SIGRA

Strengthening Investments in Gender-Responsive Climate Adaptation

Cowater Ghana

In partnership with Canada

Climate Change Risk and Vulnerability Assessment

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ANLOGA DISTRICT

FREEDOM AND JUSTICE

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NATIONAL ADAPTATION PLAN GHANA

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ACRONYMS AND ABBREVIATIONS

AF	Adaptation Fund
CARE	Cooperative for Assistance and Relief Everywhere
CRVA	Climate Change Risk and Vulnerability Assessment
CSO	Civil Society Organization
DCD	District Coordinating Director
DCE	District Chief Executive
DPCU	District Planning Coordinating Unit
DPO	District Planning Officer
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GAC	Global Affairs Canada
GCF	Green Climate Fund
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbei*t (German Agency for International Development)
GMet	Ghana Meteorological Agency
GoG	Government of Ghana
GSS	Ghana Statistical Service
I&AP	Interested and Affected Party
IPCC	Intergovernmental Panel on Climate Change
KII	Key Informant Interview
LI	Legislative Instrument
MDAs	Ministries, Departments and Agencies
MHH	Men-Headed Households
MMDAs	Metropolitan, Municipal and District Assemblies
MoF	Ministry of Finance
MoF	Matrix of Function
MoFA	Ministry of Food and Agriculture
MoGCSP	Ministry of Gender, Children and Social Protection
NADMO	National Disaster Management Organization
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NHIS	National Health Insurance Scheme
PHC	Population and Housing Census
PM	Presiding Member
PRCC	Public Relations and Complaint Committee
PWD	Person with Disability
R95p	Rainfall above the 95th percentile
R95pTOT	Very Wet Days' Contribution to Total Precipitation
RCC	Regional Coordinating Council
RR	Rainfall Rate

SDG	Sustainable Development Goal
SDII	Simple Daily Intensity Index
SIGRA	Strengthening Investments in Gender-Responsive Climate Adaptation
SSP	Shared Socio-Economic Pathway
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WHH	Women-Headed Households
WRC	Water Resources Commission

EXECUTIVE SUMMARY

Background

Climate change presents varied challenges to the socio-economic development agenda of Ghana at various levels. The changing climate has a wide-range implications for cities, local communities, indigenous businesses, industry and government at different levels. The government of Ghana, through the national adaptation planning (NAP) process, with technical and financial support from the Global Affairs Canada (GAC), under auspices of the "Strengthening Investments in Gender-Responsive Climate Adaptation" (SIGRA) project commissioned a Climate Change Risk and Vulnerability Assessment (CRVA) in the Anloga District of the Volta region of Ghana to support evidence-based decision making and planning in climate change adaptation at the local level. This report presents the findings of the CRVA conducted by the SIGRA project in the Anloga. District.

The assessment aimed to understand how climate change impacts different socio-economic groups, particularly women and marginalized populations. In Anloga, a district heavily reliant on fishing, agriculture, and water resources, climate change is intensifying environmental and livelihood challenges. Erratic rainfall, floods, and bushfires are increasingly threatening agricultural productivity, fish stocks, and the availability of clean water. These compounding challenges jeopardize food security and economic stability in the district. A core focus of this CRVA is gender and vulnerability dynamics, recognizing that women, youth, elderly individuals, persons with disabilities (PWDs), and migrant communities experience climate risks differently due to systemic socio-economic inequalities. Women, for example, are often disproportionately burdened with caregiving and food security responsibilities. By adopting a socially inclusive and gender-responsive approach, this assessment ensures that its findings inform equitable climate adaptation policies and strategies at both the district and national levels. The SIGRA project aligns with Ghana's National Adaptation Plan (NAP) and broader international climate resilience frameworks by providing local-level insights into vulnerability profiles and adaptation challenges. The findings contribute directly to national and subnational climate action planning, ensuring that adaptation strategies reflect the lived realities of vulnerable communities in Ghana's fishing, agricultural, and water resource-reliant regions.

District Profile

Anloga District, located in the coastal Volta Region of Ghana, is highly vulnerable to climate change due to its low-lying terrain, coastal erosion, and exposure to flooding. It features three major geographic zones – Coastal Strip, Lagoon Basin, and Northern Plains – and experiences unpredictable rainfall and high temperatures. The district's population is predominantly female and relies heavily on climate-sensitive sectors like farming and fishing, with women and persons with disabilities facing higher climate vulnerabilities. Environmental degradation, weak infrastructure, and limited adaptive capacity compound the climate change risks. Targeted, gender-responsive adaptation strategies are crucial for building local resilience.

Methodology

This CRVA combines qualitative and quantitative approaches to analyse climate risks and vulnerabilities in five (5) communities across Anloga District. Household surveys captured data on livelihoods, climate risks, and adaptation strategies, while focus group discussions (FGDs) engaged women, youth, migrants, and PWDs to highlight social disparities. Key informant interviews (KIIs) with local authorities provided institutional perspectives, and field observations assessed coastal erosions and water access. Additionally, secondary data reviews aligned local findings with national climate projections and policy frameworks.

Key Findings

Climate Exposures

Anloga District experiences extreme heat, floods, droughts, and windstorms, severely impacting agriculture, fishing, and water resources.

- ***Coastal erosion*** and salinization threaten fish stocks and freshwater supplies, reducing food security and economic stability.
- ***Flooding*** frequently damages infrastructure, including roads, homes, schools, and healthcare

facilities, disrupting essential services.
- ***Droughts*** and erratic rainfall reduce agricultural productivity, particularly affecting rain-fed farmers and women-headed households.
- ***Extreme heat*** and windstorms further strain livelihoods, increasing health risks.

Gender-Based Climate Sensitivity

- ***Access to Education***
  WHH (Women Headed-Households) face significant educational disadvantages, with 25.8% having no formal education compared to 4.5% of MHH. This could limit their ability to process climate information and adopt adaptation measures effectively.

- ***Water Accessibility and Burden***
  WHH (53.7%) face slightly higher challenges with water access than MHH (52.8%), demonstrating a shared degree of impact to water scarcity due to climate change. However, women, particularly in WHH, bear a disproportionate burden in water collection, with 44% responsible compared to 13.4% of men. As water scarcity worsens, this workload will likely increase and affect girls' education.

- ***Households in Flood Prone Areas***
  70.1% of WHH reside in flood-prone areas compared to 68.8% MHH, making both WHH and MHH almost equally sensitive to the impacts of climate change since the difference is marginal.

- ***Rainfed Agriculture***
  MHH are more dependent on rain-fed agriculture (62.5%) than WHH (50.5%), making them more sensitive to changes in rainfall patterns. Additionally, more MHH (42.9%) have farms in flood-prone areas compared to WHH (35.1%). However, this lower figure for WHH reflects their limited access to farmland, not safer alternatives.

- ***Cultural and Social Barriers***
  Cultural norms further limit WHH's access to resources, as reported by 25% of WHH.

Gender-Based Adaptive Capacity

Men-headed households (MHH) have greater adaptive capacity to climate change compared to women-headed households (WHH) due to better access to resources such as land (44.8% vs. 37.1%), loans (12.5% vs. 9.3%), agricultural extension services (37.7% vs. 21.6%), improved crop varieties (38.4% vs. 23.7%), and climate information services (22.3% vs. 12.4%).

- ***Financial and Decision-Making Disparities***
  Men (42.6%) have greater financial decision-making power compared to women (30.6%). This imbalance limits WHH's ability to invest in climate adaptation measures and increases their vulnerability to climate shocks.

- ***Irrigation and Agricultural Support***
  More MHH (71.4%) have access to irrigation systems than WHH (62.6%). Additionally, while MHH use a variety of irrigation methods, WHH rely more on manual options like bucket and watering can irrigation (32.8% vs. 15%). The lack of access to mechanized systems such as motorized and drip irrigation further restricts WHH's agricultural productivity and adaptive capacity.

- ***Climate Information and Early Warning Systems***
  Both groups have limited access to early-warning systems, though MHH (43.8%) report slightly higher access than WHH (41.2%). Additionally, WHH report lower access to climate information services (12.4% vs. 22.3%) and improved production methods (37.1% vs. 46.4%).

- ***Social Support and Infrastructure***
  WHH have significantly lower access to social support networks (1% vs. 4.5%) but report slightly higher enrollment in the National Health Insurance Scheme (NHIS) (81.4% vs. 75%). Access to road infrastructure remains poor for both groups, which limits access to markets, healthcare, and education.

Projected Climate Trends and Future Risks

- ***Rainfall and Temperature***
  Under SSP5-8.5, rainfall will initially increase but may decrease in the long term, with more unpredictable patterns. SSP2-4.5 projects more stable rainfall with smaller increases. Temperatures will rise across both scenarios, with SSP5-8.5 leading to a significant increase, potentially reaching 30.5°C, posing threats to agriculture, water resources, and livelihoods. **SSP2-4.5** (the "middle-of-the-road" scenario) assumes moderate socio-economic development and climate policy efforts, resulting in stabilized emissions and a more manageable level of the impacts of climate change. **SSP5-8.5** represents a fossil-fuelled development path with high economic growth, minimal climate action, and heavy reliance on oil, gas, and coal—leading to high emissions and extreme climatic conditions.

- ***Future Vulnerabilities in Anloga***
  Climatic changes will worsen vulnerabilities for women, youth, migrants, and the elderly. Women will face increased economic and social burdens, youth will experience reduced job opportunities, migrants will lack secure support systems, and the elderly will be more exposed to health and food insecurity.

Implications for Gender-Responsive Climate Adaptation Planning in Anloga District

Although the current study focuses on climate risk and vulnerability assessment, its findings provide early guidance for gender-responsive adaptation planning in Anloga District. The district faces serious climate threats – flooding, droughts, heat, and erosion – that disproportionately impact women, youth, PWDs, and migrants due to existing inequalities. Gender-responsive planning is crucial to ensure inclusive resilience building by addressing barriers to resource access, participation, and decision-making. The proposed adaptation recommendations for women-headed households (WHH) and other marginalized groups, such as improving their access to key resources, clearly support both national and global goals. These include Ghana's Nationally Determined Contributions (NDCs) and the Sustainable Development Goals (SDGs), which aim to enhance food security, promote inclusive growth, and ensure equitable, climate-resilient development.

Institutional Capacity Building and Adaptation Policy Implications

The Anloga District faces institutional capacity gaps that hinder effective climate adaptation planning. Strengthening governance through training, inclusive decision-making, and knowledge co-production is essential. Access to climate finance must be improved by building proposal-writing skills and simplifying internal processes. Gender-responsive adaptation planning should include equitable budgeting, representation, and targeted interventions. Collaboration across local, regional, and national levels ensures alignment with Ghana's NAP and the SDGs. Overall, enhancing institutional capacity and mainstreaming gender are critical to building climate resilience in Anloga.

Recommendations

Agricultural Support

- Provide targeted agricultural extension services, improved inputs, and climate-smart technologies, especially for WHHs in Devegodo and Bleamezado where flood-induced crop damage is prevalent.
- Support flood-affected sugarcane farmers in Devegodo and sugarcane plantations in Bleamezado.
- Provide assistance to Dzita Shallot Farmers Association to enhance shallot farming resilience.

Infrastructure Improvement

- Rehabilitate the deteriorating wooden bridge in Devegodo to ensure market access for traders, especially women.
- Develop climate-resilient storage facilities in Woe-Afedome to reduce post-harvest losses for tomato farmers and fishmongers.

Financial and Social Support

- Expand access to loans, savings schemes, and insurance services, particularly in Devegodo and Bleamezado.
- Establish and strengthen women's financial cooperatives and provide training on financial management.

Water Access and Management

- Improve access to reliable and climate-resilient water sources in Bleamezado, Dzita, and Woe-Afedome, where dependence on less reliable sources is high.
- Promote water management technologies and alternative water storage systems.

Livelihood Diversification

- Provide alternative livelihood support in Atito-Alakple by enhancing the fisheries sector with modern fishing equipment and capacity-building initiatives.
- Offer vocational training and small business support for WHHs across all communities to reduce dependence on climate-sensitive livelihoods.

Early Warning and Climate Information

- Expand early warning systems and access to climate information services in all communities, prioritizing WHHs who report lower access to these resources.

Institutional and Policy Actions

- Strengthen local governance capacity to implement gender-responsive climate adaptation policies.
- Integrate climate vulnerabilities and proposed adaptation options into Medium-Term Development Plans.
- Align district-level adaptation efforts with Ghana's National Adaptation Plan (NAP) and international climate frameworks.
- Develop monitoring and evaluation systems to track adaptation progress and ensure equitable resource distribution.

Conclusions and Way Forward

This report highlights the critical need to address climate vulnerability in the Anloga District. The report recommends closing the adaptive capacity gap between men- and women-headed households by promoting inclusive, gender-responsive, and community-driven adaptation by improving access to climate finance, investing in agriculture and fisheries, and integrating gender-sensitive budgeting. Aligning these efforts with Ghana's NAP and SDGs will reduce inequalities and enhance local resilience. Transformative adaptation hinges on collective action—collaboration among communities, government, CSOs, and partners is vital for addressing immediate risks and building long-term climate resilience.

Next Step Actions

The next step should be the development of a comprehensive Climate Action Plan for Anloga District. This plan will detail prioritized adaptation actions addressing key vulnerabilities, ensuring gender sensitivity and inclusivity. It will also identify practical financial options to fund interventions, thereby enhancing climate resilience and sustainable development across communities.

1. Introduction

1.1 Project Background

In support of Ghana's NAP, the SIGRA Project (Strengthening Investments in Gender-Responsive Climate Adaptation) has commissioned Climate Change Risk and Vulnerability Assessments (CRVAs) for its five partner Districts. SIGRA (2023-2028) is a Global Affairs Canada funded project that seeks to advance climate action and inclusive governance in Ghana. Its ultimate outcome is to improve the resilience of Ghanaian citizens, particularly women, girls, and vulnerable groups through increased investments in inclusive and gender-responsive climate adaptation initiatives.

The project provides technical assistance to strengthen governance and national systems with key central Ministries, Departments and Agencies (MDAs) while providing direct grants to five MMDAs funding local gender responsive climate adaptation projects. The project supports Regional Coordinating Councils (RCCs) in the Northern and Volta regions and strengthens the ability of targeted MMDAs to plan, implement, and report on climate adaptation initiatives. Additionally, SIGRA seeks to strengthen the participation, voice and influence of women led CSOs in government decision-making.

The project, which is currently being implemented by Cowater International, complements current national climate adaptation and resilience-building efforts in Ghana by recognizing the far-reaching consequences and implications of current and projected future climate change impacts on Ghana's sustainable development aspirations. As climate impacts become more pervasive, verifiable and pernicious in local communities across the country, the imperative for intentional interventions in the form of adaptation planning has also become an urgent policy concern, which has attracted several responses.

The National Adaptation Plan (NAP) as one such response is a flagship national program led by the Environmental Protection Agency (EPA) of Ghana and aims to identify climate impacts manifestations and associated risks and vulnerabilities across sectors and in local communities, and to put in place proactive adaptation interventions that build resilience. Ghana's NAP thus serves as an organizing avenue for subnational adaptation and resilience building through its use of place-based risk and vulnerability assessments, or what is described as a district-specific adaptation planning. The primary objective, as outlined in Ghana's NAP Framework (Antwi-Agyei, 2018), is to reduce vulnerability to climate change impacts by enhancing adaptive capacity and resilience within local communities. Implicit in the district-focused approach is the recognition of the fact that climate change impacts are place-specific; that they are not homogeneous and require carefully considered adaptation measures that are also place-responsive.

The SIGRA Project complements Ghana's NAP processes by helping to address the growing impacts of climate change especially in local communities. The Gendered focus of the project is particularly instructive as it highlights differential experiences of climate change impacts and how that also demonstrate differences in adaptive capacity levels, especially as they relate to women, young people, migrants and Persons with Disability (PWDs). While the project aims generally at improving the lives, livelihoods and well-being of people living in their different places and facing climate change risks and vulnerabilities, the intentional focus on marginalization and differential adaptive capacity provides deeper insights that will inform adaptation planning (Antwi-Agyei et al., 2015). Such an approach does not only enhance understandings around gender-responsive adaptation planning, but also, and perhaps more importantly, it facilitates the development of place-specific knowledge that may guide the direction of future investments in the implementation of adaptation options.

It becomes imperative, therefore, that Ghana's adaptation planning processes foster knowledge building, learning and capacity building (Manteaw et al., 2022). The SIGRA project with its emphasis on specific vulnerabilities, rather than generalized vulnerabilities, affirm the fact that climate adaptation is both a learned and learning process, which requires intentional processes that creates the enabling environment for people to learn to adapt. Adaptation only happens when people have learned to live differently or made the necessary adjustments to their lives to become resilient. And the logical process is that this work – CRVA – as has been completed for the Anloga District, will serve as the premise from

which a costed adaptation plan and associated intervention projects will be developed. A district-specific adaptation plan will ultimately serve as a major tool in the hands of the Assembly to develop innovative and bankable projects as they source funds (climate finance) for implementation.

