SIGRA

Strengthening Investments in Gender-Responsive Climate Adaptation

CLIMATE RISK AND VULNERABILITY ASSESSMENT

ANLOGA DISTRICT

SUMMARY VERSION

Plate 1: *Mudhouse damaged by floods at Bleamezado*
Credit: *Desmond Adjaison, 2024*

Cowater Ghana

In partnership with Canada

epa

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KEY TAKEAWAYS

Anloga District faces a convergence of escalating climate hazards—rising temperatures, erratic rainfall, tidal flooding, and sea-level rise—that directly threaten coastal livelihoods, infrastructure, and fragile ecosystems. Vulnerable communities, particularly along the coastline and lagoon, are already experiencing severe impacts from saline intrusion, land loss, and water contamination. Women, youth, PWDs, and migrants bear a disproportionate burden due to limited access to land, credit, and decision-making spaces. Climate-sensitive sectors such as agriculture, fishing, and salt production are increasingly fragile, with changing rainfall and tidal patterns disrupting productivity and food security. While local coping mechanisms exist, they remain fragmented and under-resourced. Climate Risk and Vulnerability Assessment (CRVA) highlights the urgent need for a costed and gender-responsive Climate Adaptation Plan that reflects local realities, empowers marginalized groups, and aligns with Ghana's broader climate goals. With inclusive governance, strategic investments, and multi-stakeholder collaboration, Anloga can convert its vulnerability into a platform for long-term resilience and equitable development.

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01

Coastal erosion, flooding, and extreme heat are intensifying climate risks across Anloga.

Communities like Fuveme, Dzita, and Woe-Afedome are experiencing more frequent tidal surges, salinization of farmlands, and heatwaves that destroy property, disrupt fishing, and undermine food and water security.

02

Women face disproportionate climate impacts and remain underserved in adaptation efforts.

In Anloga's fishing and farming communities, women manage food security, caregiving, and income generation amid flooding and resource scarcity—yet continue to lack land rights, financial access, and roles in decision-making bodies.

03

Climate stress is pushing youth away from traditional livelihoods.

Young people in places like Bleamezado and Salo are increasingly abandoning farming and fishing due to unreliable harvests, rising input costs, and the absence of agri-business support.

04

Water insecurity is a growing crisis, especially in inland and low-lying areas.

Frequent borehole breakdowns, salinized wells, and flooded storage facilities in communities such as Anyanui and Dzita leave households—especially WHHs—without safe water for drinking, hygiene, or irrigation.

05

Climate hazards are overstretching education and health systems.

Flooding and storm surges are damaging school infrastructure and disrupting attendance, while poor drainage and standing water are driving up cases of malaria and cholera, particularly in underserved areas like Fuveme and Devegodo.

06

Local adaptation is happening but is small in scale and poorly resourced.

Some farmers are using composting, improved seeds, and tree planting; others are shifting fishing times to adapt to heat. But these innovations lack the technical support, funding, or market access needed for scale and replication.

07

Weak infrastructure worsens vulnerability to climate impacts.

Unpaved roads and degraded culverts in flood-prone zones like Dzita and Bleamezado prevent market access and emergency response. Damaged sanitation and water systems further undermine public health and resilience.

08

Women, youth, and marginalized groups remain excluded from adaptation planning.

Despite their vulnerability, women fish processors, young farmers, and persons with disabilities rarely participate in climate discussions or planning sessions. This undercuts the equity, sustainability, and effectiveness of interventions.

09

Traditional knowledge holds critical insights but is underutilized..

Elders, fisherfolk, and long-term farmers have detailed seasonal knowledge of tides, rainfall patterns, and erosion risks—but these insights are rarely included in district-level adaptation planning or technical designs.

10

A costed and inclusive Climate Adaptation Plan is urgently needed to guide resilience investments.

The CRVA reveals the urgency of implementing context-specific, gender-responsive, and locally grounded solutions—particularly for water infrastructure, sustainable livelihoods, disaster preparedness, and climate-smart agriculture. A Climate Adaptation Plan with clear financing strategies will help coordinate stakeholders and unlock needed resources for long-term resilience.

A INTRODUCTION

Anloga District is increasingly facing complex and intersecting climate risks that threaten its coastal communities, agricultural productivity, and basic services. As one of Ghana's low-lying coastal districts, Anloga is particularly exposed to tidal flooding, sea-level rise, saline intrusion, and prolonged dry spells. This Climate Risk and Vulnerability Assessment (CRVA) was conducted to support the district's efforts in designing a responsive and inclusive adaptation strategy. It highlights how climate hazards impact different population groups—especially women, youth, persons with disabilities (PWDs), and migrant households—and aims to inform the development of a District Climate Adaptation Plan grounded in local realities.

Plate 2: *Flooding situation at Atito-Alakple*
Credit: *Desmond Adjaison, 2024*

A1. Background

This summary report presents key findings and recommendations from the Climate Risk and Vulnerability Assessment (CRVA) conducted in Anloga under the Strengthening Investments in Gender-Responsive Climate Adaptation (SIGRA) project. Funded by Global Affairs Canada and implemented by Cowater International, SIGRA supports Ghana's National Adaptation Plan (NAP) by helping local governments strengthen their systems, plan for climate risks, and promote inclusive adaptation strategies.

Coordinated by the Environmental Protection Agency (EPA), the NAP prioritizes **decentralized, locally driven adaptation,** particularly in high-risk areas like coastal districts. The purpose of this summary is to inform policymakers, development partners, local authorities, and civil society actors of the key findings, vulnerabilities, and recommendations emerging from the assessment, with a strong emphasis on gender and social inclusion. It is intended as a practical reference for guiding the development of a district-specific Climate Adaptation Plan and informing broader adaptation planning at regional and national levels.

A2. Scope and Objectives of the Assessment

The primary objective of the CRVA was to assess **exposure, sensitivity, and adaptive capacity** across different population groups, using an IPCC-aligned and evidence-based approach.The assessment targeted major climate hazards affecting the district:

- Sea-level rise and tidal flooding – threatening coastal settlements and infrastructure.
- Coastal erosion and saline intrusion – degrading land and freshwater sources.
- Droughts and heatwaves – impacting agriculture and water availability.

To generate a robust risk profile, the study combined **quantitative and qualitative methods**, including:

- 209 household surveys – capturing community-level data on climate impacts.
- 30+ focus group discussions (FGDs) – engaging diverse community voices.
- Participatory stakeholder workshops – fostering local ownership of findings.
- Downscaled climate modeling – using SSP2-4.5 and SSP5-8.5 scenarios to project future risks.

A3. Prioritizing Gender and Vulnerability

The CRVA places gender and social vulnerability at the core of its analysis, recognizing the unequal burden of climate impacts on marginalized populations in Anloga District.

