gaps supported via donor contributions and PPP reporting mandates.

4. Community ownership

Fisherfolk and market vendors will act as local MEL champions, ensuring grassroots tracking and cultural relevance of data.

5. Gender-responsive budgeting

Dedicated resources will support the integration of gender indicators, training for female leaders, and gender audits of adaptation projects.

6. Integration with national systems

Alignment with NDPC, EPA-Ghana, and Ghana Statistical Service to ensure national reporting compatibility.

7. Digital knowledge hub

An online portal (housed by the CCMA) will host MEL datasets, lessons, maps, and tools—open to policy-makers, researchers, and the public.

8. Responsive reviews

MEL protocols will be reviewed every 3 years to adapt to new risks, technological advancements, and policy shifts.

6.0 Institutional Arrangements and Coordination Mechanisms

6.1 Introduction

Effective climate action requires not only well-designed interventions but also strong institutions, clear roles, and collaborative governance structures. In the Cape Coast Metropolitan Assembly, where climate risks span across coastal erosion, urban flooding, ecosystem degradation, and socio-economic vulnerability, coordination across sectors and scales is critical to ensure coherence, inclusivity, and impact.

This chapter outlines the institutional framework for implementing, monitoring, and scaling the Climate Action Plan (CAP). It builds upon existing governance structures within the CCMA, aligns with national climate policy instruments such as the National Adaptation Plan and the National Climate Change Policy, and embraces a multistakeholder, whole-of-society approach that engages local communities, academia, CSOs, private sector actors, and traditional authorities.

6.2 Lead Implementing Institution: The CCMA Climate Desk

The Cape Coast Metropolitan Assembly's Climate Desk, situated within the Planning and Environment Department, will serve as the central coordinating body for the CAP. It will oversee the implementation of priority actions, liaise with sector departments, monitor progress, and ensure integration with the district's Medium-Term Development Plan.

Key responsibilities of the Climate Desk:

- Integrate climate actions into all planning, budgeting, and procurement systems.
- Coordinate cross-sectoral project implementation (e.g., agriculture, infrastructure, health).
- Maintain a climate project dashboard for reporting and learning.
- Serve as the focal point for national reporting under the NAP and the EPA-Ghana frameworks.

6.3 Sectoral Implementation Partners

The effective implementation of the CCMA CAP requires the coordinated efforts of sector-specific institutions (Table 23). For each sector prioritized in the plan, a designated lead institution will coordinate activities, oversee implementation, ensure data collection, and report progress to the CCMA Climate Desk. These lead entities will be supported by relevant stakeholders, including civil society organizations, academic institutions, and private sector actors, fostering a multisectoral approach to resilience-building. This collaborative structure ensures ownership, accountability, and sustainability across all levels of governance and service delivery.

Table 23. Sectoral leads and supporting implementation partners for the CAP execution

Sector	Lead institution	Supporting partners
Agriculture	Ministry of Food and Agriculture	Farmer groups, NGOs
Water and sanitation	CCMA Works Department	CWSA, WRC, Sanitation Task Force
Health	Metropolitan Health Directorate	CHPS compounds, UCC, Red Cross
Gender and livelihoods	Social welfare and gender unit	Women’s associations, youth councils
Infrastructure	Works and urban roads departments	NADMO, Land Use and Spatial Planning Authority
Tourism and heritage	CCMA tourism office	Museums and Monuments Board, heritage NGOs
Trade and finance	Business development unit	Chamber of Commerce, GRA, Traders’ Unions
Biodiversity and ecosystems	Environmental health and forestry units	Forestry Commission, EPA, UCC Biology department.

Source: Authors

Example

For coastal heritage protection, the Tourism Office will lead, coordinating with NADMO (on disaster preparedness), EPA (on environmental impact assessments), and the Ghana Museums and Monuments Board.

6.4 National and Regional Linkages

To ensure vertical coherence, the CCMA will align its implementation with regional and national adaptation structures, drawing on technical and policy support from:

- EPA-Ghana and the MESTI for national climate policy guidance.
- National Development Planning Commission (NDPC) for alignment with M&E frameworks.
- Ghana Meteorological Agency for data and early warning systems.
- Bureau of Ghana Water Company and CWSA for water-related infrastructure and services.
- Regional Coordinating Council (RCC – Central Region) for harmonization across districts and access to regional funds.

