

KPONE-KATAMANSO MUNICIPAL ASSEMBLY



CLIMATE CHANGE RESILIENCE, ADAPTATION AND SUSTAINABILITY PLAN

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LIST OF ACRONYMS

CBO	Community Based Organisation
DUR	Department of Urban Roads
ECG	Electricity Company of Ghana
EPA	Environmental Protection Agency
GNFS	Ghana National Fire Service
ISD	Information Service Department
KKMA	Kpone – Katamanso Municipal Assembly
MoFA	Ministry of Food and Agriculture
M &E	Monitoring and Evaluation
MTDP	Medium Term Development Plan
NADMO	National Disaster Management Organisation
NCCE	National Commission for Civic Education
NGO	Non-Governmental Organisation
P.M	Fine Particulate Matter
PPD	Physical Planning Department
SDGs	Sustainable Development Goals
WHO	World Health Organisation

EXECUTIVE SUMMARY

The Kpone-Katamanso Municipal Assembly (KKMA) is experiencing accelerated climate-related risks driven by rapid urbanization, industrial expansion, and ecological degradation. Climate stressors—including flooding, extreme heat, erratic rainfall, air pollution, and ecosystem loss—are already undermining livelihoods, public health, agricultural productivity, and Municipal infrastructure.

This Climate Change Adaptation, Resilience, and Sustainability Plan proposes an integrated, community-driven, and infrastructure-focused response aligned with Ghana’s climate commitments and SDG 13 (Climate Action). The Plan prioritizes:

- Nature-based solutions (afforestation, wetland restoration),
- Climate-resilient infrastructure (drainage and waste systems),
- Climate-smart agriculture,
- Industrial and urban emissions control,
- Youth-led climate governance and behavior change.

1.1 BACKGROUND

The Kpone Katamanso Municipal Assembly is a coastal District that was carved out of the Tema Metropolitan Assembly in 2012 and attained Municipal status in 2018.

The Municipality is strategically located 38km east of the National Capital (Accra). It is one of the biggest Districts in the Region, covering a land area of 237 square kilometers.

The Municipality's proximity to the National Capital, the Tema Harbor, the National industrial enclave (part of which is situated within the Municipality), as well as the trans-African highway (Tema-Aflao highway) has over the years, attracted business and migrants both locally and internationally.

This is evident in the agglomeration of industries and bulk haulage transportation services and residential estates such as the Asogli thermal power plant, B5plus steel industries, Sentuo Ceramics, Apollonia city among others, resulting in a rapid growth in population from 109,864 in 2010 to 417,334 in 2021 representing a growth rate of 279.9% according to the 2021 national population census. Currently, the population for 2026 is estimated at 475,577.

Despite the enormous benefits derived from the increase in population, rapid urbanization and industrial expansion, the Municipality is currently challenged with the effects of greenhouse gas emissions and encroachment of greenbelt zones originally designed to regulate temperature, air quality and serve as wetlands. This has resulted in high temperature, flooding, poor visibility and air quality.

The climate has generally become warmer with an unpredictable rainfall pattern characterized by extreme thunder storms which have led to flooding in low lying areas and negatively affected agriculture. There has also been an increase in respiratory related diseases over the last five years with Upper Respiratory Tract infections being the second on the 2024 list of top ten diseases recorded in the municipality.

The effects of climate change have become more pronounced in the last few years within the Municipality. In response, the Assembly has initiated a number of adaptation and mitigation measures including public education on climate change mitigation and adaptation, flood prevention and sanitation, periodic desilting of drains, tree planting exercises, enforcement of environmental bye-laws, sensitization on safe waste disposal and building practices among many others. While these interventions have yielded some localized and short term benefits, they have proven insufficient in scale and sustainability to address the growing intensity and complexity of climate-related risks.