Anloga's socio-economic conditions—such as a high number of female-headed households, widespread youth unemployment, and reliance on climate-sensitive livelihoods—place certain groups at heightened risk.

Key vulnerable groups include:

- **Women-Headed Households (WHHs)** – Often lack secure land tenure, financial access, and agricultural support services.
- **Persons with Disabilities (PWDs)** – Face mobility barriers, limited access to climate information, and exclusion from community decision-making.
- **Elderly and migrant populations** – Frequently excluded from social protection systems and adaptation planning processes.

These populations bear **greater caregiving burdens, face food insecurity**, and **have fewer adaptation options** during climate shocks like floods or droughts. The CRVA elevates these dynamics to ensure that **future adaptation efforts are not only effective but also equitable** grounded in justice, inclusion, and the lived experiences of those most impacted.

A4. Profile of Anloga District

A4.1 Geography and Climate

Anloga District, situated in the southern part of Ghana's Volta Region along the Gulf of Guinea, lies at approximately **5° 47′ 14″ N latitude and 0° 53′ 26″ E longitude**. It is located in Ghana's Volta Region, approximately 160 km east of Accra, bordered by Keta Municipality, South Tongu, Akatsi South, and the Gulf of Guinea. The district spans over 90,624 acres, including extensive wetlands and lagoon systems. Its low-lying coastal plain, with elevations as low as 1–3.5 meters below sea level, makes it highly vulnerable to tidal waves, flooding, and coastal erosion. The climate is tropical, with a bimodal rainfall pattern and increasing variability due to climate change.

Figure 1: Map showing the Anloga District with major communities

The district has a youthful and growing population, predominantly Ewe-speaking. Settlements are dispersed, with limited access to infrastructure and services. Women and vulnerable groups face systemic challenges in land access, education, and decision-making. Migration, especially among youth, is common due to limited economic opportunities.

A4.2 Economic Activities

Livelihoods are centered on fishing, farming, and salt mining. Women dominate fish processing and petty trading, while men engage in fishing and lagoon farming. The district's economy is climate-sensitive, with flooding and salinity intrusion affecting productivity. Access to credit, extension services, and resilient infrastructure remains limited.

A4.3 Critical Climate-Related Vulnerabilities

Anloga District faces four major climate hazards—**tidal waves, coastal erosion, flooding, and drought**—which threaten lives, disrupt livelihoods, and damage ecosystems and infrastructure. These hazards are intensifying due to rising sea levels, erratic rainfall patterns, and prolonged dry periods, with **disproportionate impacts on women-headed households, smallholder farmers, and fisherfolk**.

Tidal waves and coastal erosion pose the most urgent threat to lagoon-based and shoreline communities such as Fuveme, Agbledomi, and Salo. Seasonal high tides and storm surges wash away homes, farmland, and infrastructure, leading to **forced displacement**, destruction of cultural sites, and loss of economic assets. The retreating coastline continues to shrink arable land and fishing space, deepening insecurity for both farmers and fishers.

Flooding, often caused by intense rainfall and poor drainage systems, affects low-lying areas like Anloga township, Alakple, and Anyanui. Roads, markets, and health facilities are routinely cut off or submerged, especially during the peak rainy season. Women and children experience heightened burdens, including increased caregiving, exposure to waterborne diseases, and reduced access to schools and services.

Droughts, characterized by delayed rains and prolonged dry spells, are increasingly disrupting rain-fed farming and water access in inland communities such as Devegodo and Atiteti. Shallow wells and boreholes dry up, forcing households—especially women and girls—to travel longer distances for water. Crops like cassava and shallots suffer yield losses, undermining food security and incomes.

Saline intrusion compounds these hazards, contaminating drinking water sources and reducing soil fertility. Coastal boreholes and open wells often turn brackish during dry months, leaving many without safe water.

These converging hazards are not isolated events—they interact to **erode livelihoods, strain infrastructure, and widen social inequalities**, especially among the most vulnerable. Without targeted adaptation, Anloga's climate risks will continue to escalate, reversing development gains and undermining long-term resilience.

B METHODOLOGICAL APPROACH

The CRVA adopted a participatory and gender-responsive methodology that combines scientific climate modeling with community-based evidence. Twelve communities were selected to reflect the geographic and socio-economic diversity of the district, including coastal, lagoon-front, and inland settlements. Data was gathered through over 209 household surveys, 35 focus group discussions, and a multi-stakeholder validation workshop. Downscaled climate projections were drawn from CHIRPS, ERA5, and IPCC's CMIP6 models under SSP2-4.5 and SSP5-8.5 scenarios, with additional insights gathered from community perceptions and local planning documents. This mixed-methods approach enabled a nuanced understanding of both environmental hazards and social vulnerability dynamics in Anloga.

Plate 3: *Stakeholder Engagement Workshop at the Anloga Municipal Assembly.*
Credit: *Desmond Adjaison, 2024*

B1. Introduction

The CRVA for Anloga District was guided by the Intergovernmental Panel on Climate Change (IPCC) AR5/AR6 frameworks, which define climate risk as the interaction of hazards, exposure, and vulnerability.

This approach analyzed climate risks as the interplay of three interdependent elements: hazards, exposure, and vulnerability. The assessment placed a strong emphasis on gender dynamics, recognizing that women, youth, migrants, persons with disabilities (PWDs), and elderly populations face disproportionate climate burdens and lower adaptive capacity.

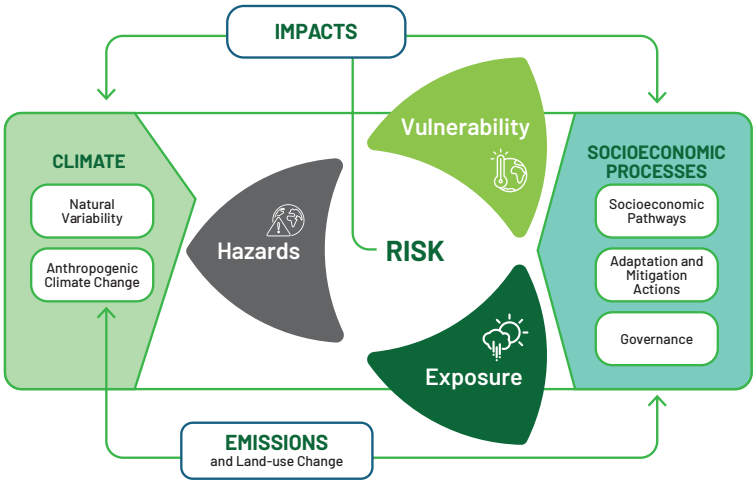

Figure 2. The IPCC Risk and Vulnerability Framework illustrating the interaction of hazards, exposure, and vulnerability in shaping climate risks, with socio-economic processes influencing overall resilience

B2. Three-Stage Assessment Process

The **three-stage methodology** was adopted to ensure a robust, participatory, and gender-responsive analysis of climate risks and adaptation priorities. This approach combined scientific data, community knowledge, and institutional inputs to produce locally grounded insights that are both evidence-based and actionable.