1.2 Defining Climate Change Risk and Vulnerability

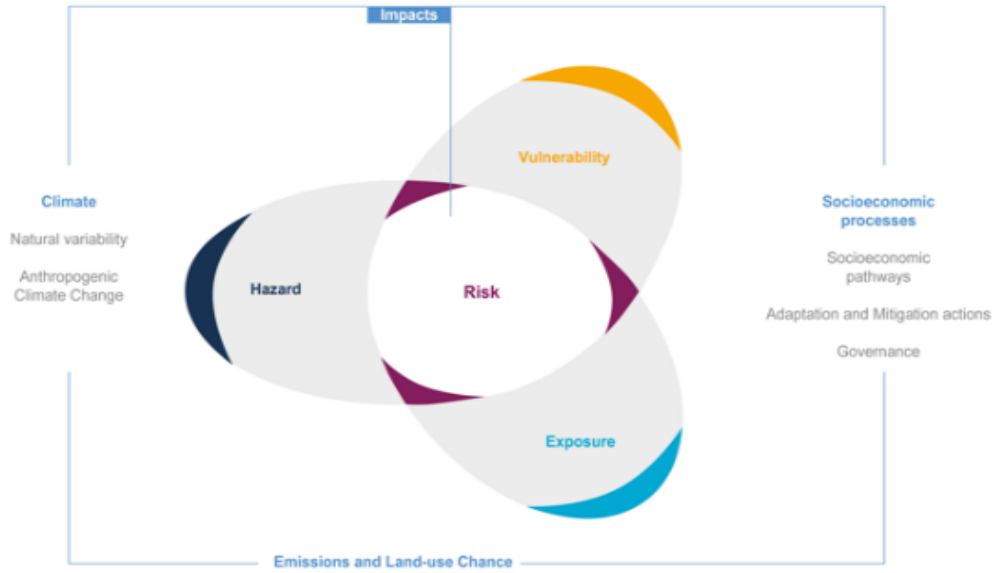
Climate change risk and vulnerability are foundational concepts for assessing the impacts of climate change on human and natural systems. These concepts have been refined and operationalized through frameworks developed by the IPCC, CARE International, and GIZ, each offering unique insights and methodologies. The IPCC provides a theoretical structure for understanding risk, while CARE and GIZ extend this framework by incorporating practical tools and participatory approaches, making them highly relevant for addressing the complex socio-economic and gendered vulnerabilities across sectors and in all communities in Ghana. Ghana's NAP process, as led by the EPA, is guided by these internationally recognized conventions.

1.2.1 IPCC Risk and Vulnerability Framework

The IPCC defines climate risk as the interaction of three core components: hazards, exposure, and vulnerability (**Figure 1**). Hazards refer to climate-related events or conditions (*e.g.*, droughts, floods), while exposure reflects the presence of people, ecosystems, and assets in areas at risk. Vulnerability encompasses the susceptibility to harm and the capacity to adapt, shaped by socio-economic, cultural, and environmental factors (IPCC, 2014; 2022). The IPCC framework emphasizes that climate risk is not only determined by the magnitude of hazards but also by the socio-economic processes influencing exposure and vulnerability. In Anloga District, gender inequalities, including restricted access to and control over land for women, significantly reduces their adaptive capacity to climate change. These challenges are further compounded by weak governance structures and limited institutional support, which constrain the district's overall adaptive capacity.

Additionally, the IPCC also highlights the concept of compound and cascading risks, where multiple hazards interact to amplify vulnerabilities. For example, in Anloga, climate change can impact fishing communities through shifts in fish distribution and reduced fish stocks, impacting the livelihoods of women engaged in fish processing and trading. This economic strain limits their ability to invest in alternative income-generating activities. This interconnectedness emphasizes the need for integrated and inclusive adaptation strategies. The IPCC framework (**Figure 1**) provides a theoretical backbone for understanding climate risks, offering a basis for assessing hazards, exposure, and vulnerability.

Figure 1: 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



1.3 Document Purpose

The Climate Change Risk and Vulnerability Assessment (CRVA) for Anloga District is designed to identify, analyze, and prioritize the gendered perspective of climate vulnerability within the Anloga District in the Volta Region in line with the NAP framework. The climate risk and vulnerability assessments were disaggregated by sectors and gender dynamics, based on local and national information.

The climate vulnerability assessment involved consultation with communities, women, and other vulnerable groups to incorporate their adaptation needs. The assessment incorporates local knowledge through a systematic evaluation of the district's climate risks and climate change impacts, emphasizing the integration of hazard, exposure, and vulnerability components as per the AR5 framework adopted from the IPCC. Specifically, the document through this assessment aims to:

1. ***Provide a Comprehensive Overview of Climate Risks:*** To capture a detailed picture of the climate hazards specific to Anloga District, including the gendered dimensions of their current and potential future impacts on people, livelihoods, and ecosystems. This entails a rapid but thorough collection of information that informs adaptation planning and decision-making processes.
2. ***Enhance Understanding of Vulnerabilities:*** To deepen the understanding of the district's vulnerabilities, considering gender considerations and the multifaceted nature of climate risks that affect social, economic, and environmental dimensions.
3. ***Support Adaptation Planning:*** To offer a foundational basis for developing targeted and effective adaptation strategies and measures that address the prioritized risks, thereby strengthening the resilience of the Anloga District to climate change.
4. ***Promote Stakeholder Engagement and Collaboration:*** To facilitate an inclusive process that engages a wide range of stakeholders, including government agencies, local communities, NGOs, and private sector actors, ensuring that the CRVA process is grounded in local realities and benefits from diverse perspectives and expertise.
5. ***Align with National and Regional Climate Change Frameworks:*** To ensure that the findings and recommendations of the CRVA for Anloga District are consistent with national climate change strategies and action plans, contributing to the broader efforts to mitigate and adapt to climate change in Ghana.
6. ***Build Institutional Capacity:*** To strengthen the capacities of Assembly staff and relevant stakeholders. This will equip them with the knowledge and skills needed to effectively govern adaptation efforts, including conducting future climate risk and vulnerability assessments and developing comprehensive adaptation plans.

1.4 Study Aims

This assessment focuses on the gendered dimensions of climate vulnerability in Anloga District. The goal is to provide actionable strategies for building resilience in vulnerable communities while ensuring equity and inclusiveness in climate adaptation efforts. The assessment integrates local insights with national and global adaptation priorities to address the unique challenges faced by the district.

At the national level, Ghana's *National Adaptation Plan (NAP)* highlights the importance of gender-responsive climate action. It calls for integrating gender considerations across all sectors and ensuring that women and other marginalized groups are meaningfully included in adaptation planning and decision-making.

The study also aligns with global frameworks that emphasize the importance of equity and resilience in addressing climate change. Sustainable Development Goal (SDG) 5 on Gender Equality highlights the need to address gender disparities in adaptation efforts and to empower women as key leaders in building climate resilience.

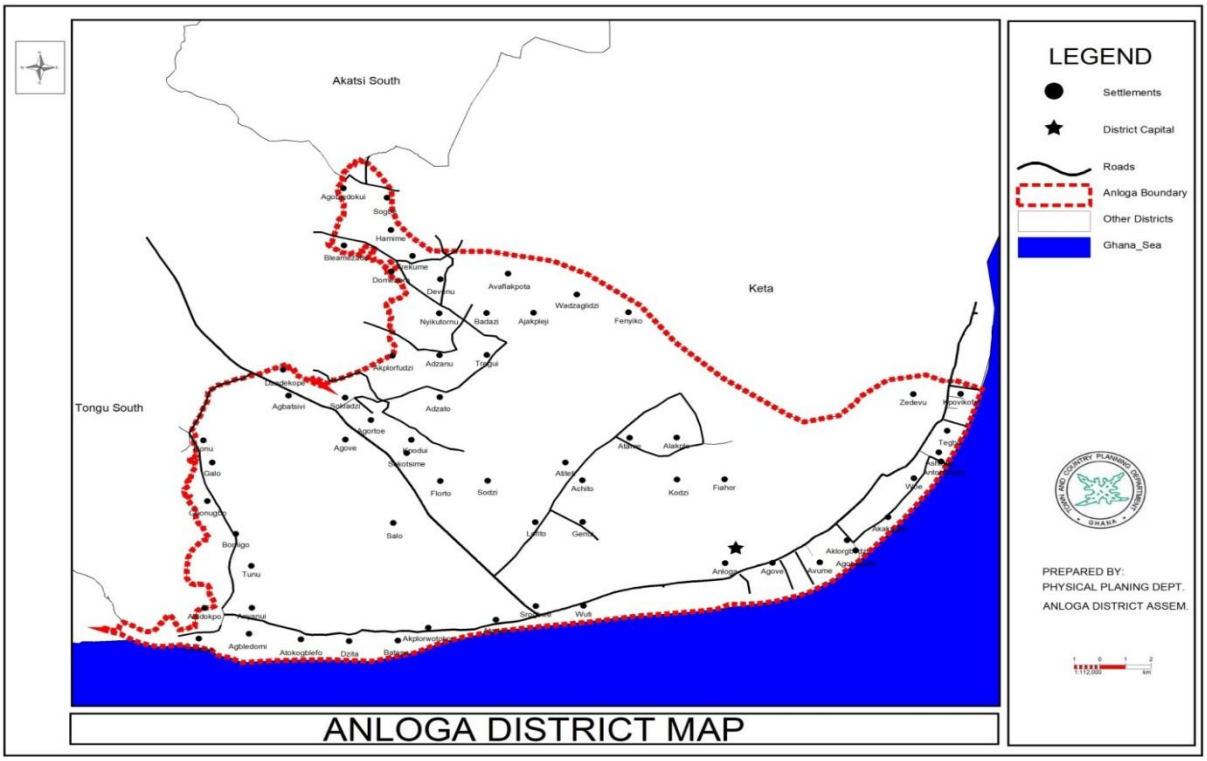
Similarly, SDG 13 (Climate Action) underscores the urgency of strengthening adaptation strategies to enhance the resilience of communities that are most vulnerable to the impacts of climate change. Together, these goals provide a foundation for integrating gender-responsive and inclusive approaches into climate adaptation planning in Anloga District.

2. Anloga District Profile

2.1 Geographical Location and Size

Anloga District is situated approximately 160 kilometers east of Accra, near the Volta estuary, along the Accra-Aflao main road. Geographically, it lies between Longitudes 0.53E and 0.89W and Latitudes 5.47N and 5.79S. The district shares boundaries with Keta Municipality to the east, South Tongu District to the west, Akatsi South District to the north, and the Gulf of Guinea to the south. Covering a total area of 90,624.9 acres, the district comprises 36,855.4 acres of the Lagoon and Volta River, 18,986.4 acres of wetlands, and 34,801.1 acres of arable land (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

Figure 2: Anloga District map



2.2 Topography and Drainage

The district is characterized by a low-lying coastal plain, with elevations peaking at 53 meters above sea level and descending to as low as 1 to 3.5 meters below sea level in coastal areas near the townships of Fuveme and Akplorwotokor. Its primary drainage system is formed by lagoons, which span an area of approximately 302 km². Notable lagoons include Anloga, Angaw Agbatsivi, Logui, Nuyi, and Klomi. Streams such as Angor, Awafla (near Awaflakpota), and Nukpehui (in the district's northwestern region) contribute to the drainage network. The district can be divided into three main geographic zones: the Narrow Coastal Strip, the Lagoon Basin in the central region, and the Northern Plains(*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.2.1 The Coastal Strip

The eastern parts of the coastal strip are predominantly low-lying, making them highly vulnerable to severe sea erosion and occasional flooding. Despite these challenges, the area holds considerable potential for irrigation. The Coastal Strip is characterized by sandbars and occasional sea cliffs along

its shoreline. Presently, the Srogboe-Dzita and Fuveme areas are facing sea erosion, which has resulted in property damage, disruption of livelihoods, and the loss of social services. Around twelve communities along this stretch are often isolated during periods of high tidal waves (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

The Lagoon Basin
The Lagoon Basin lies predominantly below sea level and comprises a network of lagoons and islands, such as Alakple. Its marshy nature is due to the sandy-clay geological formations beneath the surface.

The Northern Plains
The Northern Plains feature gently undulating terrain, with elevations rising to about 53 meters above sea level, marking the highest point in the district.

2.3 Climatic Attributes

2.3.1 Rainfall

Anloga District falls within the Dry Coastal Equatorial Climate zone, receiving an annual average rainfall of less than 1,000 mm. Rainfall decreases progressively from the northern parts of the district toward the coast, where annual totals can be as low as 800 mm, making it one of the driest coastal areas in Ghana. The district experiences a double rainfall peak, with the major rainy season occurring between March and July, followed by a minor season from September to November. This limited annual rainfall restricts the potential for year-round agricultural activities (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.3.2 Temperature

The district experiences consistently high average temperatures of around 30°C, paired with low relative humidity. These conditions lead to high evapotranspiration rates, which intensify water shortages in the area. This high rate of evaporation also presents opportunities for salt production. Over time, temperature patterns have shown a gradual decline, with an uneven distribution throughout the year (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.4 Vegetation

The vegetation of Anloga District falls entirely within the coastal savannah zone, which is categorized into four main types. The northern part of the district is characterized by tall grasses interspersed with medium-sized trees, exhibiting relatively higher tree densities. Moving to the mid-section, the vegetation transitions to shorter grasses and scattered trees(*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

The western part of the district, particularly along the Volta estuary in areas such as Salo, Agortoe, Atiteti, Anyanui, Agbledomi, Tunu, and Bomigo, is dominated by red and white mangroves alongside coconut trees. Mangroves in this area are valuable as a source of fuel and building materials, while reeds harvested from the wetlands are used for weaving mats and hats. The eastern coastal zone, stretching from Whuti/Srogboe to Tegbi, features short grasses and an abundance of neem trees (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

The district is also rich in wildlife, including three endangered marine turtle species: the leatherback, green turtle, and olive ridley. Additionally, it is home to the Western Sitatunga (Tragelaphus spekei), an amphibious antelope thought to be extinct in other parts of West Africa. Other notable wildlife includes 15 families of finfish, manatees, African/Royal pythons, and a diverse population of migratory water bird species (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.5 Pedological Characteristics

2.5.1 Oyibi Association

The coastal strip is dominated by the Oyibi and Anloga Associations, characterized by sandy soils that typically lack a humus-rich top layer. These soils are naturally suitable for coconut cultivation and, with the addition of manure, can also support the growth of shallots, okra, peppers, and other vegetables. This area is Ghana's primary shallot-producing area, even though it accounts for only about 11% of the district's land area, excluding lagoons (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.5.2 Ada-Oyibi Association

In the lagoon basin, the Ada-Oyibi Association is characterized by shallow soils resting on a compact, hard clay layer. These soils are generally alkaline, making them ideal for supporting mangrove vegetation, sugarcane, and pasture grasses. However, the presence of the underlying clay makes the area prone to flooding, rendering it unsuitable for arable farming despite comprising over 75% of the district's total dry land (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.6 Administrative Structure

The Anloga District, formerly part of the Keta Municipal, is one of the 18 administrative districts in the Volta Region of Ghana, with its capital located in Anloga. It was officially established by Legislative Instrument (L.I.) 2372 in 2018 and inaugurated on February 19, 2019. The Anloga District Assembly serves as the highest administrative and political authority within the district. The Assembly comprises 43 members, including the District Chief Executive (DCE) and the Member of Parliament. Among its members are 28 elected Assembly Members (all men) and 13 government appointees (10 men and 3 women).

The Assembly functions through two main committees: the Executive Committee and the Public Relations and Complaint Committee (PRCC). The Executive Committee, chaired by the DCE, is responsible for the executive and administrative duties of the Assembly. This committee excludes the Presiding Member (PM) and operates through several sub-committees, including Development Planning, Justice and Security, Works, Finance and Administration, and Social Services. These sub-committees focus on specific areas, providing recommendations to the Executive Committee for approval by the General Assembly.

The Directorate, led by the District Coordinating Director (DCD), provides secretarial and advisory support to the Executive Committee and the General Assembly in their planning, programming, and budgeting processes. The District Planning Officer (DPO), located within the District Planning Coordinating Unit (DPCU), oversees the Assembly's planning activities, while a Budget Analyst is responsible for supporting its budgeting operations (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.).

2.7 Demographics and Gender Characteristics

The population data from the 2021 Population and Housing Census (PHC) report for Anloga District indicates a higher female population (50,186) compared to men (44,709). This data has implications for climate change vulnerability assessment from a gendered perspective: Given that women are more likely to face disproportionate vulnerabilities to the impacts of climate change, a higher female population implies that more of the district population will have a higher vulnerability to climate change. These vulnerabilities arise from their roles as caregivers as well as from differential access to resources, healthcare, and decision-making power. Climate change vulnerability assessments must take these gendered factors into account to ensure that adaptation strategies are inclusive and address the unique needs of women, empowering them to contribute to and benefit from climate resilience initiatives.

