CLIMATE CHANGE ACTION PLAN

NANSANA MUNICIPALITY, WAKISO DISTRICT

2025-2030

OCTOBER 2025

WORLD BANK GROUP

NANSANA MUNICIPAL COUNCIL

GOVERNMENT OF UGANDA

Executive summary

Nansana Municipality, one of the rapidly urbanizing centers within the Greater Kampala Metropolitan Area (GKMA), faces mounting climate challenges manifested through floods, droughts, heat stress, and public-health risks. These climate threats have been intensified by rapid population growth, informal settlements, poor waste management, deforestation, and unregulated land use. The Nansana Municipality Climate Action Plan (CAP) 2025–2030 responds to these challenges by providing a structured framework for climate-resilient development, consistent with Uganda's Nationally Determined Contributions (NDC 2022), Vision 2040, National Development Plan IV, and the Municipal Development Plan (2021–2025).

Specific Objectives

The objectives of the climate action plan are to:
1. Strengthen resilience to climate shocks and disasters
2. Build adaptive capacity across all municipal sectors and communities
3. Promote low-carbon development and awareness
4. Facilitate climate-responsive decision-making, budgeting, and resource mobilization
5. Institutionalize climate governance through evidence-based monitoring and learning

Methodology

The Plan was developed through an inclusive, participatory, and evidence-based process, engaging municipal departments, local communities, youth and women's groups, NGOs, and technical experts. It builds on vulnerability and exposure assessments using meteorological (CHIRPS rainfall and temperature data), socio-economic surveys, and spatial mapping (DEM, rivers, schools, health facilities, roads, and wetlands). This comprehensive process identified multi-hazard zones, assessed adaptive capacity, and prioritized actions for short-, medium-, and long-term interventions across ten key result areas

Sectoral Climate Action Framework

The CAP outlines actionable strategies across ten thematic sectors to ensure holistic resilience:

- **Energy:** Promote solar and biogas adoption, energy audits, and energy-efficient construction.
- **Transport:** Develop pedestrian and cycling lanes, promote electric mobility, and introduce smart traffic systems.
- Trade and Industry: Support green manufacturing, eco-packaging, and low-emission logistics.
- **Agriculture:** Scale up climate-smart agriculture, agroforestry, irrigation, and soil conservation.
- Environment and Natural Resources: Restore wetlands and forests, enforce land-use regulation, and enhance waste management.
- **ICT and Innovation:** Deploy digital early-warning systems, GIS-based risk mapping, and ICT-driven municipal services.
- **Land and Housing:** Promote climate-resilient urban planning, elevate flood-prone housing, and strengthen tenure systems.
- **Social Development (Communities):** Expand social protection, green jobs, and community safety nets.

- **Education and Sports:** Integrate climate education, establish school-based "Green Clubs", and hold inter-school "Green Games".
- **Health:** Strengthen health systems for climate-sensitive diseases, improve WASH, and establish emergency response units

Expected Outcomes (by 2030)

The expected outcomes of this plan are:

- Reduction in flood-related losses by 50 %.
- 80 % of public facilities powered by clean energy.
- 60 % reduction in unmanaged waste emissions.
- 70 % of schools implementing climate education programs.
- At least 500 ha of wetlands and forests restored.
- Digitalized early-warning systems operational in all divisions.
- Increased adaptive capacity among 80 % of households in high-risk zones.

The Nansana Climate Action Plan positions the municipality as a model urban authority for climate-resilient development in Uganda. It transforms policy commitments into actionable, community-driven initiatives that balance environmental protection with socio-economic progress. Successful implementation will require strong leadership, technical capacity, cross-sectoral coordination, and sustained financing. By 2030, Nansana envisions a green, circular, and inclusive municipality-one that safeguards its people, infrastructure, and ecosystems while contributing to Uganda's global climate commitments.

Forward

Climate variability and its associated impacts represent a systemic and existential risk to the socio-economic and infrastructural development trajectory of Nansana Municipality. As the principal custodian of the municipal mandate, the Council acknowledges the imperative to transition from reactive coping mechanisms to proactive, integrated climate risk management. This document, the Nansana Climate Action Plan (CAP) for the planning cycle 2025-2030, formalizes that strategic commitment.

The development of this CAP was facilitated through a rigorous, multi-stakeholder consultation process, engaging technical working groups, institutional partners, and community governance structures. This methodology ensures the Plan is empirically grounded, policy-coherent, and reflective of the local vulnerabilities identified across our jurisdiction.

The CAP serves as a binding directive for enhanced climate change mitigation and adaptation, harmonized with Uganda's Nationally Determined Contributions (NDCs) and the global Sustainable Development Goals (SDGs). Critically, it provides sector-specific roadmaps designed to enhance resilience within ten strategic, cross-cutting domains: Energy, Transportation, Trade and Industry, Agriculture, the Natural Environment, ICT integration, Land and Housing development, Social Development (including community resilience), Education and Sports programs, and Public Health systems.

We commit to institutionalizing the CAP across all municipal planning and budgetary cycles, thereby fostering a green, circular economy. The successful operationalization of this Plan requires robust technical capacity, the strengthening of resilient infrastructure, and the establishment of functional early warning and information dissemination systems.

On behalf of the Nansana Municipal Council, I extend profound appreciation to all technical teams and institutional partners whose expertise was instrumental in formulating this pivotal strategy. Its execution necessitates sustained political will and synergistic action from all stakeholders. We embrace this fiduciary responsibility to deliver a climate-secure, prosperous, and sustainable Nansana for current and succeeding generations.

BAKITTE REGINA NAKKAZI MUSOKE
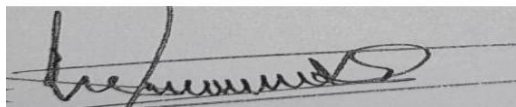Her Worship, Mayor
Nansana Municipality

Acknowledgement

The successful completion and formal adoption of the Nansana Climate Action Plan (CAP) 2025-2030 is a definitive achievement rooted in a process of sustained institutional collaboration, technical diligence, and deep stakeholder engagement. This comprehensive document, representing a strategic municipal imperative, was meticulously derived from rigorous, evidence-based vulnerability assessments and structured consultative processes. The Plan's objective is to systematically integrate climate resilience into the long-term planning frameworks of Nansana Municipality.

We extend profound gratitude to the World Bank for their instrumental financial and advisory support. The CAP was principally funded through the Greater Kampala Metropolitan Area Urban Development Program (GKMA-UDP). This critical external investment facilitated the necessary technical assessments, enhanced capacity building initiatives, and enabled the multi-sectoral engagement required to produce a robust, policy-coherent, and implementable strategy across all municipal operations.

We particularly recognize and appreciate the unwavering strategic oversight, governance, and fiduciary leadership provided by the political hierarchy of the municipality. Our sincere thanks are extended to His Worship, the Mayor, for championing the climate resilience agenda and providing the executive mandate necessary for the cross-sectoral integration; the Speaker of the Council, for ensuring democratic engagement and transparency throughout the approval process; and all Municipal Councilors, for their diligent review, substantive input, and decisive resolution in adopting this long-term resilience strategy.

A final, special acknowledgement is reserved for the technical specialists, departmental heads, and all members of the dedicated natural resources management committee. Their detailed efforts ensured the granular mapping of mitigation and adaptation actions across the priority sectors: Energy, Transportation, Trade and Industry, Agriculture, Natural Environment, ICT Integration, Land Use and Housing, Social Development (Communities), Education and Sports, and Public Health. The credibility and eventual success of this CAP hinge entirely on the commitment of these teams as we transition Nansana Municipality towards a climate-resilient urban future.

Tandeka Festo
Municipal Clerk
Nansana Municipality

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Acronyms

AFOLU	Agriculture, forestry and other land use
BAU	Business As Usual
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station data
CIRIS	City Inventory Reporting and Information System
CoM SSA	Covenant of Mayors in Sub-Saharan Africa
DRM	Disaster Risk Management
EF	Emission Factor
GDP	Gross domestic product
GHG	Greenhouse gas
GHG	GreenHouse Gas
GHG	Greenhouse Gas Emission
GPC	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories
IPPU	Industrial processes and product use
NDC	Nationally Determined Contribution
RCP	Representative Concentration Pathway
SEACAP	Sustainable Energy Access and Climate Action Plan
tCO$_2$e	Metric tonnes of carbondioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water Sanitation and Hygiene

1. CHAPTER ONE: INTRODUCTION

1.1   Background

Nationally, Uganda is highly prone to the impacts of climate change affecting the survival of urban and rural communities and livelihoods. Uganda's greenhouse gas (GHG) emissions are dominated by the Agriculture, Forestry, and Other Land Use (AFOLU) sector, accounting for about 86% of the total. Uganda's greenhouse gas (GHG) emissions are projected to increase from 90.1 MtCO2e in 2015 to 148.8 MtCO2e in 2030 and 235.7 MtCO2e by 2050 under the Business as Usual (BAU) Scenario (NDC, 2022). Nansana municipality's contribution to the overall climate change effects includes rampant degradation of natural resources, poor waste management, inefficient transportation systems and growing industries among others. The vulnerability of communities to climatic shocks is attributed to poor land use and tenure insecurity, poverty, informal settlements, limited access to weather forecasts, and types of buildings that are high prone to climate shocks among others. Climate change has rendered many people especially the youths unemployed and despite the municipality's interventions such as offering skilling opportunities, the outcomes of climate change have persisted. The climatic catastrophises that are frequently reported include floods, drought and strong winds. For example, floods are highly common around drainage channels and swamps in the areas of Kattabaana, Bulesa, Butera, Tula, Kisimu, Lubigi, Bwaise and Kavule among others.