B2.1 Risk Identification

The first stage involved an in-depth **desktop review** to map existing knowledge on climate hazards and vulnerabilities affecting Anloga's coastal and lagoon communities. Key sources reviewed included:

- Ghana's National Adaptation Plan (NAP) and National Climate Change Policy
- The Anloga District Medium-Term Development Plan (2022–2025)
- Studies and forecasts from the Ghana Meteorological Agency (GMet) and the EPA
- Volta Region climate risk reports and peer-reviewed literature on coastal vulnerability.

Through this review, five priority climate hazards were identified as most critical to Anloga:

- **Tidal flooding and storm surges**, especially in highly exposed settlements like Fuveme, Agbledomi, and Srogboe.
- **Coastal erosion**, which continues to displace residents, destroy farmland, and undermine livelihoods along the shoreline.
- **Erratic rainfall**, delaying planting seasons and complicating agricultural planning in semi-inland communities.
- **Prolonged dry spells and drought**, exacerbating freshwater scarcity and crop failure.

- **Saline intrusion**, which contaminates groundwater sources and reduces soil fertility across low-lying areas.

This phase also revealed key structural vulnerabilities, including insecure land tenure, limited social protection, and gendered disparities in access to information, credit, and decision-making—particularly affecting women-headed households, youth, persons with disabilities (PWDs), and migrant populations.

B2.2. Risk Assessment

This stage involved multi-tiered fieldwork using both qualitative and quantitative tools to deepen the understanding of exposure, adaptive capacity, and gendered vulnerabilities.

Stakeholder Workshop and Participatory Exercises

Two stakeholder workshops were convened with broad participation from district institutions, sector departments (e.g., NADMO, health, agriculture), traditional leaders, women and youth groups, CSOs, and media actors.

- The first workshop introduced the CRVA and guided participants through risk mapping, historical hazard timelines, and vulnerability ranking.
- The second workshop was a validation session, where draft findings were reviewed, gaps were identified, and local priorities were refined.

These workshops ensured institutional ownership and helped ground the CRVA in local knowledge.

Plate 4: *Participants engaged in exercise*
Credit: *Desmond Adjaison, 2024*

Participatory Community Selection

Five communities were purposefully selected—Bleamezado, Atito-Alakple, Woe-Afedome, Dzita, and Devegodo—based on:

- **Ecological and livelihood diversity** (e.g., coastal, lagoon-side, flood-prone, farming/fishing-based).
- **Representation across area councils.**
- **Social vulnerability factors** (e.g., prevalence of women-headed households, PWDs).

This selection process was guided by consultations with the District Assembly and local representatives to ensure a stratified, representative sample.

No.	Town/Area Councils	Selected Community
1	Shime	Bleamezado and Devegodo.
2	Kome	Atito-Alakple,
3	Woe	Woe-Afedome
4	Dzita/Anyanui	Dzita

Table 1: *Selected Communities and Their Respective Areas Councils*

Focus Group Discussions (FGDs)

Gender-segregated and socially inclusive FGDs were conducted in all five selected communities.
Participants included women, youth, elderly, migrants, and PWDs. Sessions explored:

- Local experiences of climate impacts (e.g., heat, flooding, salinity).
- Livelihood disruptions.
- Coping strategies and barriers to adaptation.

These discussions revealed rich, context-specific insights such as women's caregiving burdens during floods and the migration pressures felt by rural youth.

Household Questionnaire Surveys

Over **209 households** were surveyed using digital tools and trained local enumerators. The survey captured data on:

- Demographics and household structure
- Livelihoods and exposure to climate hazards
- Adaptation practices and access to services
- Gender-disaggregated access to resources (e.g., extension services, credit, water)

Particular attention was given to comparing **Men-Headed Households (MHHs)** and **Women-Headed Households (WHHs)** to uncover disparities in vulnerability and adaptive capacity.

Climate Projections and Scenario Analysis

To complement field data, climate projections were drawn from **CORDEX (West Africa)** datasets using two pathways:

- **SSP2-4.5** (moderate development and emissions): Shows moderate increases in rainfall and warming.
- **SSP5-8.5** (high emissions scenario): Predicts sharp temperature rises and erratic rainfall by mid-century.

These projections were used to estimate future hazards—such as increased **drought frequency, heatwaves, and coastal flooding**—to guide anticipatory adaptation strategies.

Data Integration and Analysis

The CRVA employed a **mixed-methods integration** strategy to ensure both depth and rigor:

- **Community perspectives** (FGDs, participatory maps) contextualized the data.
- **Survey responses** quantified patterns of vulnerability and resource access.
- **Key Informant Interviews (KIIs)** with local institutions added sectoral depth.
- **Climate data** grounded future projections in scientific analysis.
- **Secondary sources** (e.g., GSS 2021, NAP, MTDPs) informed the policy and development context.

This triangulated approach produced a socially disaggregated, evidence-based vulnerability profile for Anloga District—laying the foundation for inclusive and actionable adaptation planning.

C

KEY FINDINGS AND ADAPTATION PRIORITIES FOR ANLOGA DISTRICT

Climate impacts in Anloga District are intensifying and compounding existing development challenges, particularly in vulnerable communities. Coastal erosion and saline intrusion continue to threaten homes, farmlands, and freshwater sources in communities such as Fuveme, Anyanui, and Salo. Inland settlements are increasingly vulnerable to heat stress, water scarcity, and declining agricultural yields. Fishing livelihoods and salt production—key economic pillars of the district—are also under pressure due to changing rainfall patterns and tidal fluctuations. Vulnerability is particularly high among women-headed households, youth, PWDs, and migrants, who face barriers to land, finance, and social protection. Climate projections signal a continued rise in temperatures and more erratic rainfall, increasing the risks of food insecurity, health crises, and displacement.

Plate 5: *The wooden bridge connecting Devegodo to the nearest market.*
Credit: *Desmond Adjaison, 2024*

C1. Climate Hazards and Exposure

Anloga District's low-lying terrain, wetlands, and lagoons make it highly susceptible to multiple climate hazards." And then go into the major hazards and ensure to start with very-high, high and then medium. These hazards are not just environmental, they threaten livelihoods, food security, water access, and the overall well-being of the population. The most pressing hazards include flooding, sea-level rise, coastal erosion, drought, extreme heat, and, to a lesser extent, bushfires.