6.5 Multistakeholder Engagement Mechanisms

An inclusive governance structure is key for adaptation success. The CCMA will establish a Climate Action Coordination Platform (CACP) made up of representatives from:

- Municipal departments

- Community-based organizations
- Traditional authorities
- Private sector actors
- Academic and research institutions (e.g., UCC)
- CSOs and NGOs
- Youth and gender-based advocacy groups

This platform will meet biannually to:

- Review progress and bottlenecks
- Provide policy advice and technical input
- Align local efforts with donor and national priorities
- Validate and co-design MEL tools

Example

For instance, during the pilot phase of mangrove restoration along the Kakum River, community members, UCC researchers, and green NGOs will co-lead site selection, training, and progress assessments.

6.6 Knowledge and Capacity Building

The CCMA will promote capacity development and knowledge exchange through:

- Training workshops for assembly staff on climate budgeting and MEL
- Community climate education sessions in markets, churches, and schools
- Partnerships with UCC for student internships and research on adaptation themes
- Knowledge-sharing forums with peer metropolitan, municipal, and district assemblies (e.g., Sekondi-Takoradi, Accra)

6.7 Private Sector and Traditional Authority Roles

- Private sector: Will play a role through PPPs for infrastructure, waste management, solar solutions, and climate-smart technologies
- Traditional authorities: Will provide local legitimacy, lead tree planting and wetland protection rituals, and ensure culturally appropriate adaptation planning.

6.8 Institutional Risks and Mitigation Strategies

The successful implementation of the Cape Coast Metropolitan Climate Action Plan hinges on addressing key institutional risks that may hinder progress. These include challenges such as capacity limitations, fragmented coordination, financial shortfalls, and low community engagement. Identifying these risks early and proactively applying targeted mitigation strategies will ensure that adaptation efforts remain resilient, inclusive, and sustainable. Table 24 summarizes the major institutional risks identified and the corresponding strategies designed to overcome them.

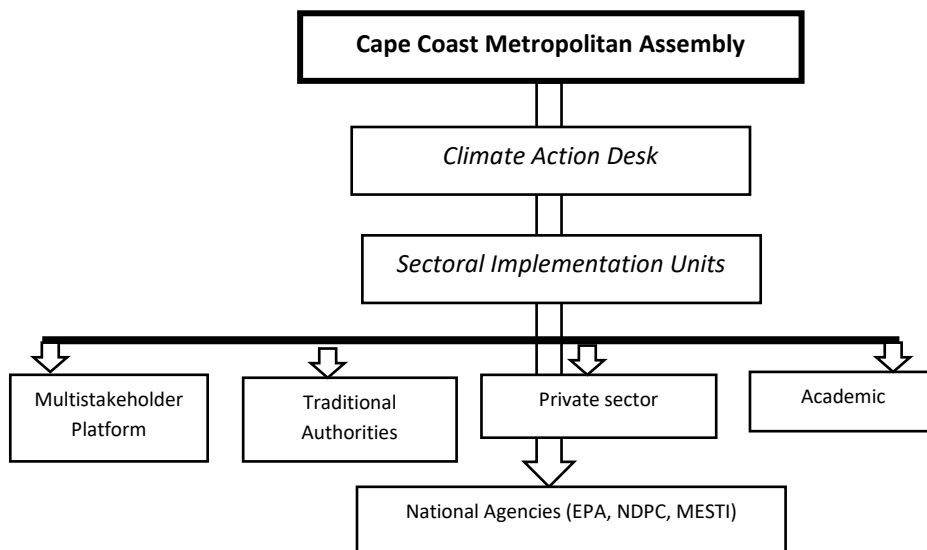
Table 24. Institutional risks and mitigation strategies for the CAP implementation

Risk	Mitigation strategy
Limited technical capacity	Partner with UCC, EPA, and NGOs for training and mentoring
Sectoral silos and poor coordination	Regular inter-departmental meetings led by the Climate Action Desk
Insufficient funding	Leverage blended finance and donor partnerships
Low community ownership	Strengthen participatory planning and MEL structures
Policy inconsistencies	Maintain regular liaison with the NDPC and RCC for policy updates

Source: Authors

The institutional framework illustrated in Figure 4 outlines the governance and coordination arrangements for the implementation of the CAP for the CCMA. At the apex of this structure is the Cape Coast Metropolitan Assembly, which provides overall political and administrative oversight. Directly beneath the Assembly sits the Climate Action Desk, which serves as the central coordinating body responsible for guiding, monitoring, and reporting on climate adaptation and mitigation activities.