2.8 Persons with Disability

The progress of a nation relies on the collective contributions of all individuals, including Persons with Disabilities (PWDs), rather than just a segment of the population. According to the 2010 Population and Housing Census, the Anloga District recorded 6,008 individuals with disabilities, representing 7.2% of the district's total population. Of this number, 3,220 are women, while 2,788 are men.

To address disability-related issues more effectively, local branches of PWD associations have been established across the district's area councils. These branches serve to decentralize disability matters and facilitate the registration of PWDs through their local executives, with the data being collated at the district level.

The Assembly has outlined plans to support PWDs through initiatives aimed at equipping them with skills, financial assistance, and logistical resources to promote their integration into society. Additional forms of support will include educational opportunities and access to medical care to enhance their quality of life and participation in community development (*Anloga District Assembly_Final Draft Plan (2022-2025)*, n.d.)

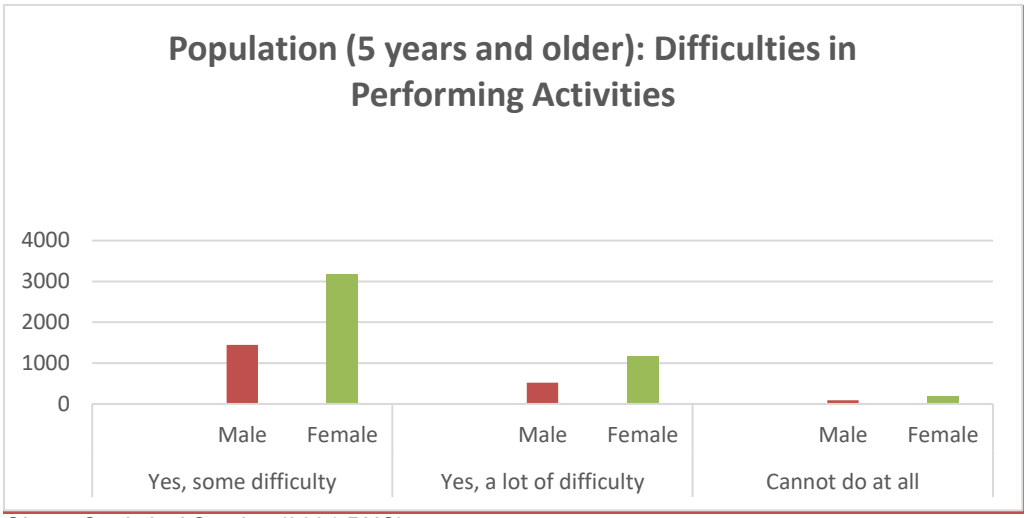
Table 1: Population by type of locality, disability type and sex

Disability Type	Both Sexes		Men		Women	
	Number	Percent	Number	Percent	Number	Percent
Total	83,449	100.0	38,720	100.0	44,729	100.0
No disability	77,441	92.8	35,933	92.8	41,508	92.8
With a disability	6,008	7.2	2,788	7.2	3,220	7.2
Sight	2,103	35.1	892	32.0	1,211	37.6
Hearing	936	15.7	373	13.4	563	17.5
Speech	996	16.5	507	18.2	489	15.2
Physical	1,683	28.0	797	28.6	886	27.5
Intellectual	854	14.2	429	15.4	425	13.2
Emotional	1,031	17.2	496	17.8	535	16.6
Other	474	7.9	236	8.5	238	7.4

Source: Ghana Statistical Service, 2010 Population and Housing Census

The 2021 Population and Housing Census data for Anloga District shows physical disabilities among population aged 5 years and older, with 1,447 males (1.83%) and 3,166 females (3.49%) reporting some difficulty in performing activities, 523 males (0.66%) and 1,167 females (1.29%) experiencing a lot of difficulty, and 93 males (0.12%) and 172 females (0.19%) unable to perform activities. These challenges pose increased vulnerabilities to climate change, particularly for those engaged in physically demanding livelihoods such as agriculture, fishing, fish smoking, and trading, which are prevalent in the district. Extreme climate events, such as erratic rainfall, drought, windstorms and rising temperatures, increase the physical demands of these activities, making adaptation particularly strenuous for those with physical limitations. For instance, farmers in the above categories may face greater difficulty with tasks like planting and harvesting under unpredictable weather, fishers may need to travel farther due to changes in fish migration patterns, and traders or fish smokers may struggle with the intensification of heat and mobility challenges. Women with disabilities who are engaged in farming and fishing activities would face significantly more difficulties than men in the same category. Addressing these vulnerabilities requires gender-responsive an inclusive climate adaptation strategy.

Figure 3: Difficulties in performing activities



Source: Ghana Statistical Service (2021 PHC)

2.9 Current Vulnerability - Sensitivity and Adaptive Capacity

Due to its location in the coastal Volta Region of Ghana, Anloga District is highly vulnerable and exposed to climate risks, including extreme weather events, sea level rise, and flooding. Various factors, including economic, social, human, and political resources, also contribute to Anloga District's vulnerability to climate change. Vulnerability is determined based on sensitivity and adaptive capacity and is characterized by both socio-economic conditions including the dependency on climate-sensitive sectors such as agriculture, as well as the institutional capacity to manage the potential for increasing climate change-related risks including floods and droughts. (Keta Municipal Assembly, 2018). (GSS, 2014).

2.10 Key Drivers of Vulnerability in Anloga District

The body of literature specifically addressing climate vulnerability in the Anloga District is sparse, likely because the district was only recently carved out of the Keta Municipality. Many studies on coastal vulnerabilities have used Keta Municipality as a case study, encompassing what is now the Anloga District. As a result, Anloga and Keta share similar characteristics in terms of climate change vulnerabilities, albeit with distinct community-specific variations in each area. The following section synthesizes existing information on vulnerabilities in the Anloga District, with these community-specific nuances further examined in the stakeholder engagement chapter.

2.10.1 Physical/Environmental Vulnerability

The Anloga District is highly at risk of climate change impacts due to its geographical location. The coastal district is ranked high in vulnerability to climate change and variability due to the increasing rate of sea level rise and widespread coastal erosion (GSS, 2014). Many of the water sources especially streams in the district are dwindling in size due to low rainfall, excessive evaporation and siltation. As a result, the quantity of water in the lagoons has considerably dwindled and tends to vary seasonally.

The coastal district is also generally affected by anthropogenic activities and geomorphological processes such as sea erosion and flooding which upset the condition of the coastal wetland, the vegetal cover and other landscape features of the locality. Wetlands are heavily impacted due to climatic and non-climatic factors such as indiscriminate harvesting of mangroves, and disposal of waste into the wetlands among others. Increased anthropogenic activities such as urbanization, farming and geomorphic processes such as sea erosion and tidal inundation owing to climate change are the key drivers of the transformations of the landscape of the district.

Coastal erosion is also having a huge impact on settlements in the district. Although the rate of erosion is considered reduced from initially predicted 2 m–1.5 m per annum (Adu-Gyamfi, Shaw and Yan, 2020) its impact on settlements is highly fuelled by the spatial coverage of the erosion (about 60% of the shoreline) and how the houses are spatially distributed near the shoreline.

2.10.2 Social-Economic Vulnerability

The most vulnerable social groups within Anloga District are female elderly and orphans, people with disabilities and low-income individuals and households in both a rural and urban setting. These group are disproportionately affected by the loss of services when infrastructure fails due to the impacts of climate change and environmental shocks. Often, it is these groups that bear the brunt of damage caused by natural disasters, as they may lack the resources to rebuild their homes, communities, and livelihoods, and who may be disproportionately affected by health and other impacts caused by disruptions to basic services (Adshead, et al., 2022). This is compounded by the lack of economic opportunities, high dependency on farming as a source of livelihood and the fact that many households have no diversified source of income. The major crops grown are mainly vegetables which include onion/shallot, okro, tomato and pepper. The district is noted as one of the highest producers of shallot and tomatoes in the country. Other types of crops grown are cassava, maize, sugar cane and rice. As agricultural lands become less productive and fish processing becomes more difficult, the combined effect of climate stress and socio-economic exclusion pushes households—especially women-headed ones—further into precarity. Fishing is a central livelihood activity in Anloga, shaping both the economy and the gendered division of Labor in the district.

Fishing in Anloga is not limited to the act of harvesting fish; rather, it encompasses an interconnected value chain that involves men and women in distinct but complementary roles. Men are primarily responsible for activities such as fishing and mangrove harvesting, while women dominate the post-harvest processing and marketing of fish, especially through fish smoking. However, this traditional livelihood system is under increasing threat due to the combined effects of environmental degradation and climate change. The depletion of mangrove forests is one of the most pressing issues identified. Men harvest mangroves while women sell the wood. The reduction in mangrove availability due to climate change, and over-exploitation, has severely impacted commercial activities for both men and women in these communities, leading to increased migration to larger towns and cities. This disruption has led to a breakdown in the fishing value chain, with women fish processors and traders being disproportionately affected due to their reliance on mangrove wood for fish smoking. The impacts are both economic and social.

Saltwater intrusion, water contamination, and unpredictable rainfall patterns have also negatively affected their farming and fish processing activities. These environmental changes reflect the symptoms of rising soil salinity – such as reduced crop yields and land degradation – which are especially harmful in coastal areas like Anloga where communities rely heavily on rain-fed agriculture.

Concurrently, a diverse spectrum of small-scale industrial operations has been identified within the district's economic sector. The small-scale industries rely on climate-sensitive raw materials such as cassava and sugarcane. In addition to these sectors, the district holds significant potential as a tourism hub along Ghana’s coastline and has key attraction sites. These facilities are located along the coastline, and they are threatened by increased sea-level rise. The residual workforce is predominantly affiliated with service-oriented professions and artisanal trades. Anloga District faces challenges in building its adaptive capacities and reducing vulnerability due to limited financial resources, inadequate infrastructure, and insufficient technical capacity and expertise. However, by building on the existing strengths, including economic diversity, and addressing the challenges, the coastal can improve its adaptive capacity and build a more sustainable and resilient future.

2.10.3 Gender-Specific Vulnerabilities in Anloga District

Climate change impacts in Anloga District present differential impacts that disproportionately affect various groups, particularly women, youth, and persons with disability. These vulnerabilities are evident across key sectors such as agriculture, water resources, community health, and infrastructure, highlighting the need for targeted adaptation strategies to ensure inclusive and equitable resilience building.

Crop and Animal Farming: In Anloga District, women predominantly engage in small-scale agriculture, mat weaving and fishing-related activities. Climate change impacts, such as unpredictable rainfall and rising temperatures, significantly affect crop yields and fish stocks. This places additional burdens on women who must spend more time on their farms to ensure foods security for their families while managing household responsibilities. Women also face limited access to financial resources, credit, and improved agricultural technologies, which further exacerbates their vulnerability and hampers their capacity to adapt to changing climatic conditions. Women also lose arable land to salinity-related degradation. Salinity-related land degradation disproportionately affects women, as it reduces their access to arable land and increases their dual burden of farming and caregiving, including making it more challenging to feed their households.

Fishing Sector: With the impacts of climate change and overexploitation, leading to reduced mangrove availability and cascading effects on the availability of fish, women find it increasingly difficult to access the fish as well as the fuel needed for fish processing. This not only limits their income-earning potential but also deepens time poverty as they must travel longer distances to find firewood or pay higher prices for alternative sources.

Water Resources: Women and girls in Anloga District bear the primary responsibility for water collection. Climate change-induced water scarcity forces them to travel longer distances to find clean water, which poses significant health risks and limits their time for educational and economic activities. During dry seasons, women and girls may need to walk several kilometers to the nearest water source, increasing their exposure to potential dangers and reducing time available for other productive tasks.

Community Health: As primary caregivers, women in Anloga District are disproportionately affected by climate change-induced health risks. Increased prevalence of diseases like malaria, diarrhea, and respiratory infections due to changing weather patterns heightens the burden on women who care for sick family members. The youth, while generally healthier, are still vulnerable to health risks associated with outdoor activities. Differently abled individuals face significant barriers in accessing healthcare, particularly during climate-induced emergencies, further exacerbating their vulnerabilities.

Infrastructure: Anloga's infrastructure, including roads, bridges, and buildings, is highly vulnerable to extreme weather events such as flooding and coastal erosion. Women are often responsible for ensuring household safety during such events, increasing their burden. Poorly designed or maintained infrastructure also poses significant challenges for differently abled individuals, making it difficult for them to access safe areas or evacuate during emergencies.

3. Methodological Framework

3.1 Introduction

This chapter outlines the methodology adopted for the climate vulnerability assessment in the Anloga District, integrating both qualitative and quantitative approaches to capture the district's climate risks and vulnerabilities. The methodology was designed to be inclusive and gender-responsive, ensuring the active participation of diverse stakeholders, including women, youth, and marginalized groups. The process was structured into four key phases: Desktop Review, Information Synthesis, Stakeholder Consultation, and Quantitative Data and Final Validation.

Desktop Review: The review focused on how climate risks intersect with socio-economic factors, particularly gender inequalities. It emphasized that vulnerable groups, including women, children, and the elderly, face disproportionate impacts from climate change due to their limited access to resources and lack of decision-making power. The desktop review identified gaps in existing knowledge, particularly regarding the localized impacts of climate change on gender-specific vulnerabilities. These gaps helped shape the design of subsequent field engagement and stakeholder consultation activities.

Information Synthesis: Insights from the desktop review were combined with secondary data from national climate reports and district-level assessments to provide a comprehensive understanding of climate risks and adaptive capacities, with a focus on gender and socio-economic factors. The preliminary risk analysis identified key climate risks, vulnerable sectors such as agriculture and water resources, and affected populations within the district. It also explored how these risks are distributed across different socio-economic and gender groups, highlighting systemic inequities. Based on this analysis, a detailed fieldwork strategy was developed to address identified data gaps and validate the preliminary findings. The strategy prioritized capturing gender-specific vulnerabilities and adaptive capacities through participatory engagement with local communities.

The Stakeholder Consultation Process: this process emphasized inclusivity and alignment with the needs of those most affected by climate change through a structured participatory methodology. It began with a workshop where the Assessment Team presented findings from the desk review and engaged stakeholders in participatory exercises like resource and hazard mapping, seasonal calendars, and historical timelines. These activities provided insights into localized challenges and opportunities. This was followed by gender-specific focus group discussions (FGDs) in five (5) selected communities, involving women, men, youth, migrants, and persons with disabilities to capture diverse perspectives. To collect quantitative data, a household questionnaire survey was designed, and an electronic version was administered to households by trained enumerators, including local residents from the Anloga communities. This strategic involvement of local people in the data collection process aimed to build their capacity in understanding climate change and vulnerability while gathering data based on the indicators for the vulnerability assessment. Household surveys gathered quantitative data on vulnerabilities, resource access, and adaptation practices, with a particular focus on gendered roles in water, food management, and alternative livelihoods. Throughout, gender inclusivity was prioritized, with women-led organizations actively contributing to identifying gendered impacts and adaptation needs.

Revision and Final Validation: The final phase focused on validating and refining the findings to ensure accuracy, relevance, and alignment with the district's needs. The draft report, which included findings from the desktop review, household surveys, and stakeholder consultations, was compiled into an in-depth analysis of climate risks, vulnerabilities, and gender-responsive adaptation strategies for the Anloga District. Validation workshops were held with key stakeholders, including local assembly representatives, women, and persons with disability to review and provide feedback on the draft, ensuring the recommendations were actionable and context specific. Feedback from these workshops was incorporated into the final report, with revisions that strengthened its alignment with local realities and emphasized gender-responsive strategies. The final report was then comprehensively validated by stakeholders to confirm its accuracy and relevance, finalizing it as a crucial tool for informing climate adaptation planning in Anloga District. The figure below illustrates the comprehensive steps taken relative to the four-phase approach utilized in this study, supported by the community-based data

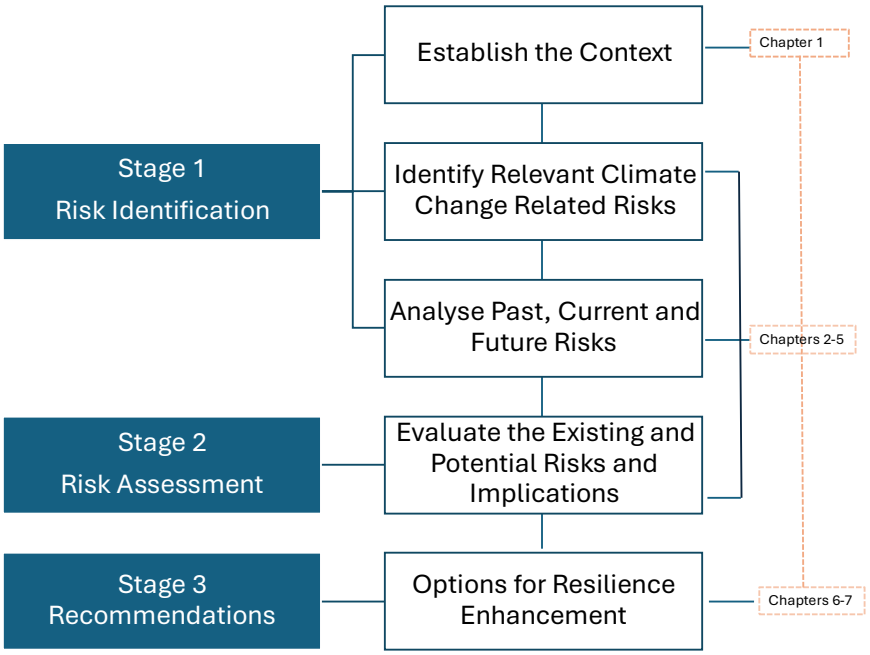
collection approaches and tools adopted to gather quality data. The steps were designed to yielded context-specific insights in order to ground the research findings in community vulnerabilities that would inform adaptation planning.