C1.1. Major Hazards

Flooding and Sea-Level Rise

Flooding is the most common and destructive hazard in Anloga District. It occurs mainly during the rainy seasons (March–July and September–November), when intense rainfall and poor drainage lead to the overflow of lagoons and inland water bodies.

- Low-lying communities such as **Fuveme, Srogboe-Dzita, and Anyanui** are severely affected by seasonal floods.
- **Saltwater intrusion** is increasingly contaminating freshwater sources and farmlands, making agriculture more difficult.
- In lagoon basins,where much of the land lies below sea level,floodwaters often take weeks to recede, leading to prolonged displacement and crop damage.

These floods are further intensified by sea-level rise and coastal erosion. Anloga's coastline is eroding at an average rate of 1.5 to 2 meters per year. This erosion has already:

- Destroyed homes, roads, and farmlands.
- Forced residents to relocate.
- Disrupted livelihoods in fishing and farming.
- Increased emotional and economic stress,especially for women, elderly residents, and children, who often lack the resources to recover.

Drought and Irregular Rainfall

While flooding dominates coastal areas, drought is a growing concern across the district. Anloga falls within Ghana's **Dry Coastal Equatorial Zone**, which receives less than 1,000 mm of rainfall annually. Rainfall patterns have become erratic marked by extended dry spells and short, intense downpours.

This unpredictability:

- Disrupts traditional planting and harvesting seasons.
- Reduces agricultural yields, particularly in key crops like shallots and tomatoes.
- Leads to water shortages for both farming and household use.

Women farmers are especially affected. Many operate small plots without irrigation, have limited access to fertilizer and inputs, and often lack formal land ownership. As a result, they are less able to cope with prolonged dry periods or failed harvests.

Extreme Heat and Heat Stress

Rising temperatures are another major concern. The district now experiences average daytime temperatures around 30°C, with more frequent heatwaves and declining humidity levels.

Extreme heat leads to:

- Increased water loss through evapotranspiration, reducing moisture for crops and vegetation
- Health risks for vulnerable groups, particularly **young children, elderly residents, and those with pre-existing health conditions.**
- Reduced productivity and safety for women working in heat-intensive sectors like **fish smoking**.

Women fish processors report deteriorating product quality, higher fuelwood consumption, and greater difficulty maintaining income—all due to heat-related challenges.

Anloga's climate follows a bimodal rainfall pattern, with a major rainy season from March to July and a minor one from September to November, separated by the August break and a long harmattan dry season from December to February. However, these seasonal cycles are increasingly disrupted by climate variability. The onset of rains has become less predictable, dry spells are lengthening, and rainfall is more intense but concentrated—leading to higher flood risk and lower groundwater recharge. Community accounts confirm that these changes have intensified over the last two decades, making traditional agricultural and water management practices more difficult to sustain.

Bushfires and Environmental Degradation

Although less frequent, bushfires pose a seasonal threat, particularly during the harmattan months. These fires are often caused by the burning of farm residues or charcoal production and are intensified by dry conditions and strong winds.

Impacts include:

- Destruction of farmlands and property
- Increased risk of respiratory illness from smoke inhalation
- Degradation of mangrove ecosystems, which are essential for:
  - Coastal protection.
  - Fish breeding grounds.
  - Climate resilience in shoreline communities.

The loss of mangroves due to both fire and human encroachment weakens the district's natural defenses against sea-level rise and storm surges.

Differential Impact is generally higher for women and PWDs in terms of the climatic hazards and sectoral impacts as will be evidenced in later sections in this summary.

	Highly Affected Sector(s)	Very High	High	Medium	Low	District-Level Impact
Lagoon flooding	Housing, Health and Education					High spread (Affects >75% of the district)
Bushfire	Agriculture					Moderate Spread (Affects 25-74%)
Drought	Agriculture and Trade with women most affected					Low Spread (Affects 1-24% of the district)
Tidal Waves	Housing, Education and Fishing.					Moderate Spread
Flash Floods	Health and education					High spread

Table 2: Summary of critical climate related hazards for Anloga District from the stakeholder engagement process

Community-Level Exposure

Community-level exposure varies significantly across the district due to differences in elevation, proximity to water bodies, infrastructure, and socio-economic status. Broadly, communities fall into three exposure categories:

1. High-Exposure Coastal and Lagoon Communities:

- Includes Fuveme, Anyanui, Dzita, Salo, and Atiteti.
- Exposed to tidal flooding, coastal erosion, saline intrusion, and storm surges.
- Homes and schools are often built on sandy soils with little protection from sea-level rise.
- Frequent loss of farmland and fish landing sites increases economic vulnerability.

2. Moderate-Exposure Inland Communities:

- Includes areas like Alakple and Avume, which are close to lagoons but elevated slightly above sea level.
- Exposed to inland flooding during intense rains and seasonal droughts.
- Agricultural systems are fragile due to sandy soils and limited irrigation access.
- Water scarcity during dry seasons is a growing concern.

3. Low-Exposure Northern Plains:

- Includes communities such as Abor and Anyidzime.
- Elevated terrain reduces exposure to flooding, but these areas face increasing drought stress and bushfires.
- Infrastructure is typically poor, limiting emergency response and climate services.

Hazard and exposure maps, generated using GIS and participatory techniques, identified climate "hotspots" and vulnerable infrastructure such as roads, market centers, and schools. For example:

- Fuveme and Srogboe were identified as at risk of full submergence without urgent coastal defense.
- Seasonal flooding consistently affects access roads to communities like Tregui and Agbledomi, cutting off markets and health services.

C2. Vulnerability Analysis

Vulnerability in Anloga District arises from the interplay of climate hazards with environmental exposure, poverty, fragile infrastructure, and deep-rooted social inequalities. This section examines four interconnected domains of vulnerability: **economic, physical, social, and gendered/ social group-specific vulnerabilities**. Insights are drawn from household surveys, FGDs, KIIs, and secondary sources.

C2.1. Economic Vulnerability

Climate-sensitive livelihoods, limited financial inclusion, and insecure land access contribute to high economic fragility—especially among women, youth, and migrants.

- **Livelihood Fragility:** Over 70% of households depend on agriculture, fishing, salt production, or petty trade. These sectors are highly exposed to weather variability and sea-level changes. Rain-fed farming (shallots, tomatoes, okra) is hindered by unpredictable rainfall and increasing pest outbreaks. Coastal erosion and floods damage farmlands, storage, and input systems.
- **Fishing Sector Pressures:** Declining fish stocks, lagoon pollution, and erratic water levels are reducing catches and income. Women fish processors face post-harvest losses due to rain exposure and lack of proper drying/ smoking facilities. Salt producers are also impacted by changes in evaporation cycles.
- **Informal Trade and Credit Constraints:** Petty traders—mostly women—are highly vulnerable during climate events that damage markets or cut transport links. They often lack collateral, access to formal loans, and insurance to recover from shocks.
- **Land Tenure and Investment Barriers:** Customary land systems restrict women, youth, and migrants from securing land titles. This limits long-term investments in climate-smart practices such as irrigation or agroforestry.