The municipality's failures to widely strengthen mitigation and adaptation measures is attributed to unsupportive government policies to curb unemployment, limited funding and limited awareness on available opportunities. Despite these challenges, the municipality has increased monitoring and regulation of water resources, increase enforcement capacities, restored wetlands, forests and riverbanks, planted tree but also promoted integrated land use planning initiatives. Nansana overtime has been incorporating climate action in its five-year development plans such 2020/21-24/25, because previously, the municipality lacked a climate action plan, but now it has been developed to guide mitigation and adaptation actions in 10 sectors (Energy, Transportation, Trade and industry, Agriculture, Environment, ICT, Land and housing, social development (Communities), Education, and Sports and Health). This climate action plan is well aligned with the updated Nationally Determined Contributions (NDC, 2022), Uganda Vision 2040, National Development Plan IV and Nansana Municipal Development plan 2021/2025.

The development of this climate action plan prioritizes youth involvement and gender responsiveness through strengthening youth structures, equipping youth clubs and supporting youth education. It is also meant to facilitate lobbying and resource mobilisation to harness investments in adaptation actions such as developing early warning systems, strengthening of municipal disaster management structures, installation of clean cook stoves especially in institutions and strengthening the already developed initiatives such as the Budde App, developed by the youths to address environmental issues facing the Municipality. The outcomes of this plan will be shared with the national government and UNFCCC processes to reflect the voices of local communities in urban and peri urbans on how their climate resilient.

It is against this backdrop, that the Nansana Municipal Climate Action Plan has been developed to inform decision making processes geared towards the planning and implementation of enhanced climate mitigation and adaptation actions in the short, medium and long term up to 2030 across the different sectors, aimed at improving their resilience.

1.2   Objectives

The objectives of this climate action plan are:
1. To enhance the resilience of the Municipality to climate shocks
2. To provide climate actions that address key vulnerabilities, and build adaptive capacities and resilience at all levels
3. To facilitate climate risk-decision making processes with guidance related to budgeting, climate action implementation arrangements, resource mobilization and dissemination of climate information
4. To promote a low carbon and climate resilient society by increasing public awareness and integrating climate actions into broader policies

1.3   Vision of the plan

Vision Statement:

"A resilient Nansana Municipality that is able to adapt to climate shocks and implement low carbon measures while promoting value addition and employment for sustainable socio-economic transformation"

1.4   Significance of the plan

The climate change plan will:
1. Strengthen the resilience of communities and infrastructure to withstand and recover from climate-related stocks such as floods, heat waves, and drought.
2. Increase community awareness of human-induced climate change impacts and promote responsible environmental practices.
3. Implement sustainable waste management, water conservation, and energy efficiency measures to reduce carbon emissions and protect natural ecosystems.
4. Promote climate-smart agriculture and adaptive livelihood strategies to improve food security and reduce vulnerability to climate variability.
5. Promote investment in green, eco-friendly urban planning and infrastructure to minimize risks like flooding, heat stress, and environmental degradation.
6. Foster inclusive, community-driven climate action by engaging local residents, leaders, and organizations in adaptation and mitigation initiatives.
1. Create sustainable green jobs and livelihoods that support economic development while safeguarding the environment.
2. Leverage technology and indigenous knowledge for climate monitoring, adaptation, and emissions reduction, and;
3. Develop robust municipal policies and frameworks that integrate climate resilience, sustainability, and urban development

1.5　　Planning Process

This plan was developed through a consultative process, indicating that it was stakeholder driven. The steps undertaken to develop this plan included stakeholder consultations (at the municipal, sub division and parish levels), analysis of climate change and vulnerabilities and validation of climate mitigation and adaptation actions. The process was entirely participatory, suggesting that the development of the plan vision, objectives and climate actions were stakeholder led. The participants were selected based on the principles of fairness, equity, gender and social inclusion.

The time frame for this plan is between 2025 and 2030, implying it is also aligned with Uganda's Updated Nationally Determined Contribution (NDC) which was developed in fulfilment of Article 4 of the Paris Agreement. In the updated NDC, Uganda presents an ambitious economy-wide mitigation target in 2030 of 24.7% reduction below the Business As Usual (BAU), a progression from the 22% reduction target communicated in the first NDC in 2016.

While developing this plan, the datasets collected and analysed to demonstrate climate change variability and vulnerabilities included meteorological (rainfall and temperature), social economic, digital elevation model, rivers, health, schools, roads and water sources among others. The results are presented in form of maps, tables and graph displaying climate change mitigation and adaptation options and adaptive capacities within Nansana Municipal. The climate actions are presented to reflect 12 result areas and these include Waste management, Energy, Transportation, Trade, Manufacturing, Agriculture (crop and livestock), Environment, ICT, land and housing, social development (Communities), Education and Sport and Health.

Figure 1: Verification of climate vulnerabilities in communities

1.6   Policy, Regulatory and Planning frameworks

This Plan has been developed to integrate multiple objectives, sectoral, catchment, and local planning for climate-resilient adaptation, in alignment with international, national, and strategic commitments. The frameworks aim to reduce emissions, build resilience to climate impacts, enhance climate-resilient infrastructure and services, and strengthen the knowledge base. Table 1 outlines the policy, regulatory, and planning frameworks that guide the planning and implementation of climate-resilient mitigation and adaptation strategies.

Table 1: Strategies, International and national policy and regulatory frameworks

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
International Frameworks	
United Nations Framework Convention on Climate Change (UNFCCC) 1992(Article 4)	Uganda signed and ratified the UNFCCC in 1992. The UNFCCC primarily focuses on developing NDCs, promotes integration of climate change into national planning, and enables access to international climate finance, capacity building and technology to align actions with global climate goals and strengthens institutional frameworks for coordinated climate action.
The Sendai Framework for Disaster Risk Reduction (2015-2030) (Priority 2)	The Sendai Framework emphasize the need to reduce disaster risks that are exacerbated by climate change, including droughts, floods, and extreme weather events; encourage the integration of DRR into climate change policies and plans. With an aim of building climate resilience, improving EWS, and ensuring that climate adaptation efforts contribute to reducing vulnerability to climate-related disasters.
The United Nations Convention to Combat Desertification (1994) (Article 2)	The UNCCD focus on promoting sustainable land management practices that prevent desertification, land degradation, and drought; implementing climate-resilient agricultural practices, improve soil health and restore degraded lands; mitigating the impacts of climate change, enhance carbon sequestration, and increasing agricultural productivity in vulnerable areas, with the goal of contributing to climate adaptation and greenhouse gas reduction.
The Paris Agreement (2015) (Article 2)	The Paris Agreement is a core in limiting global temperature rise to well below 2°C and pursue efforts to stay within 1.5°C; it guides the formulation and implementation of NDCs, which outline sector-specific strategies for climate mitigation and adaptation; enhances access to international climate finance, capacity building and technology transfer, and supports the transition to a low-carbon and climate-resilient development pathway.
Kyoto Protocol (2005) (Article 12.2 -12.6)	The Kyoto Protocol primary focus is on reducing greenhouse gas emissions; implementing emission-reduction projects, access climate finance, and promote low-carbon technologies, supporting climate action goals is easy through Clean Development Mechanism CDM.
Sustainable Development Goals (2015) (SDG 13: Climate Action)	The SDGs, specifically Goal 13 (Climate Action), focus on strengthening resilience and adaptive capacity to climate-related hazards; promoting the integration of climate change measures into national policies, strategies, and planning; encouraging access climate finance, invest in renewable energy, and promote sustainable land and resource use to achieve a low-carbon, climate-resilient future.