Figure 4: Step-by-step methodology adopted

3.3 Approach

The approach undertaken in determining the Climate Risk and Vulnerability Assessment for Anloga District follows the general risk assessment process designed and used for Municipal CRVA as shown in **Figure 5**.

Figure 5: General overview of the risk and vulnerability assessment process



Source: Adapted from (Norman, et al., 2014)

The approach sketched out in **Figure 5** shows a three-stage climate risk assessment process. Stage 1 involves identifying risks by establishing the contextual background, pinpointing and analysing risk trends over time. Stage 2 focuses on assessing the implications of both existing and potential risks. Finally, Stage 3 provides recommendations by exploring actionable strategies to enhance resilience. The chapters referenced alongside each step indicate the corresponding sections in the main report where each component is discussed in detail.

3.3.1 Gender-Responsive Climate Risk Assessment Approach

This approach started with a desktop review conducted to establish the gendered vulnerability context of the district. This involved gathering gender-disaggregated data from socio-economic reports, and gender studies to understand the specific impacts of climate risks, such as droughts and floods, on women and marginalized groups. The review also examined how socio-economic factors, like income inequality and limited access to resources, exacerbate vulnerability. Gaps were then identified in the data analysis to inform the design of fieldwork and consultations, ensuring the assessment captured diverse lived experiences and integrated gender-specific insights into the broader climate risk analysis.

4. Findings and Implications

4.1 Stakeholder Engagement

A key component of the climate risk assessment process is the active engagement of Interested and Affected Parties (I&APs). This engagement aims to enhance participants' awareness and understanding of climate change issues and impacts within the district, while also transferring capacity to relevant stakeholders for effective implementation. As part of this process, two workshops were organized. The first workshop focused on introducing the assessment process and facilitating qualitative data collection to validate the findings from the desktop review, while the second aimed at validating the draft findings.

The initial workshop was held on September 3, 2024, in the Anloga District. Nearly 40 participants attended, including representatives from the National Disaster Management Organization (NADMO), the Anloga District Assembly, and professionals from agencies such as the Community Water and Sanitation Agency. Participants also included individuals from the education and media sectors, along with community representatives such as women's groups, local farmers, and community media personnel. This diverse stakeholder engagement provided a valuable platform for collaboration and dialogue. The workshop served multiple purposes for the consultant team, including:

1. **Introduction to the NAP Project Framework:** Presenting the framework to stakeholders and outlining the collaborative process for the assessment.
2. **Climate Change Education:** Informing participants about climate change, its potential impacts, and the various factors to be considered in the risk assessment.
3. **Sharing Down-Scaled Climate Projections:** Presenting preliminary projections for temperature and precipitation at the local level.
4. **Validating Climate Projections:** Confirming the projections with empirical evidence and insights from local expertise.
5. **Gender Discussions:** Addressing the gender dimensions of climate change and their implications for adaptation planning.
6. **Risk Identification and Data Gathering:** Collecting both quantitative data and qualitative insights to deepen the understanding of climate-related risks, their consequences, and the community's adaptive capacity.
7. **Institutional Capacity Building:** creating awareness and understanding of climate change issues and impacts within the district, as well as enhancing capacity of institutional stakeholders to undertake future climate vulnerability and adaptation planning.

4.1.1 Workshop Activities

The workshop activities began with an opening presentation by the consultant team to frame the objectives and set the context for discussions. This introduction established the foundation for interactive sessions that followed, ensuring participants were aligned with the goals of the project and actively contributed to the dialogue on climate risks and adaptive strategies.

Photo 1: Participants listening to a presentation by Dr. Manteaw

The presentation was followed by participatory activities designed to actively engage participants in identifying key hazards, exposures, and vulnerabilities, as well as framing and ranking various risks. Groups participated in exercises such as physical and resource mapping, along with hazard mapping. Through these activities, participants identified the most vulnerable and high-risk locations within the district. This exercise not only pinpointed geographical areas prone to climate impacts but also highlighted critical resources at risk from these hazards. At the same time, other sector groups focused on identifying specific climate hazards. These collaborative activities provided insights into the types of hazards affecting the district, enabling participants to assess the potential impacts on resources, infrastructure, and livelihoods.

Through the hazard and resource mapping, key critical sectors and assets were identified as primary focal points for Anloga's local-level Climate Change Risk and Vulnerability Assessment. These key sectors include fisheries, critical infrastructure, agriculture, health systems, and coastal ecosystems, which are deemed vital to the district's economic, social, and environmental well-being. These identified systems and assets will serve as the foundation for assessing climate-related vulnerabilities, impacts, and adaptive capacities, to inform targeted strategies to enhance climate resilience in Anloga. The interactive nature of these sessions ensured that participants contributed their local knowledge and expertise, creating a shared understanding of risks and fostering a sense of ownership in the adaptation planning process.

Photo 2: Participants engaged in resource mapping

Building on these activities, the sector groups actively evaluated a matrix of functions (MoF) based on the availability or absence of specific functions across communities in the Anloga District. Each group actively discussed and applied their experiential knowledge to complete the district's seasonal calendar and indicate historical climate-related events. This participatory approach encouraged diverse opinions and observations, enriching the assessment with local insights.

Persons with disabilities and women participants were integrated into every group to ensure gendered perspectives which includes the different ways climate change impacts children, men, women, and other vulnerable groups such as the elderly and persons with disabilities. These conversations revealed the unique challenges faced by each group and stressed the importance of inclusive strategies that address gender-specific needs and perspectives. By incorporating these insights, the workshop ensured that the proposed adaptation responses would be equitable and effectively respond to the varying vulnerabilities within the community.

Photo 3: Participants engaged in hazard mapping

4.1.2 Climate Hazards Identified in Anloga

The stakeholder engagement process has identified various climate risks that different communities within the district face.

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

Climate Event	Sector	Frequency of Occurrence				Coverage
	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
	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 study.					

Lagoon flooding: Classified as very high in terms of frequency, meaning it occurred very frequently over the last 10 years. In terms of extent, it affects more than 75% of the district, making it the most widespread climatic event. Lagoon flooding disrupts social services such as education and health, with children being the most impacted due to the long distances they must travel to reach schools and health facilities. Pregnant women also suffer significantly during lagoon flooding periods, as they struggle to access health facilities for prenatal and postnatal care.

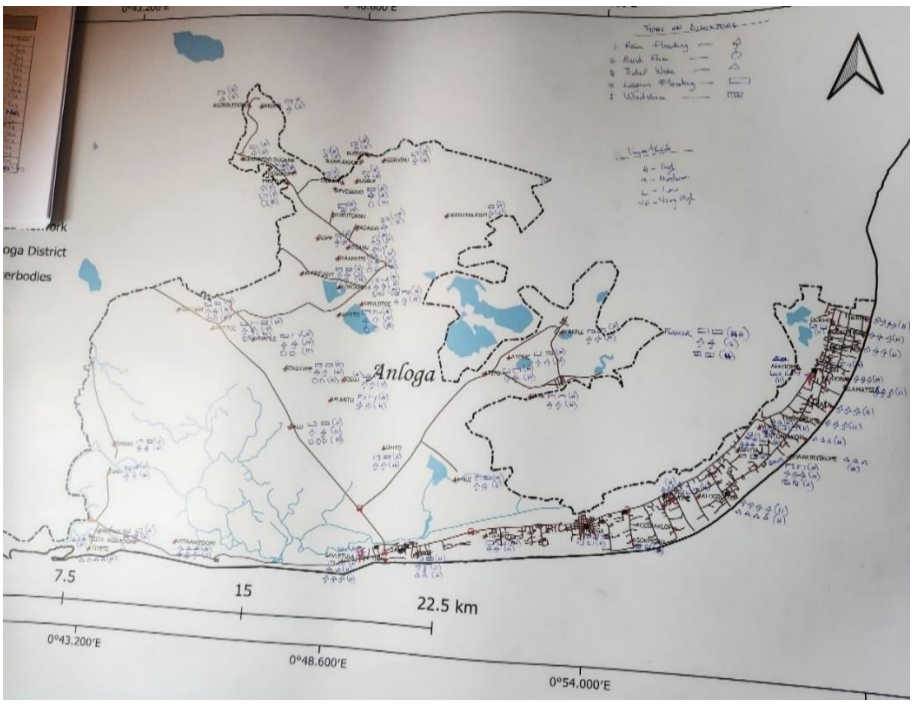
Bushfire/Wildfire Hazard: Classified as *medium* in terms of frequency, meaning it occurred moderately over the last decade. It affects between 25-74% of the district with more than 50% chance of destroying farmland. In areas already prone to wildfires, the fire season is expected to lengthen, with more days conducive to fire spread due to increasing temperatures.

Flash Floods: Also classified as *medium in terms of frequency.* In terms of extent, flash floods affect between 25% and 74% of the district, including critical social services such as health and education facilities. Flash floods make roads impassable and thus impacting the children and the aged the most in terms of accessing education and health facilities respectively.

Drought: Classified as high in terms of frequency of occurrence. In terms of extent, it affects between 1% and 25% of the district, but its impact is severe due to extreme temperatures and unpredictable rainfall. The impact on agriculture is expected to be severe with women facing the harshest impact due to their reliance of farm crops which they usually sell in Anloga, Woe and Anyanui Markets.

Tidal Waves: Classified as high in terms of frequency, meaning it is one of the most frequently occurring hazards due to ongoing sea-level rise. In terms of extent, it primarily affects coastal communities in close proximity to the sea, disrupting the livelihoods of fishermen and essential social services, including children's education and housing security. The elderly are particularly vulnerable, as they often lack the physical strength to evacuate or rescue their belongings during tidal wave events.

Figure 6: Field Data 1 – Participatory map showing the areas exposed to various climate risks



Although the hazards identified above, their magnitude, geographical extent of impact, and sectoral impacts are based on subjective assessment arising from the stakeholder engagement process, the qualitative data is supported by other studies. For example, heavy rains frequently cause rivers to overflow their banks, resulting in almost annual flood events (Danso & Addo, 2017; Ansah et al., 2020). Coastal floods are also a significant challenge for the district, with evidence showing an increase in their frequency (Brempong et al., 2023). The combination of rising sea levels, increasing coastal storms and storm surges, and rapid urbanization could exacerbate the risks and amplify the impacts of both urban and coastal flooding (Triple Line Consulting Limited, 2022). The identification of risks may not reflect the full nature of the vulnerabilities in the district. Therefore, it is essential to triangulate the qualitative data with quantitative data in order to enhance the robustness of the data to inform adaptation planning in the Anloga District.

4.1.3 Anloga District Seasonal Change Calendar

The seasonal calendar of Anloga was discussed with participants at the participatory stakeholder engagement workshop held at the district assembly. This discussion produced findings which indicated an observed change in the known seasonal calendar for the agricultural sector, which encompasses the key livelihood activities engaged in by most communities and households in the area.

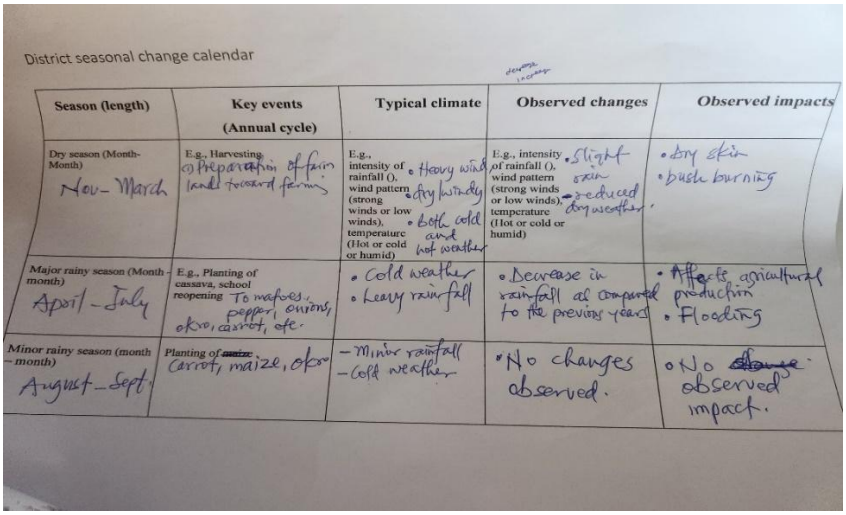
The seasonal calendar in the context of the Anloga District Assembly refers to a yearly timeline outlining the socio-economic and livelihood activities (mainly agricultural activities), in alignment with the different seasons (wet and dry) and their characteristics. This calendar encompasses planting seasons, harvesting seasons, periods of high rainfall, periods of drought, and any significant seasonal events that may affect farming.

Table 3: Seasonal change calendar for the Anloga District (based on agricultural cycle and varies per community)

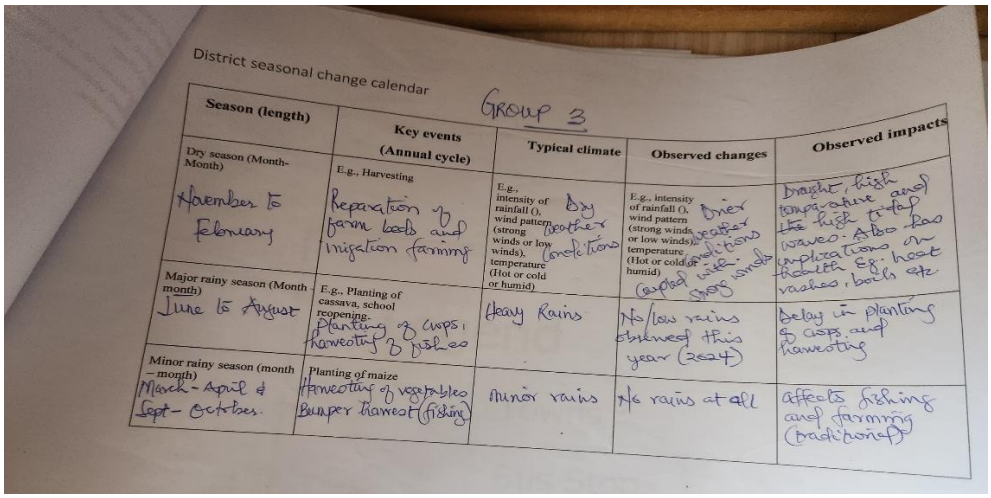
Season (Length)	Key Events (Annual Cycle)	Typical climate	Observed Changes	Observed Impact
Dry season (November - March)	Dry season farming especially vegetables using irrigation Commencement of land preparation for farming activities	Cold, hot and dry weather Windy weather	Minor rain during this season Reduced dry weather Increased temperature	High incidence of bushfires Drying up of water bodies Dry Skins
Major rainy season (April - July)	Planting by farmers, mainly vegetable farming	Frequent and heavy rains accompanied with thunderstorms	Reduction in rainfall compared to previous years	Flooding affects communities and agricultural production Unpredictable rains contribute to delayed planting and harvesting
Minor rainy season (August - September - October)	Planting continues especially with vegetables aided by irrigation Harvesting of farm produce	Less and discontinuous rains- minor rainfall	Imperceptible changes No rains	Impacts on fishing and farming

Source: Seasonal Calendar Assessment at the participatory workshop held at Anloga District Assembly, 2024.

Field Data 2: Seasonal calendar evaluation during the participatory workshop (cf. Table 3)



Field Data 3: Seasonal calendar evaluation during the participatory workshop (Group 3) (cf. Table 3)



District seasonal change calendar — GROUP 3

Season (length)	Key events (Annual cycle)	Typical climate	Observed changes	Observed impacts
Dry season (Month-Month) — November to February	E.g., Harvesting — Reparation of farm lands and irrigation farming	E.g., intensity of rainfall (), wind pattern (strong winds or low winds), temperature (Hot or cold or humid) — Dry weather conditions	E.g., intensity of rainfall (), wind pattern (strong winds or low winds), temperature (Hot or cold or humid) — Drier weather conditions (expect wind strong winds)	Drought, high temperature and the high tide has waves. Also has implications on the health Eg. heat rashes, boils etc
Major rainy season (Month – month) — June to August	E.g., Planting of cassava, school reopening. Planting of crops, harvesting of pushes	Heavy Rains	No/low rains observed this year (2024)	Delay in planting of crops and harvesting
Minor rainy season (month – month) — March - April & Sept - October.	Planting of maize — Harvesting of vegetables Bumper harvest (fishing)	Minor rains	No rains at all	Affects fishing and farming (traditional)

When we talk about the 'observed impact' on the district seasonal calendar, we are referring to changes in these traditional timelines and activities that are caused by external factors. Most notably, this might include shifts in climate patterns, such as alterations in the timing, intensity, and duration of rainy and dry seasons, or fluctuations in temperature. For instance, if the onset of rain is delayed or the dry season is extended, it significantly affects the planting and harvesting schedule of farmers. This results in crop failures, reduced yields, and food insecurity, thereby affecting the livelihood of several farming communities in the Anloga District.