C2.2. Physical Vulnerability

Anloga's fragile infrastructure, poor housing, and degraded ecosystems increase residents' exposure to climate shocks.

- **Weak Infrastructure:** Most roads are unpaved and become impassable during floods. Key economic and service corridors in towns like Fuveme and Srogboe are routinely submerged.

- Poor drainage in Anloga township worsens urban flooding and disease outbreaks.
- **Housing Fragility:** Many homes, especially in lagoon-side communities, are built with mud or planks and collapse during storms. Communities such as Salo and Dzita frequently report roof losses and partial structural failure.
- **Water and Sanitation Risks:** Flooded latrines contaminate water sources, while boreholes suffer saline intrusion. In the dry season, women and girls walk up to 3 km to fetch clean water. Sanitation facilities are sparse, especially in flood-prone zones.
- **Environmental Degradation:** Coastal sand mining and mangrove depletion weaken natural barriers. Wetland destruction heightens flood risk and undermines fish reproduction.

C2.3. Social Vulnerability

Disparities in education, health access, and information systems deepen social vulnerability, particularly among poor and remote communities.

- **Education and Literacy Gaps:** Illiteracy, especially among older women and out-of-school youth, limits engagement with climate forecasts, extension services, or recovery schemes. Youth FGDs revealed that floods force many school dropouts due to household income loss.
- **Health and Nutrition Impacts:** Climate-sensitive illnesses (malaria, diarrhea, respiratory stress) are increasing. Pregnant women and children under five are especially at risk. In places like Devegodo and Atiteti, access to health facilities is limited, and referrals during floods are difficult.
- **Weakened Social Support Systems:** Extended families, religious groups, and women's associations traditionally act as safety nets. However, migration, repeated climate shocks, and rising costs have strained these networks. WHHs, PWDs, and the elderly are most at risk of exclusion.
- **Limited Access to Climate Information:** Most communities rely on radio or word-of-mouth alerts, which are not always timely or inclusive. Women, the elderly, and migrants without mobile devices or radio access often miss early warnings.

C2.4. Gendered and Social Group Vulnerability

Climate impacts in Anloga are not experienced equally. Women, youth, persons with disabilities (PWDs), and migrants face distinct and overlapping vulnerabilities.

- **Women and Care Burdens:** Women shoulder caregiving, water collection, food provisioning, and household recovery duties—especially after floods or heatwaves. While men may migrate post-disaster, women often remain to manage the crisis with fewer resources and decision-making power.
- **Women-Headed Households (WHHs):** WHHs typically own less land, have fewer assets, and rely on informal or seasonal incomes that are easily disrupted. They report low access to extension services and limited participation in planning processes.
- **Youth Exclusion and Migration:** Young people face rising unemployment and limited engagement in climate adaptation. FGDs revealed growing frustration and migration aspirations, which risk hollowing out the local labor base and increasing generational dependency.
- **Persons with Disabilities (PWDs):** PWDs face barriers during evacuation, have limited mobility, and often lack access to tailored healthcare or early warnings. Social stigma and isolation further limit their participation in community adaptation planning.
- **Migrant Populations:** Migrants working in fishing or farming often live in temporary shelters and have weak integration into community networks. They lack tenure security, decision-making rights, and access to formal support services during recovery.

C2.5. Sector-Specific Vulnerability Overview

To strengthen targeted adaptation planning, this section summarizes the climate-related vulnerabilities across critical development sectors in Anloga District:

- **Agriculture:** Rain-fed crop production faces risks from unpredictable rainfall, soil salinization, pest outbreaks, and shortened growing seasons. Lack of irrigation, access to inputs, and market volatility compound farmer vulnerability.
- **Fisheries & Aquaculture:** Lagoon pollution, declining fish stocks, and storm surges affect fishers. Post-harvest losses among women processors are rising due to flooding and lack of preservation infrastructure.
- **Water Resources:** Dry-season shortages and saltwater intrusion compromise drinking water security. Inland communities rely on contaminated shallow wells, while boreholes face rising salinity.
- **Health Sector:** Increased cases of malaria, heat stress, and diarrheal diseases are reported during hazard periods. Health facilities are sparsely distributed, and floods cut off access to care in remote areas.
- **Education Sector:** Flooded schools, damaged roads, and household economic stress interrupt learning, especially for girls and vulnerable youth. School attendance drops during climate shocks.
- **Infrastructure (Transport & Housing):** Key roads and markets are frequently flooded. Housing built from mud or planks is prone to collapse during extreme weather events

C2.6. Institutional and Governance Vulnerabilities

While Anloga District demonstrates growing awareness of climate risks, institutional limitations remain a critical barrier to effective adaptation. Challenges stem from weak planning systems, limited technical capacity, and exclusionary governance structures that hinder inclusive and evidence-based climate action.

Key issues include:

- **Low capacity for climate planning:** District departments often lack the tools, training, and staff needed for climate risk integration.
- **Logistical constraints:** NADMO and key sector agencies face resource shortages—vehicles, data systems, and emergency supplies.
- **Coordination gaps:** Limited collaboration between departments and with regional/national institutions slows response and reduces coherence.
- **Limited inclusivity:** Women, youth, and persons with disabilities are often underrepresented in local climate governance structures.
- **Weak data integration:** Climate information is not routinely used in budgeting, planning, or infrastructure decisions.

Table 3 summarizes the percentage of households—disaggregated by gender of household head—that reported high, moderate, or low impacts from different climate hazards over the past five years. It highlights the significant exposure of both groups, with subtle differences in how each experiences specific hazards.