Figure 2. Institutional coordination organogram for climate action in the Cape Coast Metropolitan Assembly



Source: Authors

The Sectoral Implementation Units—comprising departments and directorates such as health, agriculture, water and sanitation, and urban roads—operate as the technical arms of the plan, translating strategic guidance into on-the-ground interventions. These units engage with a diverse set of partners, including the private sector, academia, and traditional authorities, to ensure that interventions are both technically sound and contextually relevant.

To foster inclusivity and stakeholder engagement, a multistakeholder platform has been established, facilitating dialogue between civil society, community groups, and implementing agencies. The platform ensures that adaptation responses are co-produced with those most affected by climate risks.

At the national level, collaboration with national agencies—such as the Environmental Protection Authority, National Development Planning Commission, and the Ministry of Environment, Science, Technology and Innovation—ensures vertical alignment with Ghana’s national climate policies and development frameworks.

This multi-layered, cross-sectoral coordination model enhances efficiency, avoids duplication, and promotes collective ownership, ensuring that climate action in Cape Coast is both robust and resilient.

7.0 Conclusion and Recommendations

7.1 Introduction

The Cape Coast Metropolitan Assembly’s climate adaptation journey represents a critical turning point in safeguarding the city’s people, economy, and ecosystems from mounting climate threats. Located along Ghana’s Atlantic coast, Cape Coast is exposed to a range of intensifying hazards including tidal surges, coastal erosion, inland and urban flooding, sea-level rise, heatwaves, and shifting rainfall patterns—all exacerbated by rapid urbanization and ecosystem degradation.

This Climate Action Plan has been shaped through a participatory and evidence-based process. It builds on the foundational Cape Coast CCVA, stakeholder consultations, and a multi-criteria analysis that prioritized locally appropriate and sector-specific adaptation responses. Encompassing fisheries, health, water, sanitation, tourism, and forestry, this plan provides a comprehensive roadmap for mainstreaming resilience into metropolitan planning and development.

Importantly, the plan is anchored in a monitoring, evaluation, and learning framework that ensures adaptive management and accountability. The recommendations that follow offer concrete actions to ensure sustainability, equity, and impact, drawing on the vision, knowledge, and aspirations of Cape Coast’s institutions, communities, and partners.

7.2 Recommendations

7.2.1 Strengthen Institutional Capacity for Climate Governance

To lead its climate agenda effectively, the CCMA must establish a dedicated Climate Action Desk within the Metropolitan Assembly, linked to relevant technical departments such as planning, environmental health, physical planning, agriculture, and works. This desk should coordinate sectoral implementation, manage MEL processes, and lead engagement with external stakeholders including EPA, NDPC, MESTI, and UCC.

Example

The organogram (Figure 4) outlines this coordination structure. Sector leads can oversee implementation of key actions such as flood-resilient infrastructure or early warning systems.

7.2.2 Enhance Community Engagement and Ownership

Engaging vulnerable communities—especially those in flood-prone zones such as Mempeasem, Abura New Town, Brofoyedru, and Dehia—is essential. The CCMA should expand its use of participatory approaches, traditional authorities, and local youth networks in project planning, implementation, and monitoring.

Example

Coastal women in Brofoyedru and Abakam already play a central role in fish processing. Thus, involving them in mangrove restoration or heritage preservation will ensure culturally resonant and effective outcomes.

7.2.3 Secure Diverse and Sustainable Funding

To implement high-impact adaptation options such as coastal protection for heritage sites, wastewater and sanitation system upgrades, or rainwater harvesting in schools, the CCMA must mobilize funds from a range of sources:

- Internally Generated Funds
- District Assemblies Common Fund
- Ghana Climate Change Fund
- International climate finance (e.g., GCF, Adaptation Fund)
- Public-private partnerships and philanthropic funding

Example

Green bonds could be explored to fund climate-resilient tourism infrastructure, while the GEF may support the restoration of the degraded Fosu Lagoon.

7.2.4 Prioritize Inclusivity and Gender-Responsive Planning

Women, youth, and informal sector actors face disproportionate climate risks. The adaptation plan must empower these groups through leadership roles, access to credit, training in sustainable livelihoods, and involvement in local decision-making platforms.

Example

Gender-responsive initiatives like Education and Skills Development for Women and Girls and Climate-Resilient Livelihoods for Women and Youth were ranked high during the MCA process and should be fast-tracked.

7.2.5 Embrace Technology and Innovation

Cape Coast's adaptation responses should leverage innovations such as:

- GIS mapping for flood-prone zones

- Mobile apps for early warning systems
- Environmental sensors for heat and rainfall monitoring
- Digital platforms for market access and youth-led e-commerce ventures

Example

Youth groups in Ewusikrom and Pedu could be supported to pilot solar-powered weather stations for flood prediction and community alerts.