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
African Union Agenda (2063) (Chapter 2, Aspiration 1)	Focuses on promoting a prosperous and sustainable Africa by supporting inclusive green growth, environmental sustainability, and climate-resilient economies; advocating for renewable energy adoption, sustainable land use, and climate-smart agriculture; encouraging regional cooperation and resource mobilization to tackle climate change effectively.
IGAD Initiatives on Drought & Desertification Strategy (2021-2025) (Pillar 1)	The strategy focuses on promoting climate-resilient agriculture, sustainable land management, ecosystem restoration; addressing land degradation and reduce vulnerability to climate shocks; promoting cross-border collaboration, capacity building, and the use of climate-smart practices; contributing to greenhouse gas reduction, enhanced adaptive capacity and improved food security in drought-prone areas.
UN 2030 Agenda (Goal 13: Climate Action)	The agenda adopted in 2015, outlines 17 SDGs, with Goal 13 (Climate Action) directly calling for urgent steps to combat climate change and its impacts; guides the integration of climate change into national planning, encourages resilient development, and supports access to international climate finance and technology.
The Ramsar Convention on Wetlands (1971) (Articles 3.1,4)	The Ramsar Convention promotes the conservation and wise use of wetlands, which advocates for carbon storage, climate regulation, and biodiversity conservation by buffering climate impacts and supporting climate-resilient livelihoods including fishing, eco-tourism, and sustainable agriculture.
National Planning frameworks	
Uganda Vision (2040) (Chapter 5, section 5.9)	The Vision acknowledges climate change as a hindrance to development thus promotes a shift to a green economy focusing on low-carbon development, renewable energy, and sustainable natural resource use; It also supports integration of climate change adaptation and mitigation into all sectors of the economy to ensure long-term sustainability.
Third National Development Plan (2020/21 - 2024/25) (Program 9)	NDPIII focuses on integrating of climate change into national and local development plans. It promotes sustainable use of natural resources, environmental protection, and low-emission development pathways through Program 9. It has supported investment in climate-smart technologies and encourages coordination among sectors to strengthen climate resilience.
Updated Nationally Determined Contribution (2022) (Page iii)	The Updated NDC outlines country's enhanced commitments to reduce greenhouse gas emissions by 24.7% by 2030, prioritizing sectors including agriculture, energy, forestry, and waste management. It promotes transition to clean energy climate-smart agriculture and afforestation, while advocating for inclusive participation and gender-responsive approaches.
Uganda Disaster Preparedness Plan (2005 – 2009)	Although it was formulated before Uganda's formal climate change policy frameworks, the plan indirectly supports climate goals by enhancing national capacity to prepare for climate-induced hazards such as floods and droughts.

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
National Disaster Risk Management (DRM) Plan (2011 – 2028)	The DRM Plan supports country's climate resilience efforts by promoting risk-informed development planning. It acknowledges the growing impact of climate-induced hazards including droughts, floods, and landslides, and advocates for adaptation measures that reduce long-term vulnerability to climate change.
NRM manifesto (2021 – 2026) (Section 3, page 277)	The Manifesto fronts the importance of sustainable natural resource management as a foundation for Uganda's future development. It profiles a commitment to climate-smart agriculture, which aims to enhance productivity while minimizing environmental degradation. It promotes the adoption of innovative technologies that can reduce carbon emissions and enhance environmental sustainability. It also calls for the integration of climate change adaptation and mitigation strategies across all sectors, including agriculture, energy, infrastructure, and transport to ensure climate resilience in both urban and rural communities.
Uganda National Adaptation Programmes of Action (2007)	NAPA establishes strategic approach to climate change adaptation by identifying the most vulnerable communities and sectors. It focuses on actions that enhance resilience in sectors including health agriculture and water resources. It proposes adaptation measures including promoting drought-resistant crops, improving water storage, and enhancing EWS for extreme weather events.
Health Sector Development Plan (2015-2020)	The plan recognizes the growing impact of climate change on public health, basically through climate-sensitive diseases including cholera malaria, and waterborne diseases. It aims to enhance the need for climate adaptation strategies to protect health systems and improve healthcare access for vulnerable populations. The plan also supports initiatives such as vector control in malaria-prone areas and strengthening health sector capacity to handle climate-related health crises.
The Water Action Plan (1995)	The plan centres on improving water resource management by ensuring sustainable water use in the face of growing climate change impacts. It emphasizes the development of water infrastructure, water conservation and promotion of efficient irrigation practices that are important for adapting to climate-induced water scarcity and droughts. It also advocates for better management of wetlands to improve water retention and resilience to climate-related shifts in water availability.
National Policies	
The 1995 Constitution of Uganda (1995) (XIII. Protection of natural resources, XXVII. The environment)	The Constitution lays the foundation for environmental protection, recognizing the duty of the state and citizens to protect natural resources, such as water, land, wetlands, and biodiversity. It mandates that development must be ecologically sustainable, which supports climate action by providing a legal basis for integrating environmental and climate considerations into national and local policies.
National Environment Management Policy (2014) (Chapter 3)	NEMP establishes a framework that focus on integrating climate considerations and environmental sustainability into Uganda's development agenda by promotes sustainable use of natural resources,

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
	supports climate change mitigation and adaptation measures, and advocates for integration of climate issues into sectoral plans, policies and budgets. NEMP encourages the mobilization of financial and technical resources for environmental protection and resilience building.
Uganda National Land Policy (2013) (Chapter 6,6.7,6.10(150-152)	The policy advocates for climate-resilient land use planning by promoting sustainable land management practices that prevent degradation and enhance productivity. It encourages protection of fragile ecosystems including forests, wetlands and mountainous areas, which are crucial for carbon sequestration and climate regulation. The policy also emphasizes the integration of climate change adaptation strategies into land tenure and utilization systems.
Uganda National Climate Change Policy (2015) (Page v, Section 3)	The policy is a central framework for addressing climate change, guiding both mitigation and adaptation efforts, promotes low-carbon development, encourages sustainable energy use, and advocates for integration of climate change into all national and sectoral plans; supports green economy initiatives and provides direction for mobilizing climate finance, research, and technology transfer to build national climate resilience.
Disaster Preparedness and Management Policy (2010) (Section 1.1.4.9)	Although the policy primarily focuses on disaster management, it also recognizes the increasing climate-related hazards including floods, droughts, and landslides and their impacts; promotes the mainstreaming of climate change adaptation into disaster risk reduction strategies and supports actions that build community resilience to the long-term impacts of climate change.
The Uganda Forestry Policy (2001) (Policy statement 7, section 1.2.3,1.2.6)	The policy seeks to promote sustainable forest management for climate change mitigation through biodiversity conservation and carbon sequestration; encourage afforestation, reforestation and restoration of degraded forest ecosystems, all which contribute to greenhouse gas emissions reduction and enhancing climate resilience across landscapes.
The Water Statute (1995)	The Water Statute advocates for sustainable use, conservation, efficient water use, protection of water resources, and resilience building in water supply systems which is key for climate adaptation. It establishes the legal basis for integrated water resources management (IWRM) approach to ensure water availability amidst changing climate patterns.
The Gender Policy (2007) (Section 5.4)	The policy primarily emphasizes equity and inclusiveness in climate change planning and response. It recognizes that women and men experience climate impacts differently and promotes the integration of gender perspectives into environmental and climate policies; it advocates for women's participation in climate actions, mainly in sectors including agriculture, water, and energy, which are highly climate-sensitive
National Acts	

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
National Forestry and Tree Planting Act (2003) (Section 2 (a -h), sections 37,39).	The Act establishes a legal framework that prioritize sustainable expansion of forests and management for climate change mitigation through carbon sequestration. It also promotes afforestation, tree planting, and reforestation in degraded areas, and supports the conservation of natural forest reserves to reduce greenhouse gas emissions and protect biodiversity.
National Climate Change Act (2021) (Section 3(a -e))	The Act primarily seeks to address climate change. It mandates the integration of climate change into all national and sectoral plans, policies and budgets. It has established institutional structures for climate governance, enforces commitments under international agreements (e.g. the Paris Agreement), and promotes emissions tracking, low-carbon development, and climate finance mechanisms to support climate-resilient growth.
National Disaster Preparedness and Management Act (2021)	The Act supports climate change adaptation by integrating disaster risk reduction (DRR) into national development plans which helps address the vulnerabilities of sectors including water resources, agriculture and health to climate change impacts such as droughts and floods. The Act enhances Uganda's capacity to prepare for and manage climate-induced hazards, promoting the sustainability of communities through EWS, resource mobilization, and adaptive measures.
The National Environment Act (NEA) (2019) (Page 9)	The NEA provides a framework for environmental management which emphasizes sustainable development and the integration of environmental concerns into national planning. It established the NEMA, a coordinating, monitoring, regulatory, and supervisory body for environmental activities. The Act seeks to address emerging environmental issues, including climate change, by promoting strategic environmental assessments and the management of hazardous chemicals.
The National Water Policy (1999) (Sections 4.1,4.3.3 ,6.4,7.2)	The policy provides a framework that prioritize sustainable management and development of water resources. It has promoted IWRM for adapting to climate variability and ensuring the equitable and efficient use of water across all sectors. It also supports water conservation and sustainable water supply for rain-fed agricultural production affected by climate change; it addresses the need for efficient use of water in industries and urban areas to reduce the carbon and water footprints of these sectors.
The Water Act, Cap. 152 (1997) (Section 4 (a-d)).	The Act establishes a framework for the use, protection, and management of water resources. It supports climate adaptation efforts, ensuring that water use for various purposes including agricultural, domestic, industrial, and energy production is conducted sustainably. This helps mitigate the impacts of climate change by maintaining the availability and integrity of water resources.
Land Act, 1998 (as amended), Cap. 227.(Part III Sections 42,43,44,45)	The Act establishes a framework for land tenure including customary, freehold, mailo, and leasehold; ownership, and management. Although the Act does not explicitly address climate change issues, but it encourages sustainable land-use practices and long-term investments