Indicator / Variable	Disaggregation	Unit	Floods	Drought	Extreme Heat	Windstorms	Other Climate Events
Percentage of Households Impacted by Climate Hazards	HOUSEHOLDS LED BY MEN (MHH) (N=112)	(0-100%)	High =72.3%	High =61.6%	High =99.2	High =58.1%	High =50.9%
			Moderate =2.7%	Moderate =14.3%	Moderate=0.7%	Moderate =7.1%	Moderate=5.4%
			Low =25%	Low =24.1%	Low = 0%	Low =34.8%	Low=43.7%
	HOUSEHOLDS LED BY WOMEN (WHH) (N=97)	(0-100%)	High =66%	High =62.9%	High = 99%	High =60.8%	High =50.5%
			Moderate =3.1%	Moderate =8.2%	Moderate =1%	Moderate =14.4%	Moderate =6.2%
			Low =30.9%	Low =28.9%	Low =0%	Low =24.8%	Low =43.3%
	Total	(0-100%)	High =69.4%	High = 62.7%	High =99%	High =59.4%	High =50.8%
			Moderate = 2.9%	Moderate =11.5%	Moderate =1%	Moderate =10.5%	Moderate=5.7%
			Low =72.3%	Low = 25.8%	Low =0%	Low =30.1%	Low =56.5%
Frequency of the Occurrence of floods over the past 5years	HOUSEHOLDS LED BY MEN (MHH) (N=112)	(0-100%)	High = 69.6%	High =60.5%	High= 99.2%	High=55.4%	High=51.8%
			Moderate= 4.5%	Moderate=12.5%	Moderate= 0.8%	Moderate=15.2%	Moderate=4.5%
			Low = 25.9%	Low =26.8%	Low= 0%	Low =29.4%	Low=43.7%
	HOUSEHOLDS LED BY WOMEN (WHH) (N=97)	(0-100%)	High = 65.9%	High=59.8%	High =99%	High =56.7%	High =50.5%
			Moderate =4.1%	Moderate=12.4%	Moderate =1%	Moderate=17.5%	Mod. =6.2%
			Low =29.9%	Low =27.8%	Low = 0%	Low =25.8%	Low =43.3%
	Total (N=209)	(0-100%)	High = 68%	High Freq. =60.3%	High=99%	High Freq.= 56%	High=51.2%
			Moderate = 4.3%	Moderate =12.4%	Moderate= 1%	Moderate= 16.3%	Moderate=5.3%
			Low =27.7%	Low = 27.3%	Low = 0%	Low= 27.7%	Low =43.5%

Table 3: Assessment of gendered exposure to extreme climate events

Table 4 compares the two groups in terms of exposure, sensitivity, and adaptive capacity, showing how underlying social and economic factors shape their vulnerability and ability to cope. The findings reveal that while both groups are highly exposed, women-headed households tend to have higher sensitivity and lower adaptive capacity, underlining the need for targeted support.

Indicator	Men-Headed Households (MHH)	Women-Headed Households (WHH)	Rank (MHH)	Rank (WHH)
Exposure	There is no significant difference in the frequency of events reported for the top three extreme climate events (-/+). Both **MHH** and **WHH** are similarly exposed to extreme heat and other climate events (-/+). But more **MHH** are exposed to floods (-1).	There is no significant difference in the frequency of events reported for the top three extreme climate events (+/-). Both **MHH** and **WHH** are similarly exposed to extreme heat and other climate events (-/+). But more **WHH** are exposed to droughts (-1) and windstorms (-).	**High Exposure**	**Higher Exposure**
Sensitivity	More **MHH** are dependent on rain-fed agricultural (-1). More **MHH** are prone to flood risks due to farm location in flood prone areas (-1); more MHH have malnourished members (-1)	**WHH** face challenges due to increased workload from climate-induced water scarcity (-1). More **WHH** are prone to flood risks due to location of houses in flood prone areas (-1); More **WHH** have no education—almost six times the number of **MHH** (-1). More **WHH** have limited access to water (-1).	**High Sensitivity**	**Higher sensitivity**
Adaptive Capacity	More **MHH** have access to resources like land (+1), savings and loans (+1), agricultural extension services (+1), water during dry season, and climate information services (+1); Improved crop varieties (+1); irrigation system (+1); early warning system; social support networks (+1); access to market; training on climate-related diseases.	More **WHH** engage in other income-generating activities (+1). More **WHH** are enrolled into the NHIS (+1); More **WHH** have access to good roads.	**High Adaptive Capacity**	**Low Adaptive Capacity**

Table 4: Summary of the key findings under Exposure, Sensitivity, and Adaptive Capacity with rankings

** **Assessment approach**: for exposure and sensitivity, (-1) means either more MHH or WHH is exposed and affected more, (+/-) means it is shared and for adaptive capacity (+1) means higher percentage of either MHH or WHH has more access to the selected capacities.*

C3. Projected Climate Trends

C3.1 Summary of projections

To understand how future climate conditions may evolve in Anloga, the CRVA incorporated a combination of observed data and scientifically modeled projections. The analysis drew on:

- **CHIRPS** for historical rainfall trends.
- **ERA5** reanalysis data for temperature baselines.

- **CMIP6 models** under two emission scenarios:
  - **SSP2-4.5** – a moderate emissions pathway.
  - **SSP5-8.5** – a high emission, fossil-fuel intensive pathway.

Climate projections were analyzed across four time periods:

- **Historical (1990–2020).**
- **Near Future (NF: 2026–2050).**
- **Mid Future (MF: 2051–2075).**
- **Far Future (FF: 2076–2100).**

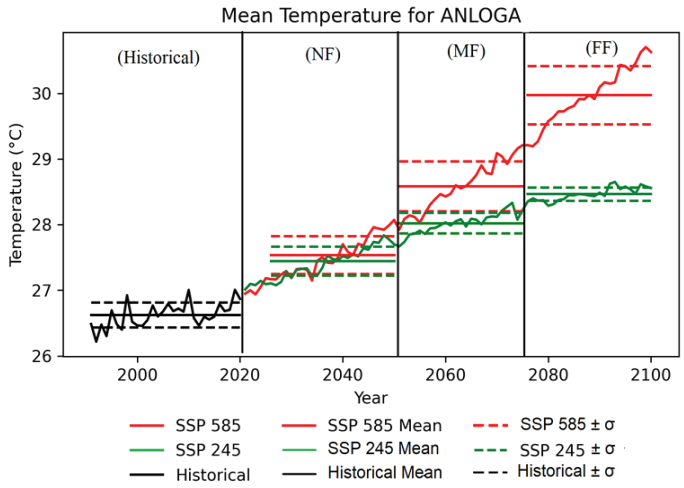

Figure 3: Historical and projected mean temperature for Anloga

Temperatures in Anloga have already been trending upward, with communities reporting hotter days and longer dry spells. Projections show that this warming will intensify in both frequency and severity.

- **SSP2-4.5 (Moderate Emissions Pathway):**

  Mean annual temperatures are expected to rise by 1.5°C to 1.8°C by mid-century (2041–2060), relative to historical averages (1981–2010). Hot days exceeding 35°C will become increasingly common, particularly from December to February.

- **SSP5-8.5 (High Emissions/Business-as-Usual Pathway):**

  Temperature increases could surpass 2.4°C, with persistent heatwaves, warmer nights, and prolonged heat stress across all ecological zones of the district.