Therefore, more coordinated and systematic adjustments in ecological, social, industrial and economic systems are required in response to actual and anticipated climatic stimuli and their impacts. Such adjustments are critical to reducing vulnerability, strengthening resilience and safeguarding the environment, livelihoods and property in a rapidly urbanizing and industrializing Municipality like ours. have to be made to reduce the impacts and safeguard the environment, lives and properties.

1. 2 INTRODUCTION

1.2. 1 *Climate Change*

Climate refers to a long-term weather condition prevailing in a particular area. Climate change describes significant and persistent shifts in these weather patterns, largely driven by human activities, that increase the concentration of greenhouse gasses in the atmosphere. Such changes manifest in various forms, including global warming, rising sea levels, erratic rainfall and general extreme weather conditions among others.

Climate change has emerged as a critical global challenge, with particularly severe implications on developing countries like Ghana and for rapidly urbanizing Municipalities like Kpone-Katamanso. These impacts affect multiple sectors, including human health, food security, infrastructure, ecosystem and livelihoods. Without carefully planned and systematically implemented interventions, communities remain highly vulnerable to climate related shocks, placing both development gains and biodiversity at significant risk. In recognition of these global threats, Sustainable Development Goal (SDG) Goal 13 which seeks to promote Climate action through resilience building and adaptation, has gained increasing prominence. In line with this objective, the Assembly is committed to strengthening climate resilience through pragmatic, inclusive and sustainable programmes and projects aimed at mitigating the adverse effects of climate change.

The Climate Change Resilience, Adaptation and Sustainability Plan seeks to assess the impact of human activities on the local climate system and proffer sustainable mitigation and adaptation measures. The

plan examines key climate-related challenges affecting the Municipality including flooding, agricultural vulnerability, respiratory health risk and the contribution of improper waste management to climate change. It further outlines strategic goals, objectives and actions designed to reduce vulnerability, enhance adaptive capacity and promote long-term environmental sustainability.

1.3 CLIMATE CHANGE AND FLOODING

Flooding has emerged as one of the most significant and recurrent effects of climate change affecting the Kpone Katamanso Municipality. In recent years, the increasing frequency and intensity of extreme rainfall events has resulted in widespread flooding particularly within low lying areas. These climate-induced hazards have been further exacerbated by human activities, including encroachment on waterways, indiscriminate disposal of solid waste leading to blocked drainage channels, and an inadequate and outdated drainage infrastructure system.

In response to these challenges, the National Disaster Management Organization (NADMO) has, over the years, implemented preventive measures such as targeted public education on proper waste disposal, fire safety, and the dangers associated with building on waterways. While these interventions have contributed to improved awareness at the community level, their impact has been largely localized and insufficient to address the scale and complexity of the flooding problem.

Addressing flooding in a sustainable manner therefore requires a broader, coordinated, and multi-stakeholder approach. Strengthened collaboration among NADMO, the Environmental Protection Agency (EPA), the Environmental Health Unit, the Waste Management Department, the media, and community-based youth groups will enhance public awareness, promote behavior change, and support effective climate change adaptation at the community level.

As part of nature-based flood mitigation strategies, a youth led tree planting and nurturing campaign is proposed to encourage young people to adopt and care for a number of trees within their communities. This initiative will contribute to restoring the vegetative cover, improve surface water absorption and reduce run-off water during heavy rainfall events.

In addition, the dredging of major storm drains and streams, routine desilting of choked gutters, intensified development control and strict enforcement of sanitation bye-laws are critical structural and regulatory measures. Collectively, these interventions will enhance storm water management, reduce

flood risks during extreme rainfall events, and promote a cleaner, safer and more resilient Municipal environment.