Frameworks, Policies, Plans and Acts	Relevance to Climate actions
	in land conservation, which are important in climate change mitigation and adaptation strategies.
The Local Governments Act (1997) (Second schedule, Part 2, item 15, Sections 30,31,32)	The Act, entrusts local governments with the management of natural resources within their jurisdictions. It empowers local authorities to implement environmental policies and programs customized to their specific contexts, facilitating more effective responses to climate change challenges; LGs can develop and enforce ordinances related to environmental conservation, promote sustainable land use practices, and engage communities in climate adaptation initiatives and enables grassroots-level climate action, fostering resilience and sustainable development.
Public Finance Management Act, 2015 (Section 9(1), (3), (5), (6), (7), (8)	PFMA carries out the systematic integration of climate change in planning and budgeting by emphasizing prudent financial management which ensures that resources are efficiently allocated toward climate-related initiatives; it facilitates the government's ability to fund climate adaptation and mitigation programs which help building resilience against climate change impacts.
The National Water & Sewerage Corporation Act. 1995(Section 4)	The policy gave rise to establishment of the National Water and Sewerage Corporation (NWSC). The NWSC has been responsible for piped water provision and focus on expanding water and sewerage services in large urban centres and small urban centres. In this context, the Act supports the implementation of IWRM, encouraging the sustainable management and conservation of water resources, contributes to enhancing climate resilience in urban areas, helping communities adapt to the impacts of climate change, such as altered precipitation patterns and water scarcity.

2. CHAPTER TWO: CLIMATE CHANGE AND VULNERABILITY

2.2.1 Greenhouse Gas Emission Inventory

The Greenhouse Gas inventory for Nansana Municipality is presented according to the GHG Protocol's scopes as well as the BASIC reporting stipulated by the GPC standard. The GPC standard refers to the "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories" and provides a standard for compiling municipality level GHG inventories. The standard is based on Scope 1, 2 and 3 emission categories outlined in the corporate standard for GHG Inventories. The scope for Nansana is hereby defined as follows:

- Scope 1: GHG emissions from sources located within the Municipality boundary
- Scope 2: GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the Municipality boundary
- Scope 3: All other GHG emissions that occur outside the municipality boundary as a result of activities taking place within the municipality boundary.

Furthermore, the GPC defines two reporting frameworks for cities to use i.e. BASIC and BASIC+. The BASIC framework covers emissions sources that occur in most of the municipalities including Stationary Energy, In-boundary transportation and in-boundary generated waste. The calculation methodologies and data are more readily available.

The energy sector has the largest source of emissions, followed by waste sector as shown in (Table *2* & Figure 2). Notably, most of the emissions are scope 1 emissions. Whereas, scope 2 emission form a small portion of the overall total. On the other hand, scope 3 emissions were not estimated in this assessment due to lack of this data.

Table 2: GHG Emissions Summary

GHG Emissions Source (By Sector)		Total GHGs (metric tonnes CO2e)		
		Scope 1	Scope 2	BASIC
STATIONARY ENERGY	Energy use	348100	538	348638
	Energy generation supplied to the grid			
				0
TRANSPORTATION		137446		137446
WASTE	Waste generated in the municipality	209321		209321
	Waste generated outside municipality			
IPPU		NE		
AFOLU		NE		
OTHER SCOPE 3		NE		
TOTAL		694868	538	695406
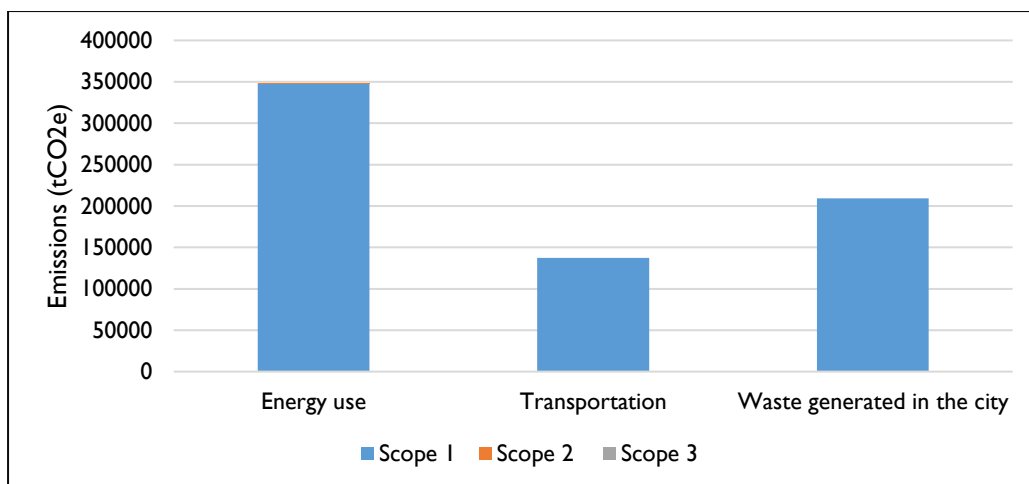
Figure 2: Nansana Municipality GHG emissions summary

Furthermore, the emissions by sector and sub-sector are presented in Table 3. The alarming source of emissions for the various sectors or sub-sectors is the solid waste generated followed by on-road transportation and non-specified sources. The contribution of each sector/ sub-sector is illustrated in (Table 3 & Figure 3) below:

Table 3: Emissions by sector and sub-sector

GHG Emissions Source (By Sector and Sub-sector)	Total GHGs (metric tonnes CO_2e)		
	Scope 1	Scope 2	Total
I. STATIONARY ENERGY			
Residential buildings	24368	161	24529
Commercial and institutional buildings and facilities	42787	65	42852
Manufacturing industries and construction	111314	310	111624
Energy industries	21501	0	21501
Agriculture, forestry and fishing activities	14038	0	14038
Non-specified sources	134093	0	134093
SUB-TOTAL	348100	537	348637
II. TRANSPORTATION			0
On-road transportation	137446	NO	137446
SUB-TOTAL	137446		137446
III. WASTE			0
Solid waste generated in the municipality	141035		141035
Wastewater generated in the municipality	68287		68287
SUB-TOTAL	209321		209321
TOTAL	1389736	1073	1390809
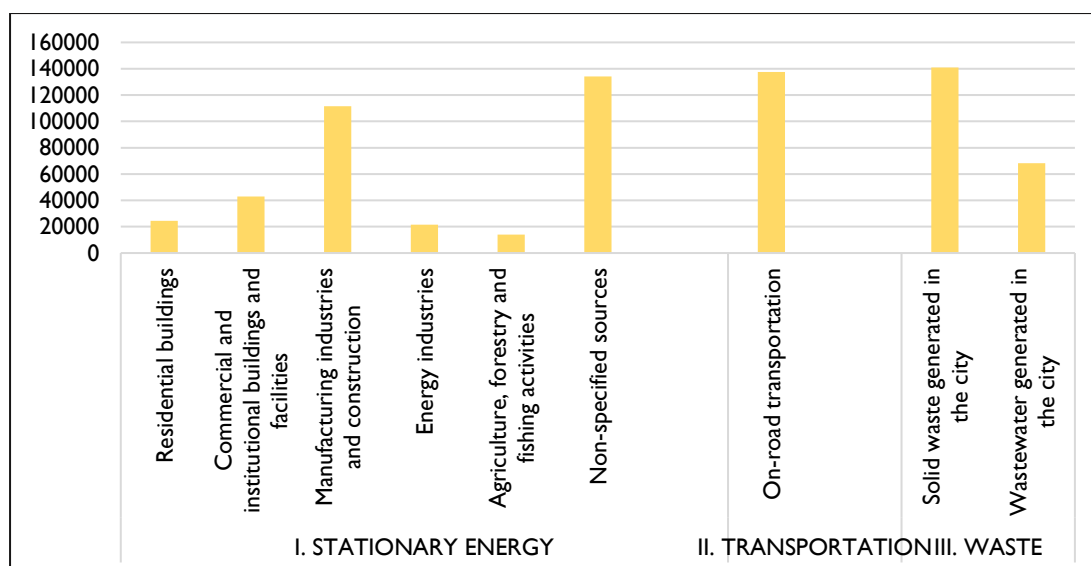
Figure 3: Emissions summary by each sector and sub-sector

There are numerous fuels used to generate energy for transportation or stationary uses. The summary is presented in Table 4. The results indicate that the primary sources of inventory are wood or waste wood (38.25%), diesel (33.94%) and charcoal (15.83%) as shown (FFigure 4).