The timeframe for the 'observed changes' could refer to changes noted over a specific period, say a decade, two decades, or more, depending on the availability of data and the specific impacts under study. The changes are generally compared against a baseline period in the past, providing a clear picture of how climatic variables and farming practices have evolved over time.

4.1.4 Identification of Priority Communities

Five key communities were selected for this assessment, excluding those previously studied by SIGRA. The selection process involved consultations with key stakeholders, including the Planning Officer and Assembly Members. Many communities in the district share similarities in their climate change dynamics, hence the selected communities were carefully chosen to highlight the unique ecological and socio-economic characteristics affected by climate change. To ensure broad representation of the climate change situation across the Anloga District, the selected communities come from different area councils. The vulnerable communities included in the assessment are Bleamezado, Atito-Alakple, Woe-Afedome, Dzita, and Devegodo.

Table 4: Selected communities and their respective areas councils

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

4.1.5 Findings from Selected Communities

Climate Risks and Impacts
All selected communities are increasingly vulnerable to extreme weather events, including destructive rainstorms over the past five years that have devastated crops. Unpredictable rainfall patterns have intensified agricultural challenges such as crop failures. Downpours occasionally cause rivers to

overflow, triggering floods that inundate homes and farmlands, destroy crops, and degrade water quality as runoff carries debris into domestic water sources. Extreme rainfall intensity and windstorms cause damage to housing infrastructure, while climate-induced salinization of freshwater sources from salt intrusions jeopardizes clean water access. Flooding further undermines local infrastructure, damaging roads and public sanitation facilities. Floodwater creates breeding grounds for pests and parasites which threaten livestock health, particularly cattle. Health risks escalate as heat stress leads to fatigue and skin rashes, while mosquito breeding in floodwaters drives an uptick in vector-borne diseases.

Photo 4: Flooding situation at Atito-Alakple

Photo 5: Mudhouse damaged by floods at Bleamezado

Photo 6: School buildings affected by rainstorms at Woe-Afedome

Photo 7: The wooden bridge connecting Devegodo to the nearest market

Coping Mechanisms

In communities such as Bleamezado and Devegodo where residents practice alcohol distillation using sugarcane as raw materials, community members report taking out loans to purchase sugar for distillation when flooding destroys sugarcane plantations. To combat health issues associated with flooding, such as diarrhea and skin rashes, residents report using coconut water mixed with salt and purchase necessary medications. In response to declining fish stocks due to flooding, residents in Woe-Afedome engage in alternative agricultural practices, such as tomato farming to sustain their livelihoods. The community residents at Woe-Afedome also reported that they engage in tree planting as part of their adaptation efforts. Overall, community members advocate for the rehabilitation of roads, establishment of health facilities, and dredging of riverbeds to improve resilience against climate impacts.

Photo 8: Alcohol distillation center at Bleamezado where residents sometimes purchase sugar to aid alcohol distillation when sugarcane farms are destroyed by climate events

Photo 9: Woman weaving mat as an alternative source of livelihoods to cope with the impacts of climate change on Agriculture at Devegodo

Table 5: Data collected from focus group discussion with vulnerable groups in the Anloga area

Sector	Vulnerability	Elderly Group	Women	Youth/Children	Migrants	Persons with Disability
Fishing Sector	• Fishing livelihood system is under increasing threat due to the combined effects of environmental degradation and climate change. The reduction in mangrove availability due to climate change, and over-exploitation, has led to a breakdown in the fishing value chain.	• Elderly group who are dependent on women fish smokers and fishermen are equally impacted by the disruption caused to the fishing livelihoods as their basic needs such as food and medical needs depend on the caregivers.	• Women fish processors and traders are being disproportionately affected due to their reliance on mangrove wood for fish smoking. • With reduced mangrove availability, women find it increasingly difficult to access the fuel needed for fish processing.	• Declining fish stocks reduce the income of youths engaged in fishing. • The disruption has also contributed to out-migration, with men seeking work elsewhere, leaving children behind.	• Migrants in the fishing sector will be hard hit and lose their source of livelihoods particularly because they often lack family or community support networks in host areas.	• Increased dependency on already strained caregivers.
Agriculture	• Climate impact on crop yields, livestock and fishing. • Saltwater intrusion, water contamination, and unpredictable rainfall patterns have negatively affected their farming.	• Climate-induced challenges, such as declining fish quality and farming difficulties caused by increased soil salinity, hinder their ability to contribute to family sustenance, particularly in terms of food security. • This reduced capacity to provide negatively impacts their mental health and well-being, leading to feelings of helplessness.	• Increased workload and stress on dual roles.	• Uncertain job prospects and disrupted education. • Loss of farm-based employment opportunities, leading to outmigration in search of jobs.	• Traditional livelihoods such as herding, fishing, and agricultural labor have been severely impacted by unpredictable weather and environmental degradation. • Herders face challenges such as grass scarcity due to prolonged droughts and soil salinity, making it difficult to feed cattle. • Extreme temperatures cause stress to both the animals and the herdsmen, resulting in a decline in livestock quality	• Accessibility barriers and need for adaptive technologies. • Climate-related disruptions in food supply chains marginalize PWDs further, as scarce or expensive food increases their struggle to secure basic necessities. • Dependency on family members or caregivers for food access rises during climate-related disasters. • PWDs running small businesses or trades face challenges due to disrupted local

Sector	Vulnerability	Elderly Group	Women	Youth/Children	Migrants	Persons with Disability
					and reduced market value. • Herdsmen employed by others often have substantial salary deductions to cover the rising costs of maintaining animals' health and well-being. • The unstable local economy makes it difficult for migrants to find consistent work or reliable income, perpetuating a cycle of poverty and dependence. • Displacement and the inability to secure stable jobs and three-square meals.	economies and reduced customer flow during climate events.
Water Resources	• Water scarcity, contamination and saltwater Intrusion	• In households where the elderly live alone or with other elderly dependents, water insecurity can lead to neglect of personal hygiene, under hydration, or even heat stress during dry seasons. • Older adults, especially those with chronic health conditions, are more vulnerable to dehydration and illness	• Longer distances and increased time spent sourcing fresh water for domestic use.	• Diverted from education to water collection.	• Limited access to water for cattle forces herders to travel farther in search of water, increasing the risk of conflict with local communities over shared water resources. • Saltwater intrusion into grazing areas causes vegetation loss, leaving insufficient pasture	• Difficulty accessing clean water, heightened dependence. • Limited mobility worsened by longer distances and physical difficulty in accessing to clean and fresh water.

Sector	Vulnerability	Elderly Group	Women	Youth/Children	Migrants	Persons with Disability
		from water scarcity yet may be unable to access health services due to distance and cost.			for animals belonging to migrants which can lead to local tensions when people's farms become alternative source of food for animals.	
Community Health	• Climate-induced health risks.	• Aging naturally brings challenges such as muscle weakness, fatigue, chronic illnesses, hypertension, and cardiovascular diseases, which have been exacerbated for the elderly in Anloga by the impacts of climate change.	• Increased caretaker burden, mental health risks.	• Exposure to health risks, educational disruption.	• Mental Health risks.	• Limited mobility and a lack of disability-friendly infrastructure hinder access to healthcare and safe shelters.
Infrastructure/ Property/ Assets	• Loss or poor resilience to extreme climate events.	• Coastal erosion has caused the loss of ancestral lands, including sacred sites, burial grounds, and family homes. • This loss has severed the elderly's connection to their cultural and traditional heritage, symbolizing a break from their identity and history.	• Damage to market stalls or trading spaces limits women's ability to sell processed fish or vegetables, cutting off their primary source of income.	• Limited engagement in recovery, lost opportunities.	• Loss of rental structures or informal shelters due to floods or evictions leaves migrants – especially female migrant households – without secure housing, increasing their housing insecurity and exploitation.	• Increased risk of injury, lack of accessible escape routes.

4.2 Household Survey Data and Vulnerability Analysis

Understanding the climate vulnerabilities faced by communities in the Anloga District is critical for developing targeted adaptation interventions that promote climate resilience and equitable development. This vulnerability analysis explores three dimensions of vulnerability – economic, physical/environmental, and social – using a gender-sensitive lens to identify disparities sensitivity and adaptive capacities among women and men.

➢ Socio-Demographic Profiles of Gendered Households

Table 6: Socio-economic profile of household heads

Variables	Households led by Men (MHH) N = 112	Households led by Women (WHH) N = 97	Full Sample N = 209
Households by Communities			
Bleamezado	17.0	10.3	13.9
Atito-Alakple	13.4	16.5	14.8
Woe-Afedome	30.4	25.8	28.2
Dzita	26.8	30.9	28.7
Devegodo	12.5	16.5	14.4
TOTAL	**100%**	**100%**	**100%**
Marital Status			
Single	3.6	3.1	3.3
Married	81.3	51.5	67.5
Living together	4.5	2.1	3.3
Widowed	3.6	35.1	18.2
Divorced	6.3	7.2	6.7
Separated	0.9	1.0	1.0
TOTAL	**100%**	**100%**	**100%**
Education			
No Formal Education	4.5	25.8	14.4
Primary Education	24.1	30.9	27.3
Junior High School	50.9	37.1	44.5
Senior High School	11.6	1.0	6.7
Vocational/Technical School	2.7	3.1	2.9
Post-Secondary Education	6.3	2.1	4.3
TOTAL	**100%**	**100%**	**100%**
Livelihood Source			
Crop/Livestock	62.5	50.5	56.9
Fishing	24.1	5.2	15.3
Trading	2.7	19.6	10.5
Others	*10.7*	*24.7*	*17.3*
TOTAL	**100%**	**100%**	**100%**
Monthly Income			
< GHS 500	50.0	57.7	53.6
GHS 500 - 1000	42.9	41.2	42.1
GHS 1000 - 2000	3.6	1.0	2.4
> GHS 2000	3.6	0.0	1.9
TOTAL	**100%**	**100%**	**100%**

➢ Description of the Socio-Economic Profile

From **Table 6,** men-headed households (MHH) and women-headed households (WHH) show socio-economic differences with implications for climate vulnerability. Woe-Afedome has the highest representation for both groups (30.4% in MHH and 25.8% in WHH). Communities such as Dzita (30.9%), Woe-Afedome (25.8%), and Devegodo (16.5%) host more women-headed households. Men-heads are predominantly married (81.3%), which provides economic and emotional stability, while women heads are more likely to be widowed (35.1% for WHH vs. 3.6% for MHH), a status that may limit their adaptive capacity to climate shocks. Other marital statuses, such as single, divorced, and living together, have marginal differences between the two groups. Men heads generally achieve higher educational levels, with only 4.5% lacking formal education compared to 25.8% of women heads. Men heads have higher representation at the junior high (50.9% for MHH vs. 37.1% for WHH), senior high (11.6% for MHH vs. 1.0% for WHH), and post-secondary education levels (6.3% for MHH vs. 2.1% for WHH).

A majority in both groups depends on agriculture (crop/livestock farming) as a livelihood source (62.5% for MHH vs. 50.5% for WHH). Men heads are more engaged in fishing (24.1%) compared to women heads (5.2%), while women heads are more active in trading (19.6% vs. 2.7% for men) and other activities (24.7% vs. 10.7%) which suggest gender-targeted livelihood adaptation initiatives should prioritize fishing for men, trading for women, and crop/livestock farming for both groups to enhance climate change adaptation. Both groups predominantly fall into the less than GHS 500 category (50.0% for MHH and 57.7% for WHH). Men heads have slightly higher representation in the GHS 1000–2000 and above GHS 2000 brackets (3.6% in both cases vs. none for women heads) which indicates that women headed households are more financially disadvantaged. These gender disparities suggest that women-headed households are more likely to be vulnerable to climate impacts due to lower education, limited economic opportunities, and reduced financial capacity, compounded by reduced socio-psychological benefits that married men heads may often experience. The next section explores gendered perspectives on climate exposures, sensitivity, and adaptive capacity to analyze vulnerability at a more granular indicator level.

Table 7: Assessment of gendered exposure to extreme climate events

Indicator	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 = 3%	Moderate = 0.7%	Moderate =7.1%	Moderate =5.4%
			Low = 5%	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 (N=209)	(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 5 years	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%

Gendered Household Exposure to Extreme Climate Events

This section analyses the exposure to climate events by assessing both the frequency and level of impact over the past five years. Exposure is typically measured by the frequency and intensity of interaction with climatic stressors (Balikoowa et al., 2019). The analysis employs a three-point Likert scale to classify the frequency and level of impact or intensity of extreme climate events as high, moderate, or low. High frequency connotes the occurrence of climate events often and very often and low frequency implies rarely and never. The data is disaggregated to capture the varying experiences of households led by women compared to those led by men, providing a nuanced understanding of the differential exposures to extreme climate events within these groups.

Level of Impact of Extreme Climate Events

The results in **Table 7** on exposure to extreme climate events shows extreme temperature or heat emerges as the most pervasive climate event, with nearly universal high impact on both men-headed (99.2%) and women-headed households (99%), reflecting no significant gender disparity at the household level. Floods follow as the second most impactful hazard, with 72.3% of men-headed and 66% of women-headed households reporting high impact, which indicates more men-headed households facing high exposure of floods than women-headed ones. Drought ranks third, affecting 61.6% of men-headed and 62.9% of women-headed households at high levels, showing slightly more women-headed households being exposed to drought. Windstorms show marginally higher percentage of women-headed households (60.8%) being highly impacted compared to men-headed ones (58.1%), while other climate events affect both groups almost equally, with 50.9% of men-headed and 50.5% of women-headed households experiencing high impact.

Frequency of Occurrence of Extreme Climate Events

Extreme heat also stands out in terms of frequency, 99.2% of men-headed and 99% of women-headed households reporting high frequency of extreme heat in Anloga, indicating near-universal exposure. Floods are the second most frequently occurring hazard, with 69.6% of men-headed and 65.9% of women-headed households experiencing them at high frequency, suggesting slightly more men-headed households being exposed. Drought ranks third, with high frequency reported by 60.5% of men-headed and 59.8% of women-headed households, showing minimal gender difference at household level. Windstorms occur at high frequency slightly more for women-headed households (56.7%) than men-headed ones (55.4%), while other climate events show a relatively lower high-frequency occurrence, affecting 51.8% of men-headed and 50.5% of women-headed households.

Overall Analysis and Gendered Implications of Exposure

The quantitative results for both the level of impact and frequency of occurrence of extreme climatic events align with qualitative data gathered during stakeholder engagements, which highlighted lagoon flooding as a critical issue affecting over 75% of the district and frequently disrupting social services such as education and healthcare. Children are particularly vulnerable, as many must travel long distances to schools and health facilities, while pregnant women face challenges in accessing prenatal and postnatal care during flood events. Additionally, prolonged droughts, characterized by extreme temperatures and erratic rainfall, affect 1% to 25% of the district. As evident from the quantitative data, more women-headed households face high exposure to droughts. This implies the 50.5% of women-headed households who depend on rain-fed agriculture are more exposed to drought than the men-headed households. The household survey results further corroborate the qualitative findings by showing the need for adaptation measures targeted toward addressing the exposure of communities to extreme heat, floods and droughts, with floods more for men-headed households, and windstorms and drought for women-headed households. The next sections focus on the inherent vulnerabilities by showing analysis of variations in sensitivity and adaptive capacity.

➢ Gendered Household Analysis of Sensitivity and Adaptive Capacity

This section adopts the definition of vulnerability as an inherent characteristic of systems, distinguishing it from exposure, which is considered external to the system according to the IPCC's sixth assessment report. Accordingly, the vulnerability of communities in Anloga is determined by their sensitivity and adaptive capacities across various sectors. The analysis specifically examines vulnerabilities with focus on the differences between men-headed and women-headed households relative to adaptive capacity and sensitivity.

Analysis of sensitivity focuses on variables such as the intersection of gendered differences with regards to decision-making power, cultural norms, household workloads among others. The analysis also explores gendered differences with respect to adaptive capacities across different sub-sectors within the broader socio-economic sector. Specific indicators include access to resources, income level, livelihood diversification, and access to early warning system, access to agricultural extension services. Furthermore, the role of community support in enhancing adaptive capacity is assessed to understand how social networks either reduce or exacerbate vulnerability. Insights into these factors are contextualized with quantitative data and qualitative narratives to provide a comprehensive understanding of how women-headed and men-headed households experience climate vulnerabilities in the Anloga District.