1. 4 MUNICIPAL FLOOD PROFILE

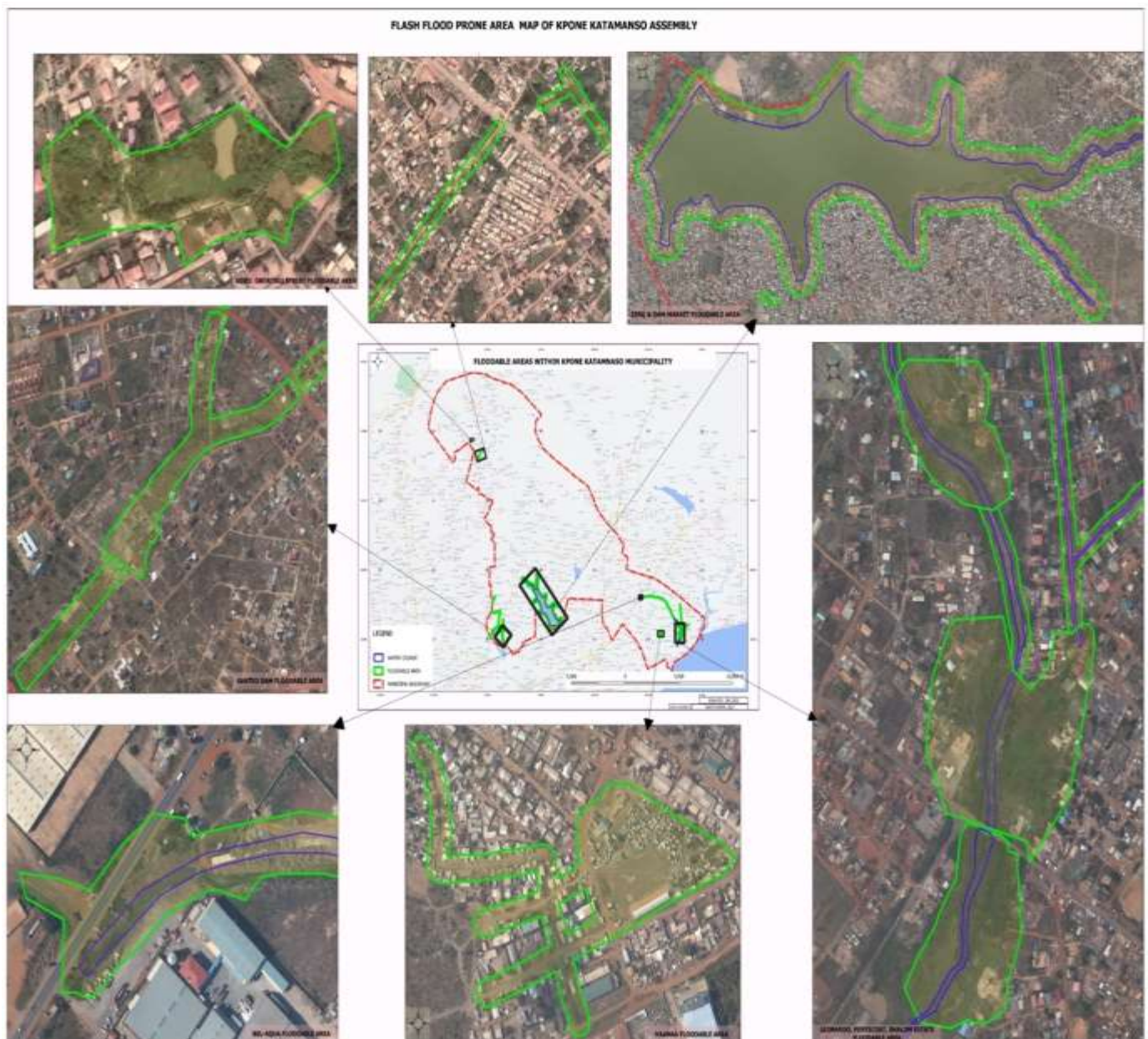
Perennial flooding remains a major challenge affecting many parts of Ghana and the Kpone Katamanso Municipality is particularly vulnerable due to its geographical and topographical characteristics. Following periods of heavy rainfall, surface run-off originating from the Akuapim Mountain range traverses the Municipality en-route the sea. The Municipality lies within the coastal plains and is characterized by generally flat terrain with elevations ranging from approximately 0 meters above sea level in the southern areas to about 35 meters in the northern sections, and only marginally rising to a maximum of about 65 meters. This low-lying and flat topography significantly increases susceptibility to flooding and coastal erosion.