Table 4: Emissions by fuel for the various sectors or subsectors

Subsector	Fuel	Emissions (tCO2e)
Residential	Wood or wood waste	11608
	Charcoal	12760
	Electricity	161
Commercial and Institutional	Wood or wood waste	40228
	Charcoal	2559
	Electricity	65
Manufacturing and Construction	Petrol	13048
	Diesel	50538
	Paraffin	7607
	Charcoal	40121
	Electricity	310
Energy Industries	Charcoal	21501
Agriculture, Forestry and Fisheries	Petrol	14038
Non-Specified	Wood or wood waste	134093
	Electricity	0
On-road Transportation	Petrol	23009
	Diesel	114437
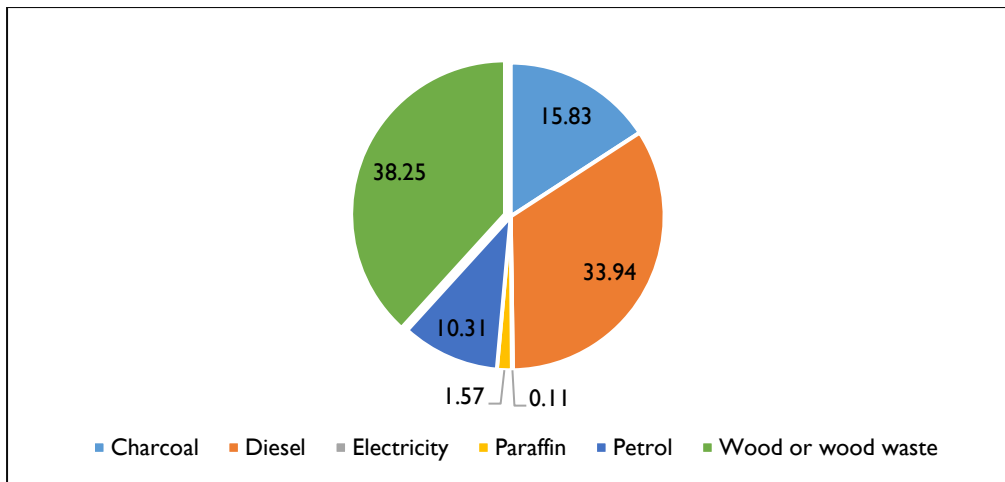
Figure 4: Fuel share percentages

2.2.2 Climate Trends and Projections

Observed and Projected Maximum Temperature Trends in Nansana Municipality

The observed average annual maximum temperatures for Nansana municipality are about 26.1 ∘C, with a minimum of 24.8 ∘C in July and a maximum of 28.3 ∘C in February. For the climatological period 1994-2024, maximum temperature in Nansana municipality has increased at a rate of 0.31 ∘C per decade. Between 1994 and 2024, the highest maximum temperature of 27.0 ∘C was recorded in 2017 (**Figure 5**). The projections of maximum temperature (2025-2030) indicate an increase of 0.3 ∘C and 0.6 ∘C under moderate (RCP 4.5) and high (RCP 8.5) greenhouse gas (GHG) concentration scenarios respectively; relative to the 1994-2024 average.
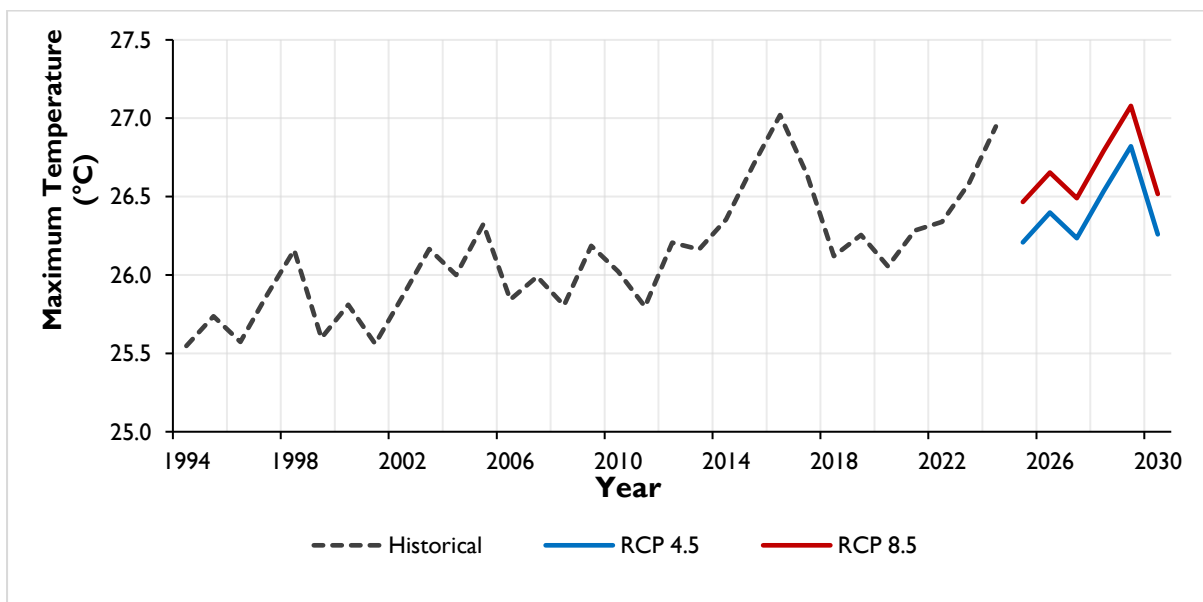
Figure 5: Historical and projected maximum temperature for Nansana municipality between 1994 and 2030

Busukuma and Gombe divisions are projected to have the highest maximum temperatures of between 26.8 ∘C and 27.0 ∘C compared to other areas especially under the high (RCP 8.5) greenhouse gas (GHG) concentration scenario (**Figure 6**).
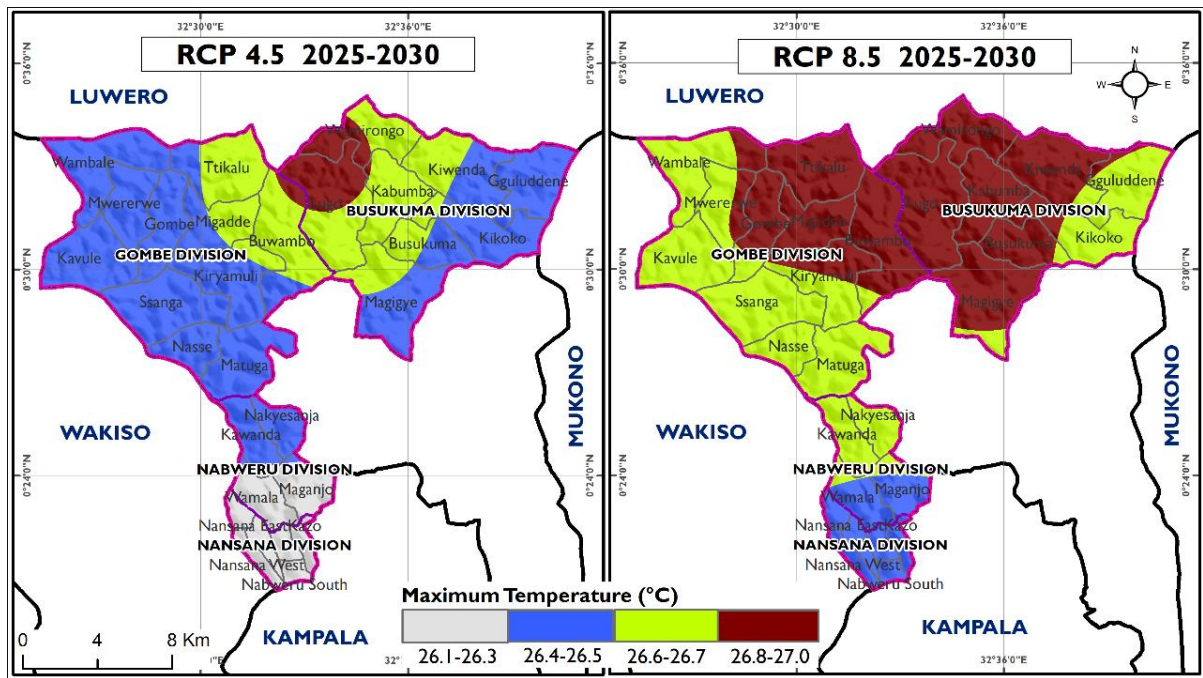
Figure 6: Projected maximum temperature for the 2025-2030 near-term projection period in Nansana municipality