Implications:

- **Health:** Greater incidence of heat exhaustion, dehydration, and respiratory issues, especially among children, elderly people, and fish processors working near open fires.
- **Livelihoods:** Crop productivity (shallots, maize, tomatoes) may decline due to heat-induced evapotranspiration. Fish processing and salt production will suffer quality losses.
- **Water stress:** Open water bodies will evaporate faster, reducing access to potable water in areas already facing borehole failures.

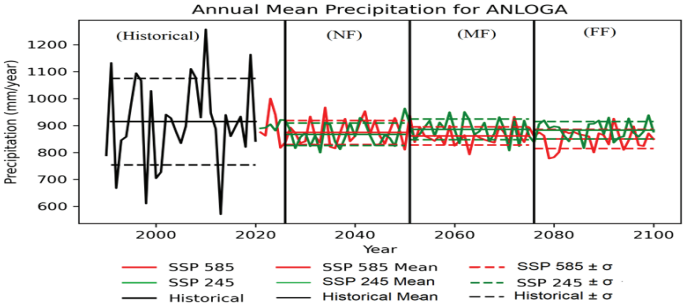

Figure 4: Historical and projected annual mean precipitation for Anloga

Rainfall in Anloga is becoming more erratic, marked by shorter wet seasons and extended dry spells.

- **SSP2-4.5:** Rainfall totals may decline slightly (by 5–10%), but with more variation in onset and intensity. Planting periods will be harder to predict.
- **SSP5-8.5:** Rainfall events will be more intense and concentrated, increasing runoff and flash flood risks. Prolonged intra-seasonal droughts will alternate with heavy storms.

Implications:

- Increased risk of flash flooding in low-lying areas like Dzita and Fuveme.
- Shorter and unpredictable growing seasons, disrupting salt production and farming cycles.
- Borehole salinization in coastal zones due to reduced freshwater recharge and rising tidal pressure.

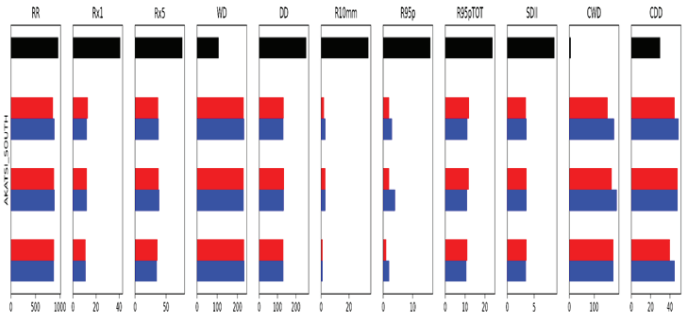

Figure 5: Historical and projected climate extreme metrics across the Anloga district.

Figure 5 compares observed climate extremes with future projections under SSP2-4.5 and SSP5-8.5 scenarios. Results show a clear rise in extreme weather events, particularly affecting Anloga's low-lying and coastal communities.

Key trends include:

- **Longer dry spells (CDD),** worsening water scarcity and stressing dry-season farming.
- **More intense rainfall (Rx1day, Rx5day),** increasing flash flood risks in flood-prone areas like Fuveme and Agbledomi.
- **Rising heavy rainfall days (R10mm, R20mm),** damaging crops and rural infrastructure.
- **Greater temperature extremes (TXx, TNx),** increasing heat stress, especially for vulnerable groups.

C3.2 District-Specific Risks in Anloga

Climate impacts in Anloga are not uniform. Some communities are more exposed due to their location, infrastructure, and livelihood reliance:

- **Fuveme, Srogboe, and Anyanui:** Highly vulnerable to sea-level rise, saline intrusion, and permanent inundation. Shoreline retreat is displacing households and schools.
- **Woe-Afedome and Tregui:** Face repeated seasonal flooding, which isolates communities and cuts off access to markets and clinics.
- **Atito-Alakple and Devegodo:** Experiencing rising heat stress and unpredictable rainfall patterns. Farmers report crop failure and reduced yields due to mid-season droughts.

D

ADAPTATION PRIORITIES AND RECOMMENDATIONS

The assessment calls for a multidimensional adaptation strategy that builds resilience across social, economic, physical, and institutional systems. On the social front, the district must strengthen access to climate education, health services, and inclusive governance structures that elevate the voices of marginalized groups. Economically, it is essential to promote climate-smart agriculture, diversify income sources, and expand financial access for women and youth. Infrastructure upgrades—particularly in water supply, roads, and erosion control—are critical for protecting lives and livelihoods in high-risk zones. Institutionally, the district needs to integrate climate priorities into planning frameworks, strengthen coordination with national agencies, and ensure that budgets are gender-responsive and locally accountable.

Plate 6: *Woman weaving mat as an alternative source of livelihoods to cope with the impacts of climate change on Agriculture at Devegodo.*
Credit: *Desmond Adjaison, 2024*

D1. Strategic Adaptation Options

Anloga's vulnerability to climate hazards demands a multidimensional response that integrates social equity, economic security, resilient infrastructure, and institutional reform. This section outlines strategic interventions across five pillars. Ensuring that climate action is inclusive, sustainable, and grounded in local realities.

D1.1 Social Interventions:

1. Inclusive Governance and Participation

- Establish gender-balanced and youth-inclusive climate committees at community and district levels.
- Institutionalize participatory planning processes using tools such as seasonal calendars and risk mapping.
- Facilitate platforms for persons with disabilities (PWDs) and migrants to influence decision-making.

2. Education and Climate Literacy

- Integrate climate change and environmental stewardship into school curricula and non-formal education.
- Organize community sensitization campaigns targeting WHHs, elders, and fisherfolk with practical climate coping tips.
- Strengthen local media partnerships to disseminate climate forecasts and adaptation information in local languages.

3. Health and Caregiving Support

- Expand mobile clinics and health outreach programs to serve flood-isolated communities.
- Provide maternal and child health services with climate-sensitive contingency planning.
- Train caregivers, especially women, in emergency preparedness and household resilience.

D1.2 Economic Strategies: Strengthening Livelihood Resilience

1. Climate-Smart Agriculture (CSA)

- Promote drought-resistant and saline-tolerant crop varieties (e.g., cassava, okra, and rice).
- Establish demonstration farms and farmer field schools focused on CSA techniques.
- Introduce soil conservation and mulching practices to reduce erosion and preserve fertility.

2. Livelihood Diversification

- Support alternative income-generating activities such as aquaculture, agro-processing, and eco-tourism.
- Facilitate vocational training for youth in renewable energy, sustainable salt production, and crafts.
- Expand support for women's cooperatives and SMEs in fish processing and marketing.

3. Access to Finance and Insurance

- Develop local microfinance schemes offering low-interest loans for adaptive livelihoods.
- Establish community-based savings and insurance groups tailored to WHHs and PWDs.
- Facilitate uptake of weather-index insurance in partnership with national insurance schemes.