Anthropogenic factors have further amplified the flood risk within the Municipality. Several communities that naturally serve as run-off channels have experienced poor adherence to planning schemes, largely due to complex chieftaincy arrangements, land ownership challenges and weak development control enforcement. These conditions have led to extensive encroachment of wetlands and designated green belts, resulting in a substantial reduction of flood retention areas.

In addition, the degradation and loss mangrove ecosystems has disrupted aquatic habitats and weakened the Municipality's natural buffers. Consequently, the burden of artificial storm water management systems has increased, resulting in higher cost and greater technical complexity for drainage infrastructure development and maintenance.

Given these constraints, future plan and investments in drainage and flood management system must adopt a resilient integrated and sustainable approach. This should combine engineered solutions with nature-based interventions, strengthened development control and protection and restoration of wetlands and greenbelts to effectively mitigate flood risks arising from both natural and man-made factors.

Figure 1. 1 Map of Flood prone areas within the Municipality



Source: PPD, 2025

1.4. 1 Identified Flood-Prone Areas

The following communities have been identified as highly susceptible to flooding within the Municipality.

- Oyibi Gbortsui
- Oyibi Kas Valley
- Kpone Barrier (Bel Aqua Area)
- Kpone Haana School Area
- Kpone Township Bridge
- Kubekuro no. 1&2
- Santeo
- Community 25
- Gulf City
- Katamanso
- Zenu

1. 5 CLIMATE CHANGE AND AGRICULTURE

Agriculture within the Kpone Katamanso Municipal Assembly is predominantly rain fed, making crop and livestock production highly sensitive to climate variability. The Municipality experiences a bimodal rainfall pattern, with a major rainy season occurring between April and July, and a minor season between September to November, receiving between 30mm and 790mm of annual rainfall. Ambient temperatures remain generally warm throughout the year, averaging 25-30°C, but can rise to about 34-40°C during the drier minor season.

In recent years, agriculture production has been increasingly disrupted by irregular and unpredictable rainfall patterns characterized by delayed onset of rains, prolonged dry spells, and sudden heavy downpours. These climatic anomalies have adversely affected farm planning, planting schedules, and overall productivity. Farmers face growing uncertainty in determining optimal planting periods resulting in ineffective use of inputs and increased vulnerability to crop failure.

Inconsistent rainfall distribution has led to poor seed germination, moisture stress, flooding of farmlands, and heightened pest and disease incidence. These conditions have negatively affected key crops cultivated within the municipality, including maize, vegetables, and onions. Consequently, reduced vegetative growth, lower yields, and extreme cases total crop failure have been recorded. The need for repeated replanting has further increased production costs thereby eroding farm incomes and household resilience.

In the year 2025, onion production was particularly impacted by climate variability. Irregular rainfall patterns created favourable conditions for the proliferation of onion thrips, a major pest that damages onion leaves and bulbs. As a result, average yields reduced significantly, with noticeable reduction bulb sizes and quality. These changes adversely affected market value and pricing, leading to reduced incomes for farmers and increased food security risk within the Municipality.

In response to these challenges, there is the need to adopt climate-smart agricultural practices such as small scale irrigation systems, mulching and greenhouse farming to regulate soil moisture and temperature, and integrated pest management strategies to sustainably control pest outbreaks. These measures are critical to enhancing agricultural resilience, stabilizing yields and safeguarding farmer incomes under increasing variable climatic conditions.