7.2.6 Establish a Strong Knowledge and Learning Culture

The CCMA should create structured platforms for south-south learning, cross-district exchanges, and partnerships with UCC and other academic institutions. Knowledge generated through the MEL framework should inform future iterations of this Plan.

Example

CCMA can organize annual Climate Resilience Forums bringing together academia, youth, civil society, and the private sector to review progress, challenges, and innovation.

7.3 Conclusion

The development of this Climate Action Plan for the Cape Coast Metropolitan Assembly represents a forward-looking response to the pressing climate vulnerabilities identified across the metropolis. Through a rigorous and participatory planning process—including vulnerability assessments, stakeholder consultations, and multi-criteria prioritization—the plan articulates a strategic framework for integrating climate resilience into local governance, development planning, and investment decision making.

This action plan outlines sector-specific adaptation measures across agriculture, health, water and sanitation, infrastructure, biodiversity, and tourism, each tailored to the unique climatic exposures and socio-economic dynamics of Cape Coast. It further establishes a monitoring, evaluation, and learning framework to ensure transparency, accountability, and adaptive management, and proposes a multi-tiered funding and implementation strategy grounded in local, national, and international mechanisms.

The successful implementation of this plan will depend on sustained political commitment, institutional capacity, cross-sectoral coordination, and inclusive stakeholder engagement. In particular, efforts must be made to ensure the meaningful participation of vulnerable groups—including women, youth, and informal workers—whose adaptive capacities and knowledge systems are central to the effectiveness and sustainability of adaptation measures.

References

- Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, 15(2), 77–86.
- Africa Adaptation Initiative (AAI). (2021). *Mobilizing Climate Finance for Africa’s Adaptation Needs: Best Practices and Opportunities*. Nairobi: AAI Secretariat.
- Antwi-Agyei, P., Dougill, A. J., Fraser, E. D., & Stringer, L. C. (2013). Characterising the nature of household vulnerability to climate variability: Empirical evidence from two regions of Ghana. *Environment, development and sustainability*, 15, 903-926.
- Antwi-Agyei, P., Abalo, E. M., Dougill, A. J., & Baffour-Ata, F. (2021). Motivations, enablers and barriers to the adoption of climate-smart agricultural practices by smallholder farmers: Evidence from the transitional and savannah agroecological zones of Ghana. *Regional Sustainability*, 2(4), 375-386.
- Cape Coast Metropolitan Assembly. (2021). *Medium-Term Development Plan (2022–2025)*. Unpublished.
- Dovie, D. B. K., & Dzanku, F. M. (2020). Climate Change Vulnerability and Adaptation Planning at the District Level in Ghana. *Climate and Development*, 12(3), 245–258. <https://doi.org/10.1080/17565529.2019.1687079>
- Environmental Protection Agency (EPA). (2020). *Ghana’s National Adaptation Plan Framework*. Accra: Ministry of Environment, Science, Technology and Innovation (MESTI).
- Environmental Protection Authority (formerly EPA). (2024). *Cape Coast Climate Vulnerability Assessment*. Unpublished report under the NAP-Green Climate Fund Project.
- Forestry Commission of Ghana. (2022). *Strategic Forest Investment Plan for Ghana*. Accra: Ministry of Lands and Natural Resources.
- Ghana Infrastructure Investment Fund (GIIF). (2021). *Annual Report and Investment Guidelines*. Accra: GIIF Secretariat.
- Ghana Statistical Service (GSS). (2021). *2021 Population and Housing Census: Cape Coast Metropolitan Assembly Analytical Report*. Accra: GSS.
- Global Environment Facility (GEF). (2018). *GEF Programming Directions: Biodiversity, Climate Change, Land Degradation and Chemicals and Waste Focal Areas*. Washington, DC: GEF Secretariat.