D1.3 Physical and Infrastructure Upgrades

1. Infrastructure Upgrades

- Rehabilitate roads and culverts in flood-prone zones such as Alakple, Fuveme, and Dzita.
- Construct elevated market sheds, storage facilities, and safe shelters for emergency response.
- Expand access to climate-resilient water infrastructure (e.g., boreholes with solar pumps).

2. Irrigation and Water Management

- Promote small-scale irrigation schemes and rainwater harvesting systems.
- Construct water retention structures to reduce reliance on seasonal rains.
- Restore wetlands and mangrove buffers to regulate water flow and reduce flood peaks.

3. Erosion Control and Ecosystem Restoration

- Implement community-led mangrove reforestation along the Keta Lagoon.
- Introduce vetiver grass planting and contour bunding to reduce soil erosion on farms.

D1.4 Institutional and Policy Reforms: Enhancing Adaptive Governance

1. Capacity Building

- Provide training for Assembly staff on climate budgeting, proposal development, and gender analysis.
- Establish a dedicated climate unit within the District Planning Coordinating Unit (DPCU).
- Promote peer learning exchanges with other vulnerable districts implementing adaptation plans.

2. Gender-Responsive Budgeting

- Introduce budgeting guidelines that integrate gender and climate risk considerations.
- Allocate funds specifically for WHHs, youth, and PWD-focused initiatives.
- Track and publicly report gender-responsive adaptation expenditures.

3. Policy and Planning Alignment

- Mainstream climate priorities into Medium-Term Development Plans (MTDPs).
- Align local adaptation actions with Ghana's NAP, SDGs, and the Green Ghana Agenda.
- Strengthen vertical coordination between the District Assembly, RCC, and national ministries.

D2. Community-Specific Recommendations

To ensure equitable outcomes, tailored interventions must target high-risk communities based on localized hazard profiles, livelihood dependencies, and social vulnerability dynamics.

Community	Primary Risks	Recommended Actions
Fuveme	Coastal erosion, sea-level rise	Planned relocation, dune reinforcement, community-based mangrove reforestation, and construction of elevated shelters.
Dzita	Flooding, saltwater intrusion	Improve drainage, protect water sources, promote rainwater harvesting, support salt producers with climate-resilient techniques.
Salo	Inland flooding, poor housing	Strengthen housing codes, retrofit vulnerable homes, create climate-responsive village planning guidelines.
Woe-Afedome	Agricultural stress, limited market access	Expand access to irrigation, support women tomato farmers with cold storage and market linkages, and provide microloans.
Anyanui	Livelihood instability (fishing/salt)	Train women processors in hygienic fish handling, upgrade fish-smoking kilns, and provide safety gear for fishers facing rougher weather conditions.
Bleamezado	Flooding, health risks	Construct raised CHPS compound, introduce mobile health services, and distribute treated mosquito nets before rainy seasons.

Table 5: Community-Specific Climate Adaptation Recommendations

These tailored interventions should be co-designed and owned by community members, with specific indicators for gender inclusion, youth engagement, and local leadership.

E

CONCLUSION AND NEXT STEPS

Anloga is at a pivotal moment in its climate journey. The CRVA offers a clear foundation for designing and implementing equitable adaptation measures that reflect both scientific evidence and community priorities. Immediate next steps include developing a costed and actionable Climate Adaptation Plan, identifying quick wins that address urgent community needs, and building partnerships with national institutions and development partners for long-term support. As the district moves forward, sustained commitment to inclusion, local leadership, and evidence-based planning will be key to transforming climate vulnerability into a pathway for resilience and sustainable development

Plate 7: *Classrooms in Anloga left roofless and abandoned due to severe rainstorms in the district.*
Credit: *Desmond Adjaison, 2024*

E1. Summary of Findings and Key Emerging Insights

The Climate Risk and Vulnerability Assessment (CRVA) for Anloga District highlights a sobering reality: climate change is no longer a distant threat—it is a lived experience for communities across the district. Rising sea levels, unpredictable rainfall, flooding, saline intrusion, and heat extremes are compounding longstanding socio-economic inequalities. These challenges disproportionately affect vulnerable populations, especially **women, youth, persons with disabilities (PWDs), women-headed households (WHHs), and migrant groups**.

Key Emerging Insights

- **Localized adaptation is essential:** Effective climate responses must be tailored to the distinct vulnerabilities and capacities of individual communities, recognizing their geographic and socio-economic diversity.
- **Social equity matters:** Gender, age, disability, and migration status significantly shape climate risk exposure and must be central to adaptation planning.
- **Infrastructure gaps and degraded ecosystems intensify risks:** Poor road networks, limited water infrastructure, and the destruction of natural buffers (e.g., mangroves) increase exposure and reduce resilience.
- **Alignment with national and global frameworks is critical:** District-level action must be linked to Ghana's National Adaptation Plan (NAP) which guides climate resilience efforts nationwide, the Sustainable Development Goals (SDGs), and national climate finance mechanisms.
- **Institutional capacity and financing are limiting factors:** Without dedicated resources, technical skills, and participatory systems, adaptation efforts will remain fragmented and reactive.

E2. A Call to Action

To safeguard the future of Anloga District, **climate adaptation must become a shared, urgent priority across all levels of governance and society**. The District Assembly, traditional authorities, local communities, civil society organizations, and development partners must work in unison—**not just to react to climate impacts, but to proactively build resilience**.

This is not just a technical mandate—it is a moral and developmental imperative. The cost of inaction will be borne most heavily by those already on the margins. Together, stakeholders must seize the opportunity to turn evidence into action, and vulnerability into a foundation for transformation.

E3. Next Steps

To translate this assessment into meaningful, locally owned adaptation outcomes, the following immediate actions are recommended:

1. **Develop a District Climate Adaptation Plan (DCAP)**
   - Ground the plan in the CRVA findings, with costed interventions across sectors and timelines.
2. **Implement quick-win priorities**
   - Begin with high-impact, visible actions such as:
     - Rehabilitating flood-damaged roads and culverts.
     - Expanding mobile health outreach in isolated communities.
     - Initiating mangrove restoration and flood control works.
3. **Mobilize financing and partnerships**
   - Engage with national ministries (e.g., MESTI, MLGRD), donor partners, NGOs, and private sector actors to secure financial and technical support for adaptation initiatives.
4. **Institutionalize monitoring and learning systems**
   - Establish an M&E framework with gender-responsive indicators to track adaptation progress and refine strategies.

These insights underscore the need for urgent, inclusive, and well-coordinated action to transform climate risks into opportunities for resilience and sustainable development.

SIGRA
Strengthening Investments in Gender-Responsive Climate Adaptation

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In partnership with Canada

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