Table 1. 1 THRIPS SITUATION - 2025

District	Total farmland affected (acres)	Number of farmers affected	
		Male	Female
KPONE KATAMANSO	162	136	57

SOURCE: Department of Agriculture, 2025

Figure 1. 2 Thrips Attack at Michel Camp



The above pictures show onion fields at the Michel Camp Irrigation Site that were severely attacked by onion thrips as a result of irregular rainfall patterns experienced during the peak onion production season.

Figure 1. 3 Crops Affected by Heavy Rainfall



The images above are from tomato fields, which were affected by a heavy downpour that damaged the plastic mulch and resulted in fruit rot and lodging in the tomatoes.

1. 6 WASTE MANAGEMENT AND CLIMATE CHANGE

Waste generated within the Municipality can be categorized into liquid, solid and gaseous waste streams. When not managed sustainably, all forms of waste contribute significantly to environmental degradation and climate change with adverse implications on public health, ecosystems and Municipal resilience.

The management of solid waste remains a major challenge in the Municipality. Currently, the Assembly does not have an engineered land fill site. Instead an open dumping site for mixed waste located within Kpone-Katamanso serves both the Municipality and neighboring Assemblies. This site lacks basic engineering controls and has no mechanism or system for managing gaseous emissions, resulting in the uncontrolled release of greenhouse gasses into the atmosphere.

Additionally, waste collection equipment and logistics are inadequate, resulting in gaps in waste collection coverage. Consequently, plastics and other solid waste frequently end up in drains, streams, lagoons, and the sea. This situation exacerbates flood risks by obstructing the free flow of storm water and contributing to broader environmental pollution.

1.6. 1 Liquid Waste and Drainage Systems

Liquid waste management also presents significant challenges. Due to extensive encroachment on wetlands, streams, lagoons, and storm water corridors, many natural drainage systems have become heavily silted, requiring substantial investment to restore their functionality. The predominance of open drainage systems further increases vulnerability, as solid waste easily enters and blocks drains, restricting wastewater flow. Addressing these challenges will require the adoption of more resilient, integrated, and sustainable drainage systems capable of withstanding increasing climate pressures.

1.6. 2 Gaseous Emissions and Air Quality

Gaseous emissions from industrial activities, the nearby harbor, heavy-duty transportation trucks, indiscriminate domestic waste burning, and the progressive loss of vegetative cover have collectively contributed to deteriorating air quality within the Municipality. According to the World Health Organization (WHO) 2021 Air Quality Guidelines, annual average concentrations of fine particulate matter (PM_{2.5}) should not exceed 5 µg/m³. However, data from IQAir, a global air quality monitoring platform, indicates that the average annual PM_{2.5} concentrations in the Greater Accra Region—where Kpone-Katamanso is located—is 36.3 µg/m³, approximately 7.3 times higher than the recommended WHO threshold.

Poor air quality is closely linked to increasing incidences of respiratory illnesses, skin diseases, cardiovascular complications, and cancer. There is therefore an urgent need to intensify public sensitization, enforce carbon footprint standards for industries, and scale up afforestation and green infrastructure initiatives to reduce atmospheric pollutants and protect ecosystem health.

1. 7 CLIMATE CHANGE ADAPTATION, RESILIENCE AND SUSTAINABILITY GOAL

The overarching goal of the Kpone-Katamanso Municipal Assembly is to develop a climate-resilient municipality capable of withstanding the impacts of climate change, where urbanization and economic growth are guided by sustainable practices, green infrastructure, and resilient systems that protect the environment and reduce greenhouse gas emissions.

1.7. 1 Objectives

1. Restore Vegetative Cover and Ecosystems

The Assembly will implement an intensive tree planting and nurturing programme targeting industrial areas, green belts, wetlands, mangroves, and residential communities. While previous efforts involved distributing seedlings to schools and communities, these interventions were limited in scale and largely rainfall-dependent, resulting in high seedling mortality during dry seasons. Under this objective, tree nurturing will be fully integrated into implementation, supported by water storage facilities and community stewardship. Youth groups will be sensitized and motivated to adopt and care for trees within their localities, while the Forestry Commission will provide drought-resistant tree species suitable for local climatic conditions.