Observed and Projected Minimum Temperature Trends in Nansana Municipality

The observed average annual minimum temperatures for Nansana municipality are about 17.0 °C, with a minimum of 16.3 °C in July and a maximum of 17.8 °C in April. For the climatological period 1994-2024, minimum temperature in Nansana municipality has increased at a rate of 0.19 °C per decade. Between 1994 and 2024, the highest minimum temperature of 17.7 °C was recorded in 2024 (**Figure 7**). The projections of minimum temperature (2025-2030) indicate an increase of 0.76 °C and 0.78 °C under moderate (RCP 4.5) and high (RCP 8.5) greenhouse gas (GHG) concentration scenarios respectively; relative to the 1994-2024 average.
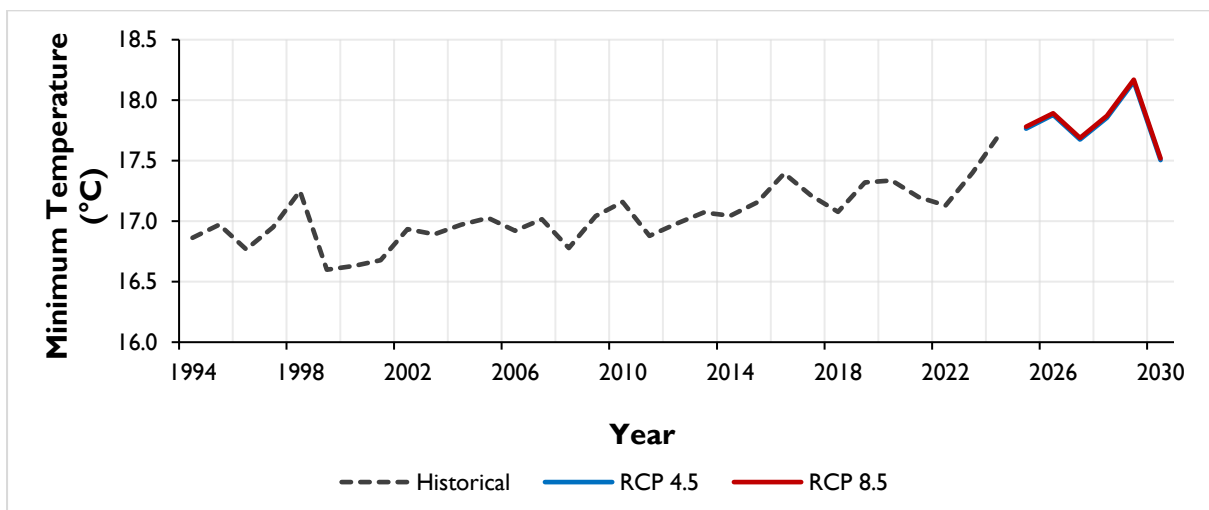
Figure 7: Historical and projected minimum temperature for Nansana municipality between 1994 and 2030

Nansana, Busukuma and Gombe divisions are projected to have the highest minimum temperatures of between 17.9 °C and 18.0 °C compared to other areas especially under the high (RCP 8.5) greenhouse gas (GHG) concentration scenario (**Figure 8**).
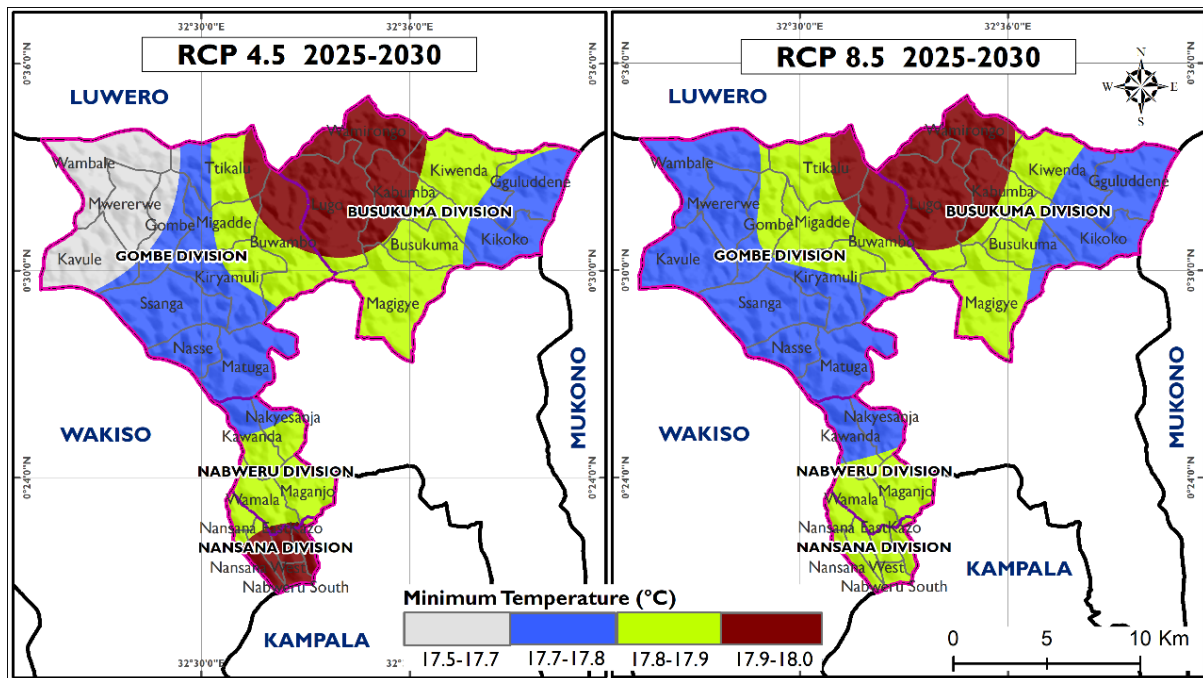
Figure 8: Projected minimum temperature for the 2025-2030 near-term projection period in Nansana municipality

Observed and Projected Rainfall Trends in Nansana Municipality

Between 1994 and 2024, the total annual average rainfall for Nansana Municipality was 1,363 mm, and mean monthly rainfall varied from 60.7 mm in July to 151.0 mm in November. For the climatological period 1994-2024, rainfall in Nansana municipality has increased at a rate of 4.66 mm per decade. Between 1994 and 2024, the highest annual rainfall of 1,670.5 mm was recorded in 2019 (**Figure 9**). The projections (2025-2030) indicate an increase of mean rainfall for Nansana Municipality. Under RCP 4.5, mean rainfall is projected to increase by 220.9 mm (16.2%) relative to the 1994-2024 average. Similarly, under RCP 8.5, mean rainfall is projected to increase by 183.8 mm (13.5%) relative to the 1994-2024 average.
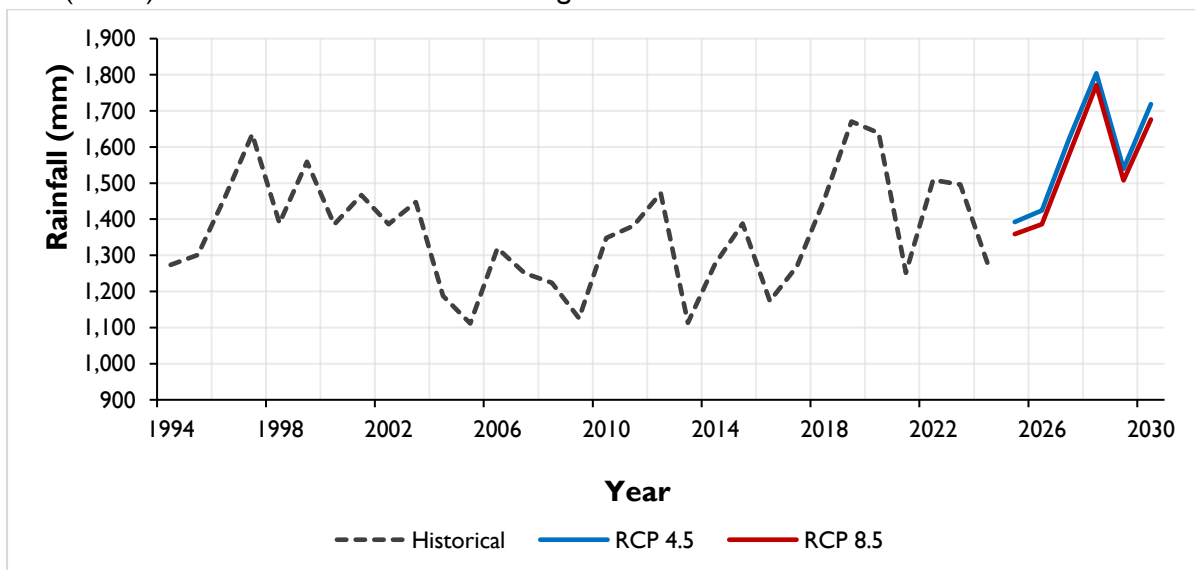
Figure 9: Historical and projected rainfall for Nansana municipality between 1994 and 2030