Table 8: Assessment of gendered sensitivity

Indicator / Variable	Unit of Measurement	HOUSEHOLDS LED EN (MHH) (N=112)	HOUSEHOLDS LED BY WOMEN (WHH) (N=97)	Total (TT) (N=209)
SENSITIVITY				
% of households with livelihood dependence on rain-fed agriculture	0-100%	MHH=**62.5%**	WHH=**50.5%**	TT= **56.9%**
% of households living in flood-prone areas	0-100%	MHH=**68.8%**	WHH=**70.1%**	TT= **69.4%**
% of households with farms in flood-prone areas	0-100%	MHH=**42.9%**	WHH=**35.1%**	TT= **39.2%**
% of households with challenges with water access	0-100%	MHH=**52.8%**	WHH=**53.7%**	TT= **53.2%**
% of households with no education	0-100%	MHH=**4.5%**	WHH=**25.8%**	TT= **14.4%**
% of households with malnutrition		MHH=**3.6%**	WHH**=2.1%**	TT= **2.9%**

Gendered Household Analysis of Sensitivity

From **Table 8**, men-headed and women-headed households show varying degrees of sensitivity to climate change based on livelihood reliance, location, and socio-economic factors. A larger proportion of men-headed households (62.5%) depend on rain-fed agriculture compared to women-headed households (50.5%), which shows that men-headed households will face a higher degree of impact to changes in rainfall patterns. However, more women-headed households (70.1%) reside in flood-prone areas compared to men-headed households (68.8%). Regarding farm location, 42.9% of men-headed households (MHH) have farms in flood-prone areas, compared to 35.1% of women-headed households (WHH). While this suggests that more farmlands belonging to MHH are exposed to flood risks, it also shows a critical barrier—the lower percentage of WHH with farms in flood-prone areas is not because they have alternative, safer lands, but because they often lack access to farmland altogether.

Meanwhile, 62.5% of MHH who depend on agriculture and 72.3% and 69.6% of MHH who reported high impact and frequency of floods, respectively, will continue to face greater flood risks to their agricultural activities. However, these figures must be understood alongside the exclusion of WHH from land ownership, which leaves them with fewer adaptation options and greater livelihood insecurity in the face of climate change. Both groups report similar levels of challenges with water access, with 52.8% of male-headed and 53.7% of female-headed households affected, demonstrating shared degree of impact to water scarcity due to climate change. Most households (over 60% for both men and women-headed) depend on standpipe water which implies their degree of impact to climate-induced water scarcity depends largely on the availability and quality of the source of water for the standpipe.

Education levels show a significant disparity, with 25.8% of women-headed households having no formal education compared to only 4.5% of men-headed households. This gap reduces women-headed households' capacity to adapt to climate change effectively particularly in terms of processing climate information and hence a higher degree of climate change impacts. Malnutrition levels are low across

both groups but slightly higher among men-headed households (3.6%) compared to women-headed households (2.1%). While malnutrition levels are low across both groups, It is unclear what specifically accounts for the slightly higher incidence among men-headed households (3.6%) compared to women-headed households (2.1%) as men typically have greater access to agricultural resources, but it may suggest that women-headed households (WHH) are employing more effective household food management strategies despite their limited access to land and agricultural inputs. Addressing food security challenges requires targeted interventions to strengthen adaptive capacity in both WHH and men-headed households (MHH), with a particular focus on closing the adaptive capacity gap for WHH. Enhancing women's access to land, financial resources, and climate-smart agricultural support is crucial to ensuring long-term food security and equitable adaptation to climate change**.**

Overall, these findings emphasize the urgent need for gender-responsive interventions that address the vulnerabilities associated with reliance on rain-fed agriculture. It must be emphasized, however, that as water resources such as lakes, rivers, and lagoons become more susceptible to drought, the burden of securing drinkable water will disproportionately fall on women. Currently, 44% of females across both household types are responsible for fetching water, compared to only 13.4% of males. As water scarcity worsens, women will be forced to spend even more time and effort on this task, further straining their daily responsibilities. This increased workload not only limits their income-generating opportunities but also affects girls' education, as they are often required to assist in water collection. Hence, more women-headed households need adaptation interventions that reduce their sensitivity to climate change because of limited educational attainment and workload to enhance their adaptive capacity.

The next section will analyze how other underlying factors such as uneven income-generating sources, asset ownership, social networks, and access to information and facilities among others will reshape vulnerability for both women-headed and men-headed households asymmetrically based on adaptive capacity.

Table 9: Assessment of gendered adaptive capacity

Indicator / Variable	Unit of Measurement	HOUSEHOLDS LED BY MEN (MHH) (N=112)	HOUSEHOLDS LED BY WOMEN (WHH) (N=97)	Total
Assets/Financial Security				
% of households with access to land	0-100%	MHH=**44.8%**	WHH=**37.1%**	TT= **41.3%**
% of households with access to loans/financial assistance	0-100%	MHH=**12.5%**	WHH=**9.3%**	TT= **11%**
% of households engaged in other income-generating activities	0-100%	MHH=**62%**	WHH=**67%**	TT= **64%**
% of households with access to insurance	0-100%	MHH=**55.4%**	WHH=**55.7%**	TT= **55.5%**
% of households with access to savings to cope with climate impacts	0-100%	MHH=**8%**	WHH=**2.1%**	TT= **5.3%**
Agriculture				
% of households with access to agricultural extension services	0-100%	MHH=**37.7%**	WHH=**21.6%**	TT= **29.2%**
% of households with access to improved crop varieties	0-100%	MHH=**38.4%**	WHH=**23.7%**	TT= **31.6%**
% of households with access to irrigation system	0-100%	MHH=**71.4%**	WHH=**62.6%**	TT= **67.5%**
% of household heads with membership in farm-based organizations	0-100%	MHH=**36.6%**	WHH=**29.9%**	TT= **33.5%**

Indicator / Variable	Unit of Measurement	HOUSEHOLDS LED BY MEN (MHH) (N=112)	HOUSEHOLDS LED BY WOMEN (WHH) (N=97)	Total
% of households with access to water during dry season for farming	0-100%	MHH=**55.4%**	WHH=**52.6%**	TT= **54.1%**
Access to Information				
% of households with access to early warning systems	0-100%	MHH=**43.8%**	WHH=**41.2%**	TT= **42.6%**
% of households with access to climate information services	0-100%	MHH=**22.3%**	WHH=**12.4%**	TT= **17.7%**
% of households with access to information on improved production methods and systems	0-100%	MHH=**46.4%**	WHH=**37.1%**	TT= **42.1%**
Infrastructure/Facilities				
% of households with market access	0-100%	MHH=**36.6%**	WHH=**30.9%**	TT= **34%**
% of households with access to good road networks	0-100%	MHH=**33.9%**	WHH=**35.1%**	TT= **64.4%**
Social Networks				
% of households with access to social support networks	*0-100%*	MHH=**4.5%**	WHH=**1%**	TT= **2.9%**
Health				
% of households with training on climate-related diseases	*0-100%*	MHH=**30.4%**	WHH=**18.6%**	TT= **24.9%**
% of households enrolled unto the National Health Insurance	*0-100%*	MHH=**75%**	WHH=**81.4%**	TT= **78%**

Gendered Household Analysis of Adaptive Capacity

Men-headed households (MHH) and women-headed households (WHH) demonstrate varied adaptive capacities to climate change across key indicators. A higher percentage of MHH generally have better access to resources such as land (MHH=44.8% vs. WHH 37.1%), loans (MHH=12.5% vs. WHH 9.3%), agricultural extension services (MHH=37.7% vs. WHH=21.6%), improved crop varieties (MHH=38.4% vs. WHH=23.7%), and climate information services (MHH=22.3% vs. WHH=12.4%), which demonstrates gender disparities in financial and agricultural support at the household level. However, overall, less than 50% of the total number of households surveyed in this study have access to land, loans, agricultural extension services, improved crop varieties and climate information service. This low level of access across the selected communities in the Anloga District is concerning and underlines the urgent need for community-wide climate adaptation measures. Additionally, targeted efforts should be made to address the gendered household challenges faced by women-headed households relative to the above-mentioned indicators, by implementing more inclusive and gender-responsive adaptation initiatives to bridge the existing gaps.

The findings also indicate that men (42.6%) have greater decision-making power over finances across both household types compared to women (30.6%). This financial control disparity has implications for women's adaptive capacity in the face of climate change. With limited authority over financial decisions, women may struggle to allocate resources for adaptation measures such as livelihood diversification. This restriction not only hinders their ability to respond effectively to climate risks but also reinforces economic dependence, making them more vulnerable to climate-induced shocks.

A higher percentage of men-headed households report access to irrigation systems (MHH=71.4% vs WHH=62.6%), early warning systems (MHH=43.8% vs WHH=41.2%) and climate information services (MHH=22.3% vs WHH=12.4%). However, a closer look at the data shows that, more women-headed households (32.8%) rely on the bucket/watering can type of irrigation compared to 15% of men-headed

households. This implies increased workload for women who would have to fetch water for irrigation in addition to the domestic use. Studies have shown that women and girls shoulder a significant burden of domestic work due to resource shortages, including climate-induced water shortage (Mujere, 2016).

Again, half of men-headed households (50.1%) rely on various irrigation methods, including treadle pumps, motorized pumps, drip irrigation, and sprinkler irrigation. In comparison, 29.5% of women-headed households (WHH) use irrigation, but only through treadle pumps and sprinkler irrigation, with no WHH reporting access to motorized or drip irrigation systems.

From the above data, women-headed households (WHH) that have access to treadle pumps and sprinkler irrigation are fewer compared to men-headed households (MHH) in the same category. In addition to that, WHH do not have access to advanced and mechanized irrigation methods such as motorized and drip irrigation, which suggests barriers to accessing modern irrigation technology. These barriers could stem from women's financial constraints, lack of technical support, or limited decision-making power in agricultural investments. As a result, these limitations reduce women's ability to implement efficient irrigation, making their agricultural activities more vulnerable to climate variability.

For a gender-responsive intervention, it is important to expand women's access to efficient irrigation technologies to enhance their adaptive capacity, improve agricultural productivity, and ensure greater climate resilience in WHH. This would also help reduce the strenuous workload associated with irrigation methods that require fetching water with buckets, thereby alleviating the labor burden on women in agriculture. Additionally, there is a need for community-wide adaptation interventions to expand access to early warning systems and climate information services for both groups. However, there must be a more targeted focus on climate information services and improved production methods for women since fewer women-headed households have access to climate information service (WHH=12.4% vs. MHH=22.3%, improved production methods (WHH=37.1% vs. MHH=46.4%) and membership in farm-based organizations (WHH=29.9% vs. MHH=36.6%) which limits their adaptive capacity to the impacts of climate change.

Fewer women-headed households (WHH) have access to social support networks (WHH = 1% vs. MHH = 4.5%), but they surpass MHH in enrolment in the national health insurance scheme (NHIS) (WHH = 81.4% vs. MHH = 75%). While WHH also report slightly higher access to good road networks (WHH = 35.1% vs. MHH = 33.9%), this difference is negligible. Road infrastructure remains a challenge for both groups, but it disproportionately affects marginalized populations, including women. Poor road conditions limit access to essential services such as markets, healthcare, and education, for WHH, who already face economic and social barriers.

Despite strengths in certain areas (*e.g.,* NHIS), women-headed households are disadvantaged in financial security, agricultural resources and services, and social networks, emphasizing the need for targeted, gender-responsive interventions to bridge these gaps and enhance climate resilience in the selected communities in the Anloga District. Studies have shown that limited information, resources and services often create gender-specific vulnerabilities to the impacts of climate change (Mujere, 2016). In Anloga, women's access to resources is further hindered by cultural norms, as reported by 25% of women-headed households. There is a need for greater participation of women in social networks and climate change programs that are designed to address the specific resource needs of women-headed households.

Table 10: Summary of the key findings under exposure, sensitivity, and adaptive capacity with rankings

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

Indicator	Men-Headed Households (MHH)		Women-Headed Households (WHH)		Rank (MHH)	Rank (WHH)
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 of houses location 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

* 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.

➢ Gendered Vulnerability to Climate Change Across Communities

As shown in **Table 10**, the district-level comparison of sensitivity and adaptive capacity indicators reveals that WHH are more vulnerable than MHH due to their significantly lower adaptive capacity. Thus, there is the need for adaptation planning that prioritizes bridging the adaptive capacity gaps for WHH by addressing access to land, financial resources, agricultural services, climate information services, improved crop varieties, irrigation systems, infrastructure, and social support. The following section presents a synthesized summary of each of the five communities for addressing gender disparities in climate vulnerability. It identifies where targeted interventions are most needed to bridge the gap between men-headed and women-headed households, based on comparative analysis of sensitivity and adaptive capacity indicators. Detailed data supporting this analysis are provided in **Annexes B and C**.

Devegodo

This community demonstrates the greatest disparity, with WHHs lacking access to extension services, loans, savings, and organizational support. They also report high dependence on less reliable water sources (93.8%) and households located in flood-prone areas (43.8%). Although they maintain strong access to land (100%) and high-income diversification (75%), their adaptive capacity is critically low. Devegodo should be prioritized for agricultural support systems, as 83.3% of residents rely on crop and livestock farming as their primary source of income. Frequent flooding damages sugarcane farms in this area. Additionally, the deteriorating condition of the wooden bridge – a critical link to markets – also affects traders who are mainly women. Addressing these challenges through targeted agricultural support and infrastructure improvements will enhance resilience.

Bleamezado

WHHs in Bleamezado face intense climate sensitivity due to their location in flood-prone areas (100%), highest reliance on rain-fed agriculture (90%), and greater dependence on less reliable water sources (70%). Coupled with low adaptive capacity (limited access to loans, insurance, extension services, and

savings), this makes Bleamezado a top priority for interventions focused on improving access to agricultural services, financial resources, and climate-resilient infrastructure. From the qualitative data, households in Bleamezado are heavily impacted by crop failures due to erratic rainfall and flood-induced damage to sugarcane plantations. Hence agricultural supports must target these areas.

Atito-Alakple

Key concerns for WHHs in Atito-Alakple include a high reliance on less reliable water sources (18.8%) and the location of farmlands in flood-prone areas (6.3%). Their adaptive capacity is further constrained by limited access to loans, insurance, and agricultural inputs. As the community has the highest dependence on fishing for livelihoods, targeted support for the fisheries sector will significantly enhance the resilience of women whose economic activities are closely linked to fishing.

Woe-Afedome

WHHs are in flood-prone areas (88%) and considerable reliance on less reliable water sources (88%), intensifying their sensitivity. In terms of adaptive capacity, they show relatively better access to land and NHIS. Farming (54.2%) and fishing (18.6%) are the predominant livelihood activities in the community. Bridging the gender gap in Woe-Afedome will require targeted support, particularly storage facilities for tomato farmers and fishmongers.

Dzita

WHHs in Dzita are also located in flood-prone areas (83.3%), moderate agricultural dependence (61.7%) compared to Devegodo and Bleamezado, and high reliance on less reliable water sources (73.3%). Adaptive capacity is constrained by limited access to formal financial services, extension services, and agricultural inputs. Farmers in this community are engaged in shallot farming and support can be extended to Dzita Shallot Farmers Association.

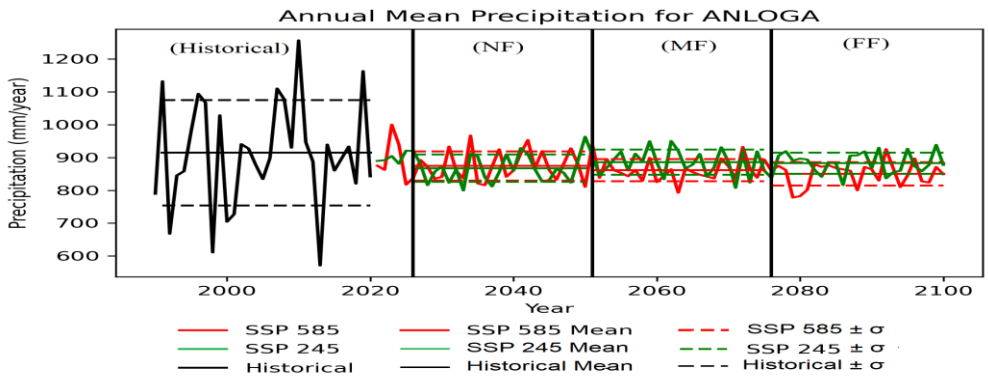
4.3 Projected Climate in Anloga District

The data used for climate projections in Anloga District consists of historical climate records and future climate simulations based on Shared Socio-Economic Pathways (SSPs). The dataset includes temperature and precipitation patterns under different emissions scenarios (SSP5-8.5 and SSP2-4.5), which represent high-emissions and moderate-emissions futures, respectively. The Shared Socio-Economic Pathways are scenarios that describe how human activities, economic growth, and climate policies could shape future greenhouse gas emissions.