2. Enforce Carbon Footprint Standards

To reduce greenhouse gas emissions from industrial, domestic, and transport sources, the Assembly will establish a joint enforcement task force with the Environmental Protection Agency (EPA). The Municipality also plans to acquire carbon monitoring equipment to strengthen independent emissions assessment and compliance monitoring. As part of low-emission livelihood support, the Assembly will promote the replacement of the traditional “Chokor” fish smoking ovens with environmentally friendly “Ahotor” ovens, which emit significantly less smoke. Existing bye-laws on indiscriminate burning will also be strictly enforced.

3. Promote Climate-Smart Agriculture

This objective seeks to modernize agricultural practices and reduce dependence on rainfall by promoting greenhouse farming and small-scale irrigation systems. These interventions will enable year-round cultivation, improve productivity, and enhance farmers’ resilience to climate variability.

4. Improve Sustainable Waste Management

The Assembly will promote waste recycling, reuse, and sustainable collection and disposal practices to reduce indiscriminate dumping. Waste separation bins will be provided to schools to inculcate waste segregation habits among students. In collaboration with the Ministry of Sanitation, the Assembly will advocate for the establishment of an engineered landfill with recycling facilities to reduce greenhouse gas emissions and environmental contamination.

5. Reduce Flood Risks through Drainage Improvement

Major storm drains and earth channels will be dredged and desilted to improve water flow during heavy rainfall events, thereby reducing flood risks and associated damages.

6. Strengthen Youth Engagement and Climate Awareness

Targeted sensitization programmes will be conducted in schools, churches, markets, and communities to build awareness of climate change adaptation and resilience. Seedlings and water storage equipment will be provided to support tree nurturing during dry seasons, while incentive and award schemes will be introduced to encourage community participation. Selected youth from each electoral area will be empowered as climate agents to monitor, nurture, and protect planted trees, as well as promote climate-smart practices.

Table 1. 2 CLIMATE CHANGE ADAPTATION ACTION PLAN 2026

S/N	Strategic Objective	Key Activities	Location	Timeframe	Lead Implementing Institution	Supporting Institutions
1	Restore vegetative cover and protect ecosystems	Plant and nurture 30,000 trees along roads, schools, public institutions, and communities	Katamanso, Gbetsile, Kpone, Nganoman	2026–2027	Development Planning Unit	Forestry Commission, NADMO, Environmental Health Unit, Assembly Members, NGOs, Media
2	Restore vegetative cover and protect ecosystems	Plant 20,000 trees in industrial areas, wetlands, green belts, and flood-prone zones	Oyibi, Kpone Barrier, Kubekuro, Santeo, Gulf City, Zenu	2026–2027	Development Planning Unit	Forestry Commission, EPA, NADMO, Community Youth Groups
3	Strengthen youth participation in climate action	Implement annual “Adopt-a-Tree” youth campaign with award schemes	Municipal-wide	Annual	Development Planning Unit	NYA, Forestry Commission, Assembly Members, Media
4	Improve tree survival and climate resilience	Provide water storage tanks to basic schools for tree nurturing	Selected Basic Schools	2026–2027	NADMO	Education Directorate, Forestry Commission
5	Build community-level climate resilience	Train and deploy climate and disaster volunteers (10 per electoral area)	Municipal-wide	2026–2027	NADMO	NYA, Environmental Health, Assembly Members
6	Reduce flood risk	Dredge and desilt major storm drains, earth channels, and dams	Zenu, Oyibi, Kpone, Katamanso	2026–2029	Works Department	NADMO, Environmental Health, DUR
7	Improve development control and ecosystem protection	Enforce development control regulations in wetlands, green belts, and waterways	Municipal-wide	Continuous	Physical Planning Dept.	Works Dept., EPA, Assembly Members
8	Promote climate-smart agriculture	Train farmers on climate-smart	Municipal-wide	Annual	Department of Agriculture	NGOs, MoFA, Central Administration