The highest projected mean rainfall in Nansana Municipality is expected in Busukuma division in the wards of Gguluddene, Kikoko, Kiwenda, and Busukuma (**Figure 10**).
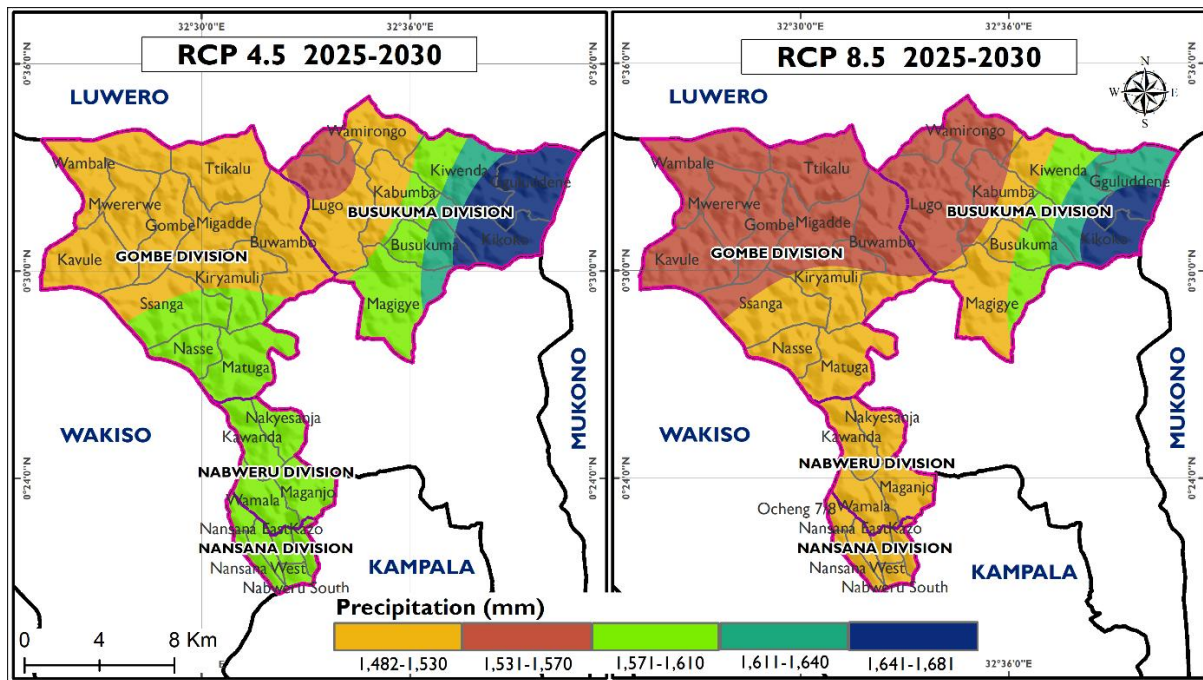
Figure 10: Projected rainfall for the 2025-2030 near-term projection period in Nansana municipality

2.2.3 Climate Hazards

Climate hazards refer to events or conditions resulting from climate or weather-related phenomena that have the potential to cause harm to people, property, and the environment (Zscheischler et al., 2020). The climate hazards that affect Nansana municipality include drought, floods, hailstorms, lightning, and windstorms. These climate hazards are briefly described below.

Drought Hazard

Drought is defined as a recurrent feature of climate that occurs when there is an extended period of abnormal deficiency in precipitation (relative to what is considered normal) (Sivakumar & Wilhite, 2002). Drought in Nansana Municipality has been attributed to environmental degradation majorly cutting down of trees, and encroachment of wetland ecosystems. The impacts of drought include water crisis, reduced crop and livestock productivity, and increased food prices. The warmer temperatures also favour the survival of some pests and parasites thus an increase in pests, parasites, and diseases.

Drought in Nansana Municipality was assessed using the Standardized Precipitation Index (SPI). Rainfall data (1994-2024) from CHIRPS (Climate Hazards Group InfraRed Precipitation with Station data) was used to compute the SPI. The SPI was computed using the Drought Indices Calculator (DrinC). Drought was then categorized based on SPI values as described by (Guttman, 1999; McKee et al., 1993).

The biggest part of the municipality (64.5%) is exposed to low drought hazard. However, wards such as Maganjo, Migadde, Ttikalu, Gombe, Mwererwe, Wambale, and Wamirongo; are exposed to moderate drought hazard (**Figure 11**).

DROUGHT HAZARD IN NANSANA MUNICIPALITY
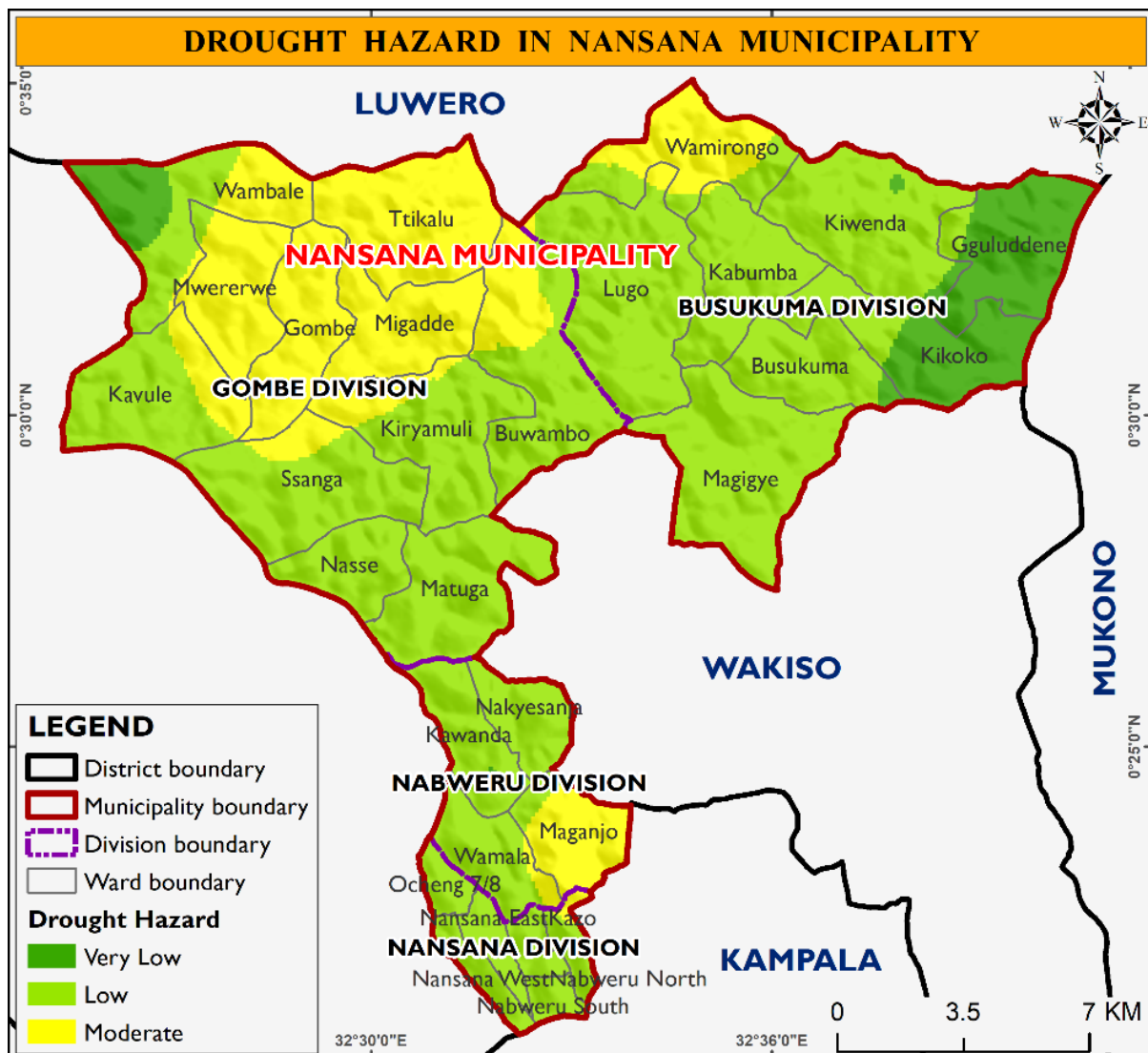
Figure 11: Drought hazard zonation in Nansana Municipality

Flood Hazard

Flooding is an overflow of water that submerges land that is usually dry (Farida & Maswanku, 2022). The floods in Nansana Municipality are majorly attributed to excessive rainfall due to climate change, clearing of trees and vegetation, encroachment of wetlands, municipal waste disposal in drainage channels, and increased farming of the river banks. The impacts of floods in Nansana Municipality include loss of lives; destruction of houses and household property; destruction of croplands; contamination of water sources; destruction of WASH facilities and infrastructure such as health centres, schools, roads, bridges and culverts. The biggest part of the municipality (26.3%) is exposed to floods of moderate intensity.