4.3.1 Precipitation

In Anloga District, the analysis of annual total precipitation shows historical pattern with significant interannual variability (580 mm - 1250 mm). The projection period shows a reduction in precipitation variability. Within the near future (NF: ~2020–2040), the Shared Socio-Economic Pathways (SSP) 5-8.5 scenario (red) projects marginally higher precipitation climatology compared to SSP 2-4.5 (green), which slightly reverses towards the end of the century (**Figure 7**). Under SSP 2-4.5, precipitation remains relatively stable across the projection periods, with lower variability and fewer signs of long-term marginal increase.

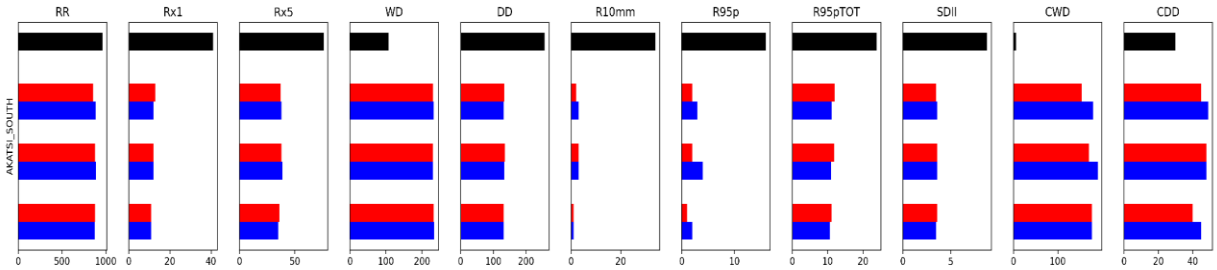
Figure 7: Historical and projected mean precipitation patterns under SSP 5-8.5 and SSP 2-4.5 scenarios for Anloga



The climate indices for Anloga District **(Figure 7)** also projects decline in RR, Rx1 and Rx5 events, the frequency of dry days, moderate rainfall days (R10mm), very wet days' contribution to total precipitation (R95pTOT), and the simple daily intensity index (SDII). These trends indicate a potential reduction in the intensity and frequency of extreme and moderate rainfall events and marginally prolonged dry periods, which is also heightened under SSP 5-8.5. Despite the increases in low-intensity rainfall events, the overall precipitation outlook shows a reduction in extreme rainfall events, suggesting increasing risks of water stress and changes in hydrological patterns under future climate scenarios.

In **Figure 8** flack bars denote the historical pattern, and the red and blue boxes denote SSP 2-4.5 and SSP 5-8.5 respectively for the projection periods.

Figure 8: Historical and projected climate extreme metrics across the Anloga District



4.3.2 Temperature

The temperature profile for Anloga (**Figure 9)** indicates a steep and continuous increase throughout the 21st century, with projections showing an acceleration in warming towards the end of the century. Under the SSP 5-8.5 high-emissions scenario, temperatures are expected to reach approximately 30.5°C, which is significantly higher than the estimates for the moderate SSP 2-4.5 scenario. The difference of about 2.5°C between the two scenarios highlights the pronounced impact of greenhouse gas emissions on regional temperature increases. The more moderate warming under SSP 2-4.5, while still significant, suggests that climate mitigation efforts can substantially reduce these impacts, emphasizing the importance of pursuing sustainable development and emissions reduction strategies to safeguard livelihoods and ecosystems in the region.

Figure 9: Historical and projected mean temperature patterns under SSP 5-8.5 and SSP 2-4.5 scenarios for Anloga District

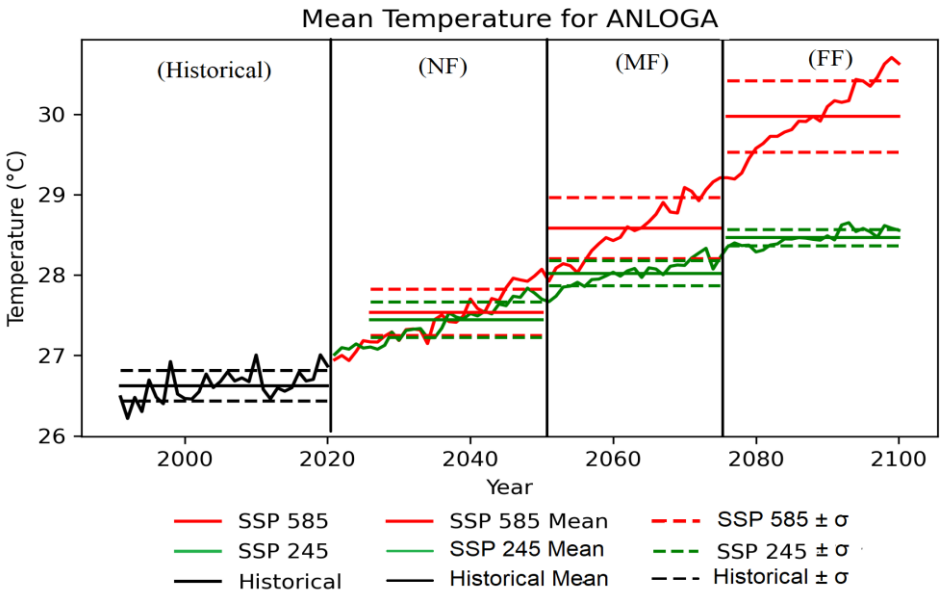
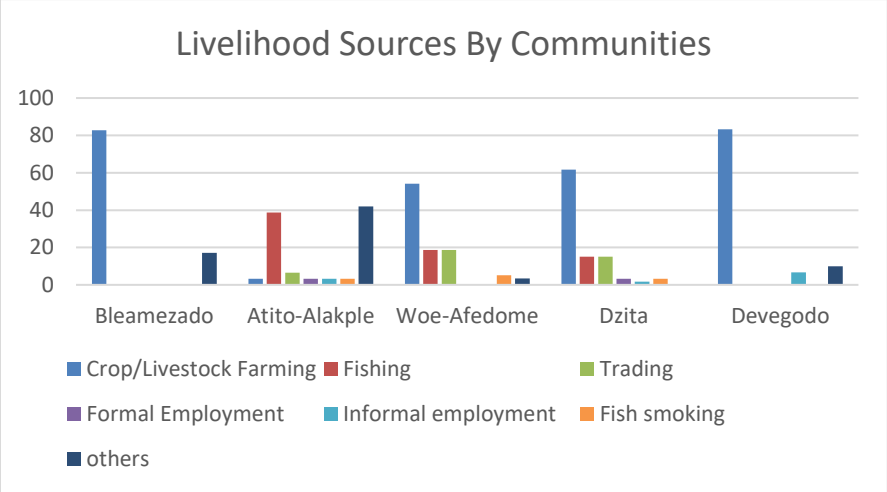


Table 11: Summary of climate projections for Anloga

Climate Variable	Key Findings	Implications for Anloga
Precipitation Trends	Rainfall patterns in Anloga vary yearly. Under SSP5-8.5, rainfall will be slightly higher in the near future but may decrease later.	Water availability may become uncertain, so better water storage and irrigation methods will be needed.
Annual Rainfall	SSP5-8.5 brings more unpredictable rainfall, while SSP2-4.5 keeps rainfall more stable with smaller increases.	Floods and droughts may happen more often, requiring stronger water management and resilient agricultural systems.
Rainfall Extremes	Fewer extreme rainfall events are expected, but longer wet periods under SSP5-8.5 may still increase flooding risks.	Flood risks will increase due to longer rainy periods, so better drainage and flood protection are important.
Temperature Rise	Temperatures will keep rising. Under SSP5-8.5, it could reach 30.5°C, much higher than SSP2-4.5.	Hotter temperatures will affect farming, water, and health. Fishing communities may face lower fish catches. Strategies for sustainable fishing and alternative incomes are needed.

4.3.3 Community and Gender Implication of Projected Climate

Figure 10: Livelihood sources by communities



The projected changes in rainfall and temperature for the Anloga District will likely impact the five communities based on their main livelihood source. From *figure 9*, Communities like Devegodo (83.3%), Bleamezado (82.8%), (Dzita (61.7%) and Woe-Afedome (54.2%) that heavily rely on crop and livestock farming will face severe challenges due to reduced rainfall and prolonged dry periods, which will increase water stress and lower agricultural productivity. Rising temperatures, projected to reach 30.5°C under the high-emissions scenario, will exacerbate heat stress on crops and livestock, further reducing yields. Fishing-dependent communities such as Atito-Alakple (38.7%) and Woe-Afedome (18.6%) will experience reduced fish stocks caused by shifts in hydrological patterns and aquatic ecosystem disruptions. This decline will also affect fish-smoking activities dominated by women-headed households (WHH), particularly in Woe-Afedome (5.1%) and Dzita (3.3%), leading to increased financial strain. Trading, a key income source in Woe-Afedome (18%) and Dzita (15%) will suffer disruptions due to reduced agricultural and fishing outputs, impacting WHH, who rely heavily on trading for income. Informal employment, significant in Devegodo (50%), Atito-Alakple (25%), and Dzita (25%), will likely shrink as climate-induced livelihood disruptions limit opportunities tied to farming and fishing. Moreover, WHH, already disadvantaged by low education levels (25.8% with no formal education), limited access

to social networks (1% vs. 4.5% for men-headed households), and financial insecurity, will face compounded challenges in adapting to these changes. Water scarcity will further strain WHH, as they bear the primary responsibility for water collection (53% vs. 20.5% for men-headed households). Based on the data gathered on the marginalized groups through focus group discussions, the following are the probable implications of the projected climate.

The projected changes in rainfall and temperature will have implications for vulnerable groups such as the elderly, youth/children, migrants, and persons with disabilities (PWDs). For the elderly, declining crop yields, livestock productivity, and water scarcity will increase dependency on family support, which will likely increase food insecurity and mental health challenges, while coastal erosion and the loss of ancestral lands will sever cultural connections vital to their identity. Youth and children will face disrupted livelihoods due to reduced fishing and farming opportunities, educational interruptions caused by water collection duties and extreme weather, and heightened health risks such as malnutrition. Migrants, heavily reliant on traditional livelihoods like herding and fishing, will likely encounter job instability and displacement, which could perpetuate poverty as climate-related disruptions strain local economies and reduce access to reliable income. For PWDs, food supply chain disruptions and water scarcity will intensify struggles to secure necessities, and increase dependence on caregivers, while limited mobility and inaccessible infrastructure will hinder their ability to access healthcare, safe shelters, and economic opportunities during extreme climate events. These challenges underscore the urgent need for inclusive and targeted interventions to enhance resilience and secure livelihoods. These projections highlight the need for inclusive and targeted adaptation strategies that address gendered challenges and specific needs of these vulnerable populations to enhance climate adaptation.

5. Institutional Capacity Building and Adaptation Policy Implications

5.1 Introduction

Adaptation governance requires intentional efforts and adequate capacity at all levels both human and institutional. A major lesson that has emerged from all our CRVA experiences, especially at the subnational level, and in the district, is the lack of climate adaptation governance capacity. This remains a national challenge and one that we have tried, as much as it has been possible, to use our current assignments and engagements with the Assemblies to address. In all instances, we have approached our work in the districts as learning and capacity building journeys and in ways that bring a conscious focus on the need to co-produce knowledge and to build the capacity of district/municipal staff, as well as other critical stakeholders in adaptation planning and in areas such as climate risk and vulnerability assessments, and climate-informed decision making.

While we have done our best, there is still a capacity gap at the institutional level which needs to be addressed. We proceeded from the premise that the Anloga District Assembly is not an exception even though it remains at the forefront of providing the requisite governance machinery for adaptation planning and resilience building in the district. The Assembly, therefore, is supposed to provide leadership to address the district's unique climate impacts and vulnerabilities, which include flooding, drought, soil erosion, and resource scarcity. Our engagements therefore targeted key personnel from the Assembly and relevant stakeholders within the district and the objective was to use participatory learning processes to develop knowledge and build capacity.

These collaborative efforts, as we have learned, enriched the process by ensuring inclusion, voice, ownership and incorporating diverse perspectives. The collaborative processes especially using tools such as participatory risk mapping, seasonal calendar analysis, matrix of function, etc., highlighted the pressing issues faced by communities, particularly women, youth, and other marginalized groups. The different discussions also provided an understanding of the climate change phenomenon, the nature of impact manifestations and how different groups such as women, children the elderly, etc. experienced impacts and vulnerabilities in different ways and the need for targeted adaptation interventions.

In this chapter, we highlight the vital role of the District Assembly in providing strong leadership for climate change governance. We also emphasize the need to build capacity across all relevant institutions and sectors, as this is essential for effective and proactive adaptation planning. We also highlight an unavoidable concern: Climate Finance, as a necessary topic for broader engagement and discussion. In our view, climate finance is at the very core of adaptation planning both at the national and subnational levels. Thus, we as a consultant team, have been conscious and intentional about making the topic a part of our process and as an effort towards institutional strengthening and capacity building. We provided insights and directions on how to identify funding sources and what to do to attract funding.

Additionally, we have also been very intentional about locating this work within the broader Ghana National Adaptation Plan (NAP) process by educating stakeholders on how the implementation of adaptation actions in the district contributed to the NAP process at the national level. We demonstrated the link between national and subnational level processes and how that responds to the vertical integration approach adopted by the Ghana NAP process. By aligning district level planning processes to national level aspirations, we clearly demonstrated what vertical integration means and how such processes could distil and highlight unique needs and particularities at the district level and how they might be prioritized within national policy regimes. A case in point is the issue of gendered vulnerabilities, biophysical challenges and the diversity and extremity of climate constraints and associated adaptation needs in specific local communities. A principal organizing philosophy that underscored this work was awareness creation, knowledge co-production and understanding of the complex linkages between national level climate risk and vulnerabilities and subnational risk and vulnerabilities. More importantly, we highlighted the gendered nature of climate impacts, risks and vulnerabilities and the critical imperative for gender-responsive adaptation interventions.

5.1.1 Strengthening the Enabling Environment for Climate Finance

Accessing climate finance is vital for the Anloga District Assembly to implement large-scale adaptation strategies. Participatory workshops conducted during the assessment process brought together community members, District Assembly staff, CSOs, and traditional leaders to highlight the challenges and opportunities of accessing resources such as the Green Climate Fund (GCF) and Adaptation Fund (AF). These workshops emphasized the need for enhanced technical capacity, streamlined processes, and collaboration among stakeholders to navigate the complexities of climate finance.

Table 12: Key actions, expected outcomes, and collaborators for strengthening the enabling environment for climate finance

Key Actions	Expected Outcomes	Key Collaborators
Train district personnel on writing fundable proposals aligned with climate finance priorities.	Increased capacity to secure and manage funds for gender-responsive adaptation projects.	EPA, Ministry of Finance, Development Partners, Academic Institutions
Simplify internal administrative processes for budgeting and resource allocation.	Faster and more transparent disbursement of funds to priority projects.	Anloga District Assembly, CSOs
Foster partnerships with CSOs and international agencies to strengthen funding applications.	Improved technical expertise and resource mobilization for climate adaptation projects.	UNDP, World Bank, Local NGOs

5.1.2 Implementing a Gender-Responsive National Adaptation Plan

Ghana's National Adaptation Plan (NAP) serves as a guiding framework for climate adaptation across all levels. Through participatory workshops, the Anloga District Assembly engaged with community members, CSOs, and traditional leaders to co-create locally relevant and gender-responsive adaptation strategies. These efforts emphasized the inclusion of women, youth, and marginalized groups in decision-making processes to ensure equitable outcomes.

Table 13: Key actions, expected outcomes, and collaborators for implementing a gender-responsive NAP

Key Actions	Expected Outcomes	Key Collaborators
Develop district-level guidelines to integrate gender considerations into adaptation projects.	Projects that address unique vulnerabilities of women, youth, and marginalized groups.	MoGCSP, EPA, CSOs
Establish quotas for women and youth in district adaptation committees.	Increased representation of women and youth in decision-making processes.	Anloga District Assembly, Women-Led CSOs
Create gender-responsive monitoring indicators to assess project impact.	Improved accountability and ability to measure progress in reducing gender inequalities.	MoGCSP, Local NGOs, UNDP

5.1.3 Enhancing Planning and Execution of Inclusive Projects

Participatory workshops created a platform for identifying local vulnerabilities and co-developing solutions that reflect the specific needs of communities in Anloga District. By engaging community members, traditional leaders, civil society organizations (CSOs), and the District Assembly, the process ensured that diverse perspectives were integrated. Taking similar inclusive and participatory steps will be crucial for enhancing the effectiveness of future adaptation planning efforts.