- Green Climate Fund (GCF). (2022). GCF Programming Manual: Policies and Processes for Programming. Incheon: GCF. edited volume. *Climate and Development*, 6(3), 241–242.
- Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report*. Cambridge University Press.
- MESTI. (2021). *Ghana: Updated Nationally Determined Contribution under the Paris Agreement (2020 – 2030)* Environmental Protection Agency, Ministry of Environment, Science, Technology and Innovation, Accra.
- Ministry of Environment, Science, Technology and Innovation (MESTI). (2013). *Ghana National Climate Change Policy (NCCP)*. Accra: Government of Ghana.
- Ministry of Finance. (2019). *Ghana’s Medium-Term National Development Policy Framework (MTNDPF) 2018–2021*. Accra: National Development Planning Commission.
- Ministry of Local Government, Decentralisation and Rural Development (MLGDRD). (2021). *Guidelines for the Preparation of District Development Plans under the MTDPF (2022–2025)*.
- Ministry of Sanitation and Water Resources. (2020). *National Water Policy Review Report*. Accra: Government of Ghana.
- NAP Global Network & United Nations Framework Convention on Climate Change. (2019). *Toolkit for a gender-responsive process to formulate and implement National Adaptation Plans (NAPs)*. Dazé, A., and Church, C. (lead authors). International Institute for Sustainable Development. <http://napglobalnetwork.org/resource/toolkit-for-gender-responsive-national-adaptation-plans/>
- NAP Global Network. (2020). *Integrating gender considerations into Ghana's national adaptation plan process*. Retrieved April 7, 2025, from <https://napglobalnetwork.org/wp-content/uploads/2020/12/napgn-en-2020-integrating-gender-considerations-into-ghanas-nap-process.pdf>
- Reid, H., & Schipper, E. L. F. (2014). *Upscaling community-based adaptation: An introduction to the United Nations Framework Convention on Climate Change (UNFCCC)*. (2015). The Paris Agreement. Bonn: UNFCCC Secretariat.
- United Nations Development Programme (UNDP). (2020). *National Adaptation Plans in Action: Lessons from Developing Countries*. New York: UNDP.

United Nations Framework Convention on Climate Change. (2011). Assessing the costs and benefits of adaptation options: an overview of approaches. *The Nairobi work Programme on impacts, vulnerability and adaptation to climate change*, 52.

United Nations Office for Disaster Risk Reduction (UNDRR). (2015). Sendai Framework for Disaster Risk Reduction 2015–2030. Geneva: UNDRR.

Zobeidi, T., Yazdanpanah, M., Komendantova, N., Löhr, K., & Sieber, S. (2024). Evaluating climate change adaptation options in the agriculture sector: A PROMETHEE-GAIA analysis. *Environmental and Sustainability Indicators*, 22, 100395.

Appendix A. Recommended Materials and Resources

Climate Adaptation Planning and Governance

1. Ghana's National Adaptation Plan (NAP) Framework

- A guiding framework for integrating climate adaptation into national and sub-national development planning.
- Where to find: <https://napglobalnetwork.org/wp-content/uploads/2020/04/napgn-en-2018-ghana-nap-framework.pdf>.

2. Ghana's Nationally Determined Contributions (NDCs)

- Useful to align district actions with national climate commitments under the Paris Agreement.
- Resource: https://mesti.gov.gh/documents/ghanas-updated-nationally-determined-contribution-unfccc_2021

Sector-Specific Guidance

1. Climate-Smart Agriculture Sourcebook (FAO)

- Excellent guide for extension officers and NGOs supporting smallholder resilience.
- Download (<https://www.fao.org/climate-smart-agriculture-sourcebook/en/>)

2. Nature-Based Solutions for Urban Resilience (IUCN, UNEP)

- Especially relevant for biodiversity, green infrastructure, and flood management.
- [Guide](#)

3. Blue Guide for Coastal Protection and Planning (UN-Habitat, IOC-UNESCO)

- Best practices for integrating coastal protection into urban development.
- [Access](#)

Tools and Technologies for Monitoring and Learning (MEL)

1. Community-Based Monitoring Toolkit (CARE International)

- Simple MEL tools adaptable for local communities and CSOs.
- [Toolkit PDF](#)

2. Sendai Framework Disaster Risk Reduction Monitoring Tools (UNDRR)

- Useful for integrating disaster preparedness and early warning metrics.
- [Dashboard and Resources](#)

Financial and Investment Mobilization

1. GCF Handbook for Readiness and Project Preparation

- Essential for teams preparing climate finance proposals.
- [Download](#)

2. Guidebook: Mobilizing Finance for Local Climate Action (ICLEI & GIZ)

- Practical strategies for public-private partnerships and community co-financing.
- [Link](#)

Knowledge Platforms and Learning Resources

1. Climate Change Knowledge Portal – World Bank

- Offers data, projections, and interactive visualizations for Ghana.
- [Portal](#)

2. Africa Adaptation Knowledge Network (AAKNet)

- Regional platform with tools, case studies, and policy briefs from across Africa.
- [Visit AAKNet](#)

3. NAP Central – UNFCCC

- Central repository for adaptation plans, technical documents, and country submissions.
- [Explore](#)