		agriculture and integrated pest management				
9	Reduce dependence on rainfall for farming	Promote small-scale irrigation systems and greenhouse farming	Municipal-wide	2026–2029	Department of Agriculture	MoFA, NGOs, Central Administration
10	Improve waste management and reduce emissions	Distribute waste segregation bins to basic and senior high schools	Kpone SHS, Zenu, Gbetsile, Oyibi	2026–2027	Environmental Health Unit	NCCE, Procurement, NADMO
11	Reduce indiscriminate waste disposal	Strengthen waste collection, recycling, and disposal systems	Municipal-wide	2026–2029	Environmental Health Unit	Private Waste Operators, Central Administration
12	Improve air quality and reduce carbon emissions	Enforce carbon footprint standards for industries	Industrial Areas	Continuous	EPA	GNFS, Factories Inspectorate, NADMO
13	Promote low-carbon energy solutions	Sensitize households and industries on solar energy and energy-efficient appliances	Municipal-wide	Annual	NADMO	ECG, Energy Commission, ISD
14	Reduce plastic pollution	Promote paper packaging alternatives among food vendors and market women	Markets & Food Vendor Zones	Annual	Environmental Health Unit	NCCE, ISD, Market Associations
15	Strengthen public awareness and behaviour change	Conduct climate change education campaigns in schools, churches, markets, and communities	Municipal-wide	Continuous	Development Planning Unit	Media, Faith-Based Orgs, CBOs

1. 8 RECOMMENDATIONS

To effectively support climate change adaptation and resilience, there is a critical need for a new policy direction backed by sustained investment in climate-smart infrastructure within the Kpone-Katamanso Municipality. In this regard, the Assembly should undertake a comprehensive evaluation of the existing open drainage system with the aim of redesigning, upgrading, and expanding it into a more resilient, efficient, and climate-responsive drainage network capable of minimizing flood risks under extreme rainfall conditions.

In addition, the Municipality should secure land for the establishment of an engineered landfill facility with integrated recycling and resource recovery systems to support waste sorting, reuse, and recycling. Private sector participation in waste collection should be restructured and closely monitored to ensure timely collection and environmentally sound disposal practices. These measures will significantly reduce indiscriminate dumping and open burning of waste, thereby lowering greenhouse gas emissions and preventing waste from entering drains, water bodies, and coastal ecosystems.

To strengthen emissions control and air quality management, Environmental Health Officers should be adequately trained and equipped with carbon monitoring devices to enable the Assembly to independently assess, monitor, and regulate industrial emissions. This will enhance enforcement of carbon footprint standards and ensure compliance with nationally and internationally acceptable limits.

Furthermore, development control measures must be intensified, with particular emphasis on the protection of green belts, wetlands, and water bodies. All unauthorized developments encroaching on these environmentally sensitive areas should be removed in accordance with planning regulations, and degraded sites should be restored through re-vegetation and ecosystem rehabilitation initiatives.

1. 9 CONCLUSION

Climate change has, over the years, exerted significant pressure on Municipal health and safety, food security, environmental sustainability, and economic stability within the Kpone-Katamanso Municipality. Addressing these challenges require a deliberate shift towards integrated climate resilience and adaptation strategies that reduce community vulnerability to climate-related disasters, strengthen the agricultural sector against climatic shocks, and safeguard critical ecosystems.

Through the implementation of the proposed climate adaptation measures, the Municipality seeks to build long-term resilience, protect livelihoods, and support sustainable urban and economic development. These interventions are essential to achieving the Assembly's broader objective of withstanding current and future climate change impacts while ensuring a safe, healthy, and sustainable environment for present and future generations.