Table 14: Key actions, expected outcomes, and collaborators for enhanced planning and execution of inclusive projects

Key Actions	Expected Outcomes	Key Collaborators
Conduct participatory planning workshops to co-design adaptation initiatives with communities.	Locally relevant projects that address specific vulnerabilities, fostering ownership and trust.	District Assemblies, CSOs, Local Leaders
Provide technical training on implementing adaptive practices like climate-smart agriculture.	Improved project outcomes and increased capacity to mitigate climate impacts on food security.	MoFA, FAO
Establish robust monitoring and evaluation systems to track project impacts.	Enhanced accountability, timely course corrections, and data-driven improvements in project design.	EPA, Development Partners, Local NGOs

5.1.4 Collaboration Between Key Institutions and Stakeholders

The success of climate adaptation efforts in Anloga District depends on effective collaboration between the Assembly and various stakeholders. By working closely with government agencies, CSOs, development partners, and research institutions, the Assembly can ensure that its adaptation strategies are well resourced, aligned with national goals, and responsive to community needs.

Table 15: Key institutions and their roles for collaboration between key institutions and stakeholders

Institution/Agency	Role in Climate Adaptation
Environmental Protection Agency (EPA)	Provides technical guidance and ensures alignment with Ghana's NAP.
Ministry of Gender, Children, and Social Protection (MoGCSP)	Advocates for gender-responsive adaptation strategies and supports capacity building for women and marginalized groups.
Civil Society Organizations (CSOs)	Facilitate community engagement, provide technical assistance, and advocate for inclusive and gender-responsive policies.
Development Partners (UNDP, World Bank, GCF)	Offer funding, technical expertise, and capacity-building support to enhance local adaptation efforts.

5.2 Strengthening Institutional Capacity

5.2.1 Building Capacity of Local Governance Structures

The effective implementation of climate adaptation strategies at the district level relies on the effectiveness of local government structures. This therefore implies that MMDAs as governance institutions should have the requisite capacity to lead tailored and gender-responsive adaptation planning. It also implies that Assemblies should have the capacity to integrate climate adaptation considerations in their Medium-Term Development Plans (MTDP).

Key Strategies

- Targeted Training Programs: Provide comprehensive training for MMDA staff on climate adaptation, with a focus on identifying gender-specific vulnerabilities and designing interventions to address them.
- Knowledge Transfer: Facilitate peer learning and exchange programs where officials from Anloga District can learn from successful climate adaptation initiatives in other districts or regions.

- Toolkits and Guidelines: Develop user-friendly toolkits on gender-responsive climate adaptation for district-level officials, covering vulnerability assessments, project design, and community engagement.

Expected Outcomes

- Increased technical capacity to design and implement gender-responsive climate projects.
- Improved engagement with communities to ensure that adaptation plans reflect their specific needs and priorities.

5.2.2 Expanding Gender-Sensitive Budgeting Strategies

Gender-sensitive budgeting is a critical tool for ensuring that resources are allocated equitably and that climate adaptation initiatives address the unique needs of different groups within the community. This approach requires integrating gender analysis into all stages of the budgeting process, from planning to execution and evaluation.

Key Strategies

Capacity Building for Finance Officials

- Conduct workshops to train district finance and planning officers on integrating gender perspectives into budget formulation and execution.
- Introduce training on tracking and reporting gender-focused expenditures to ensure accountability.

Development of Budgeting Tools

- Create standardized templates and checklists to guide the preparation of gender-sensitive budgets for climate adaptation projects.
- Include gender impact assessments as a mandatory component of project budget proposals.

Participatory Budgeting Mechanisms

- Involve women, youth, and other marginalized groups in budget planning discussions to ensure their priorities are adequately represented.
- Establish community budgeting forums where stakeholders can provide input on resource allocation for adaptation projects.

Practical Examples

- Supporting Women's Livelihoods: Allocate a specific percentage of the adaptation budget to initiatives that support women-led cooperatives in climate-resilient livelihoods.
- Youth Inclusion: Design budget lines to fund skill-building programs for youth in adaptive technologies, such as solar irrigation or climate-smart agriculture.
- Health and Safety: Ensure sufficient budgetary provisions for mobile health units and childcare facilities to support women during climate crises.

5.2.3 Fostering Collaboration Between Local and Regional Agencies

Collaboration between local and regional agencies is essential for ensuring that adaptation strategies are coherent, well-coordinated, and effectively implemented. The Anloga District Assembly can benefit from strengthening ties with regional coordinating councils, CSOs, and development partners.

Key Strategies

Inter-Agency Coordination

- Establish regular coordination meetings and joint task forces between the District Assembly and regional agencies to align adaptation strategies and share resources.
- Create shared action plans that integrate district-level projects with regional adaptation frameworks.

Data Sharing Platforms

- Develop digital platforms to share real-time data on climate risks, project implementation progress, and funding opportunities.
- Use these platforms to monitor and evaluate the impact of regional and district-level adaptation initiatives.
- Capacity-Building Partnerships: Collaborate with regional institutions such as the Environmental Protection Agency (EPA) and Ministry of Gender, Children, and Social Protection (MoGCSP) to provide technical training and advisory services.
- Engage development partners like UNDP and the World Bank to support project funding and capacity-building initiatives.

Expected Outcomes

- Streamlined implementation of climate adaptation strategies across local and regional levels.
- Increased resource efficiency through coordinated planning and data sharing.
- Mainstreaming of climate-informed budgeting in MTDPs.

5.3 Policy Implications

Addressing climate vulnerabilities in Anloga District requires effective climate change policies that are responsive to the unique needs and situations of local places and in this regard the districts. More importantly, such policies should also be located within the Ghana NAP framework and other national development policies that advocate for inclusion by integrating gender-responsive approaches and tackle systemic barriers faced by women, youth, and marginalized groups. Policies should also be informed and guided by the Sustainable Development Goals (SDGs). This section outlines actionable recommendations to guide policy integration and alignment, supported by practical examples.

5.3.1 Integrating Gender-Responsive Approaches into Adaptation Policies

Gender-responsive policies ensure that adaptation efforts address the unique vulnerabilities of women and marginalized groups while promoting equitable resource allocation and decision-making.

Table 16: Policy recommendations for integrating gender-responsive approaches into adaptation plans

Recommendation	Action	Expected Outcome	Practical Example
Institutionalize gender mainstreaming in policies	Include mandatory gender analysis in all district adaptation policies.	Policies address specific vulnerabilities of women and marginalized groups.	Gender analysis incorporated into coastal and flash flood management plans in Woe-Afedome and Dzita respectively.
Promote gender-equitable resource allocation	Embed gender-sensitive budgeting requirements into district frameworks.	Increased funding for initiatives supporting women and marginalized groups.	Allocating funds for women involved in tomato farming in Woe-Afedome.
Ensure women's representation in policymaking	Introduce quotas for women in district climate committees.	More inclusive and diverse decision-making processes.	Women-led CSOs actively participating in drafting adaptation strategies in Dalun.

5.3.2 Addressing Systemic Barriers to Resource Access

Systemic barriers, such as limited land ownership and financial constraints, hinder women and marginalized groups from participating fully in adaptation efforts. Tackling these barriers requires targeted policies that remove restrictions and promote inclusivity.

Table 17: Recommendations for addressing systematic barriers to resource access

Barrier	Policy Recommendation	Action	Practical Example
Women's limited access to land.	Facilitate land ownership and inheritance rights for women through district bylaws.	Provide land tenure certificates to women farmers to secure credit.	Pilot land tenure programs in Dzita.
Financial resource constraints.	Develop microfinance policies mandating low-interest loans for women-led enterprises.	Partner with financial institutions to establish loan guarantee schemes.	Microfinance support for tomato farmers in Woe-Afedome and sugarcane farmers in Devegodo.
Cultural norms restricting women's participation.	Include public awareness campaigns in district action plans to challenge restrictive norms.	Leverage traditional leaders to advocate for women's participation in adaptation projects.	Traditional leaders supporting women-led reforestation initiatives in Woe-Afedome.

5.3.3 Aligning Local Adaptation Efforts with National and International Frameworks

To maximize impact and efficiency, local adaptation efforts must align with Ghana's National Adaptation Plan (NAP), the Sustainable Development Goals (SDGs), and other international frameworks. This alignment ensures that district-level initiatives contribute to broader climate resilience objectives**.**

Table 18: Policy recommendation for aligning local adaptation efforts with national and international frameworks

Framework	Alignment Recommendation	Action	Practical Example
Ghana's National Adaptation Plan (NAP)	Integrate district priorities into the NAP.	Reflect district priorities, like flood management in Bleamezado and coastal erosion control in Woe-Afedome, in national plans.	Community-led adaptation solutions incorporated into NAP submissions.
Sustainable Development Goals (SDGs)	Align district policies with SDGs 5 (Gender Equality) and 13 (Climate Action).	Include gender-responsive water management and climate-smart agriculture projects in district strategies.	Rainwater harvesting systems installed in Bleamezado to address SDG 6 (Clean Water and Sanitation).
Regional climate cooperation	Collaborate with neighbouring districts on regional adaptation strategies.	Develop joint flood management systems and water-sharing agreements.	Joint regional flood mitigation projects initiated between Anloga and nearby districts.

6. Conclusion

Anloga District faces complex climate vulnerabilities that demand targeted, inclusive, and sustainable solutions. This report outlines gender-responsive strategies to close the adaptive capacity gap between MHH and WHH households in the district. Key recommendations include promoting gender-inclusive decision-making, expanding access to climate finance, investing in the fishing and agricultural sector, and integrating gender-sensitive budgeting into governance frameworks. These actions aim to enhance community resilience, reduce inequalities, and align local efforts with Ghana's National Adaptation Plan (NAP) and Sustainable Development Goals (SDGs).

Transformative adaptation requires collective action and inclusive governance. Collaboration among community members, government agencies, CSOs, and development partners ensures that adaptation strategies reflect the diverse needs of women, men, youth, and marginalized groups. In fostering partnerships and leveraging local knowledge, the district can address immediate vulnerabilities while strengthening its capacity for long-term climate adaptation.

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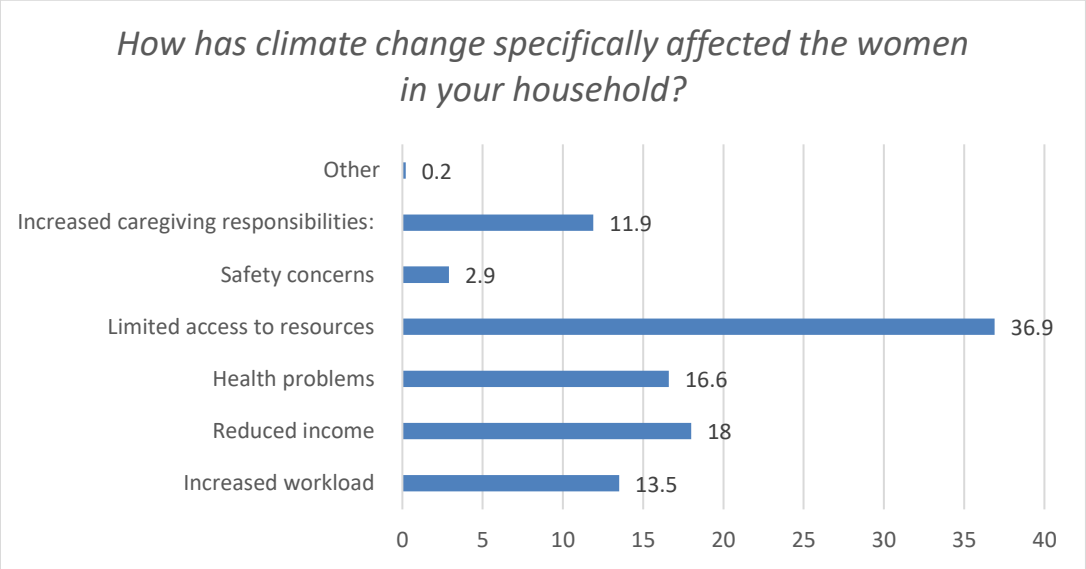
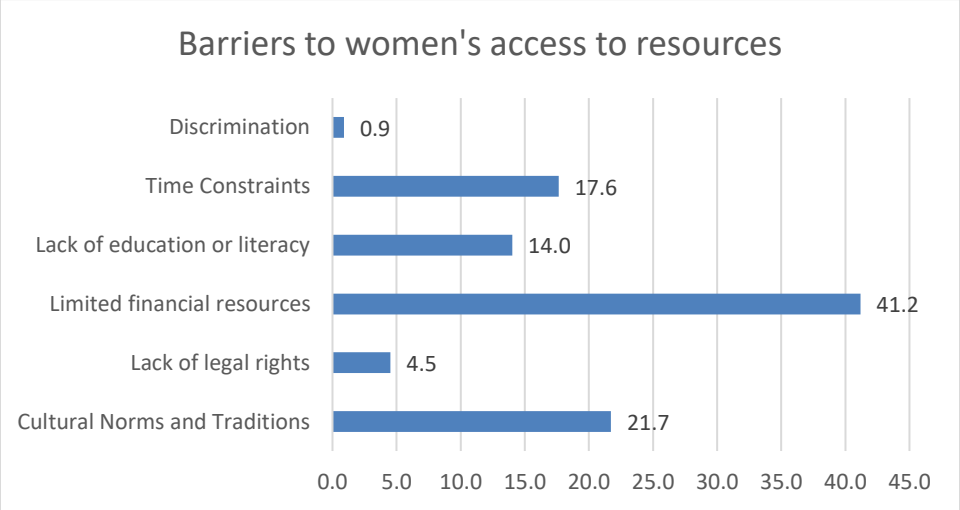
ANNEX A: Quantitative Data





ANNEX B: Community Level Analysis of Gendered Sensitivity to Climate Change

Community	Indicator	Men-Headed HHs (%)	Women-Headed HHs (%)
Bleamezado	Dependence on Rainfed Agriculture	78.9	90.0
	Households in Flood-Prone Areas	94.7	100.0
	Farms in Flood-Prone Areas	0.0	0.0
	Water Access Challenges	63.2	70.0
Atito-Alakple	Dependence on Rainfed Agriculture	33.3	26.3
	Households in Flood-Prone Areas	33.3	25.0
	Farms in Flood-Prone Areas	0.0	6.3
	Water Access Challenges	6.7	18.8
Woe-Afedome	Dependence on Rainfed Agriculture	61.8	44.0
	Households in Flood-Prone Areas	88.2	88.0
	Farms in Flood-Prone Areas	76.5	76.0
	Water Access Challenges	44.1	88.0
Dzita	Dependence on Rainfed Agriculture	73.3	50.0
	Households in Flood-Prone Areas	80.0	83.3
	Farms in Flood-Prone Areas	73.3	46.7
	Water Access Challenges	86.7	73.3
Devegodo	Dependence on Rainfed Agriculture	85.7	81.3
	Households in Flood-Prone Areas	0.0	43.8
	Farms in Flood-Prone Areas	0.0	0.0
	Water Access Challenges	92.9	93.8

ANNEX C: Community Level Analysis of Gendered Sensitivity

Indicator	Bleamezado (Men-HH)	Bleamezado (Women-HH)	Atito-Alakple (Men-HH)	Atito-Alakple (Women-HH)	Woe-Afedome (Men-HH)	Woe-Afedome (Women-HH)	Dzita (Men-HH)	Dzita (Women-HH)	Devegodo (Men-HH)	Devegodo (Women-HH)
% with Access to Land	92	90	85	88	90	92	87	85	93	100
% with Access to Loans	45	35	40	25	48	38	42	36	50	31.3
% in Other Income Activities	67	80	36	75	55	65	25	50	36	75
% with Insurance	5	0	0	0	0	0	0	0	0	0
% with Savings to Cope	30	10	10	5	25	15	12	8	21.4	0
% with Extension Services	15	10	20	15	22	18	19	15	7.1	0
% with Improved Crop Varieties	25	18	15	10	32	25	22	20	14.3	0
% with Irrigation System	60	55	50	47	57	60	58	55	57.1	62.5
% in Farm Organizations	40	35	30	28	38	32	28	25	0	0
% with Water for Dry Season Farming	70	65	80	78	86	83	85	80	85.7	87.5
% with Early Warning Systems	5	2	3	2	4	3	4	2	0	0

Indicator	Bleamezado (Men-HH)	Bleamezado (Women-HH)	Atito-Alakple (Men-HH)	Atito-Alakple (Women-HH)	Woe-Afedome (Men-HH)	Woe-Afedome (Women-HH)	Dzita (Men-HH)	Dzita (Women-HH)	Devegodo (Men-HH)	Devegodo (Women-HH)
% with Climate Info Services	8	5	6	4	7	5	6	5	0	0
% with Production Info	10	8	5	3	9	7	6	5	7.1	6.3
% with Market Access	50	45	48	40	55	50	53	50	66.7	56.3
% with Good Road Network	30	25	28	20	35	30	33	30	0	0
% with Social Support Networks	25	18	20	18	22	19	20	17	0	0
% with Training on Climate-Related Diseases	2	1	3	2	4	3	2	2	0	6.3
% enrolled in NHIS	58	68	57	69	60	71	57	68	57.1	68.8