Flooding in Nansana Municipality was delineated using the HEC-GeoRAS tool. The input datasets included rainfall, elevation, land use/cover, and stream geometry data. The flood extents were then categorized into flood hazard intensities based on water depth: very high (>2m), high (1.5m-2m), moderate (1m-1.5m), and low (0.5m-1m).

Table 5 shows the flood hotspots highlighted by the community members in the different divisions of Nansana Municipality.

Table 5: Flood hotspots in Nansana Municipality

Divisions	Busukuma	Nabweru	Nansana	Gombe
Hotspots	Kattabaana, Kasangati, Nasirye, Bulesa, Butera, Namawata, Kabonge-Buyaga, Kigemezi-Buwanuka, Nabutiti, Bukemba-Kabanyolo, Bulyankuyege-Butera, Namulonge TC	Kawempe B, Tula, Kisumu, Kakira, Nabweru Division Head Quarters, Wamala	Katalemwa, Katoogo, Lubigi, Bwaise, Kibwa, Katooke, Kazo, Lugoba-kazinga, Bujjagaali, Kabumbi	Watindo Wambale, Semuto, Ngalomyambe, Kavule, Gombe

The flood hazard hotspots in Nansana Municipality are presented in **Figure 12**.
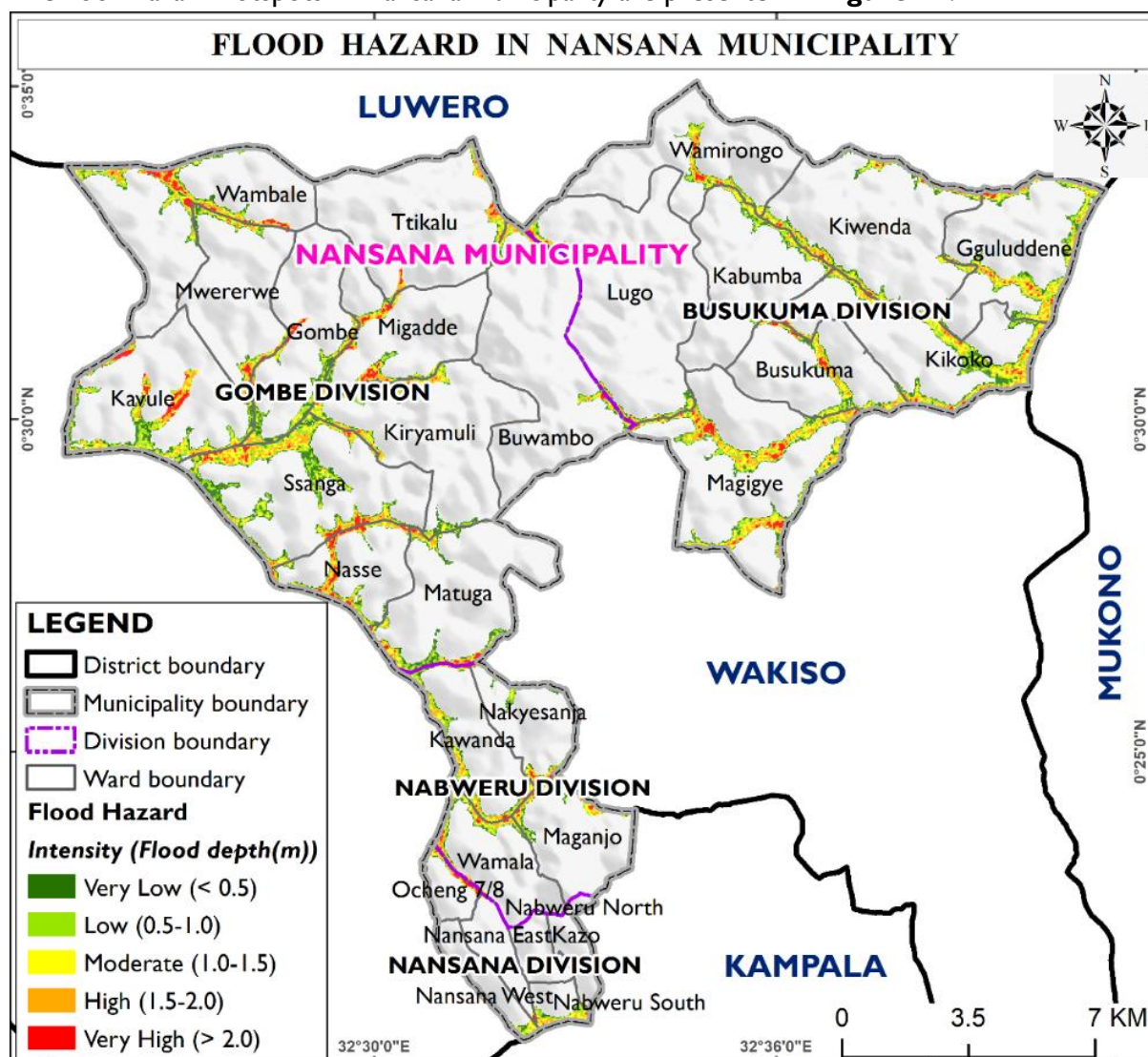
Figure 12: Flood hazard zonation in Nansana Municipality

Hailstorm Hazard

Hail is a form of solid precipitation. It consists of balls or irregular lumps of ice, each of which is called a hailstone. Hailstones consist mostly of water ice and measure between 0.2 inches and 6 inches in diameter. Hail develops when rising air in a thunderstorm, known as the updraft, lifts water droplets high into the atmosphere where temperatures are below freezing. This causes the water droplets to turn into hailstones before falling down to earth.

The stronger the updraft, the larger the hailstones can become before succumbing to the pull of gravity and falling to the earth's surface. Depending on their intensity, hailstorms can destroy crops also cause temporary damage to WASH infrastructure (such as water points, and latrines). The entire municipality is moderately vulnerable to hailstorm hazard (**Figure 13**).
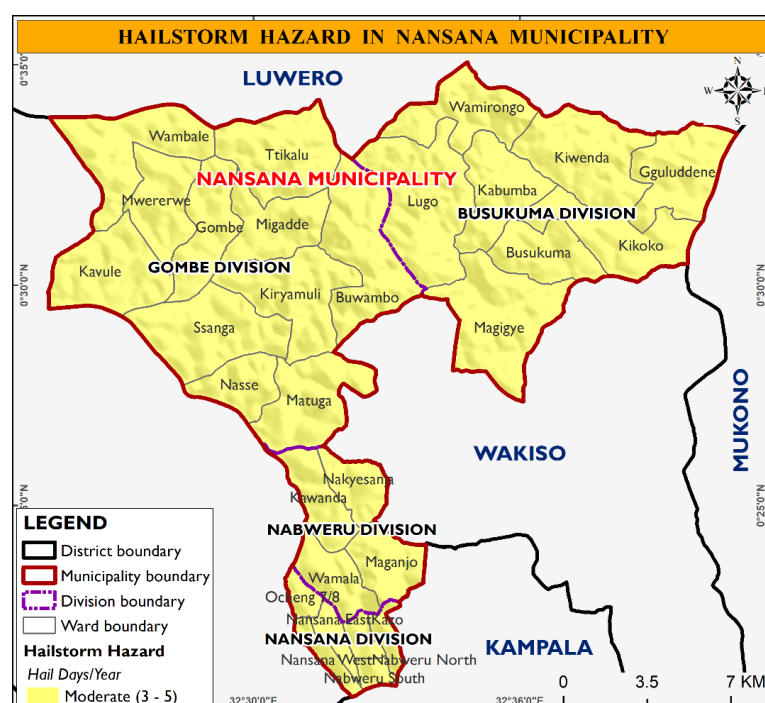
Figure 13: Hailstorm hazard zonation in Nansana Municipality
Data Source: *OPM, 2019*

Lightning Hazard

Lightning is the occurrence of a natural electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud (Agrawal & Nigam, 2014). The frequencies and severities of lightning incidences have increased, resulting in significant loss of life and property. Lightning happens under favourable conditions, where electrical discharges occur from a charge centre in a cloud either to: (i) the induced charge on the earth, (ii) the charge centres of another cloud, or (iii) a charge centre of the same cloud.

Thunder day data was used to profile lightning, and this was supplemented with Over-shooting Tops (OT) data acquired from NASA Meteosat Second Generation (MSG) 3km resolution Spin-Enhanced Visible Infrared Imager (SEVIRI). The lightning hazard zonation was generated with reference to flashes per square kilometre per year and classified as low, moderate, and high (**Table 6**).

Table 6: Lightning hazard intensity scale

Intensity Class	OT Counts/month	Flash density (strikes/yr/km^2)
High	10-15	50-75
Moderate	5-10	10-50
Low	2-5	< 10

The biggest part of Nansana Municipality (40.9%) is exposed to moderate lightning hazard. However, some areas in Wamirongo ward, Busukuma division are exposed to high lightning hazard (**Figure 14**).
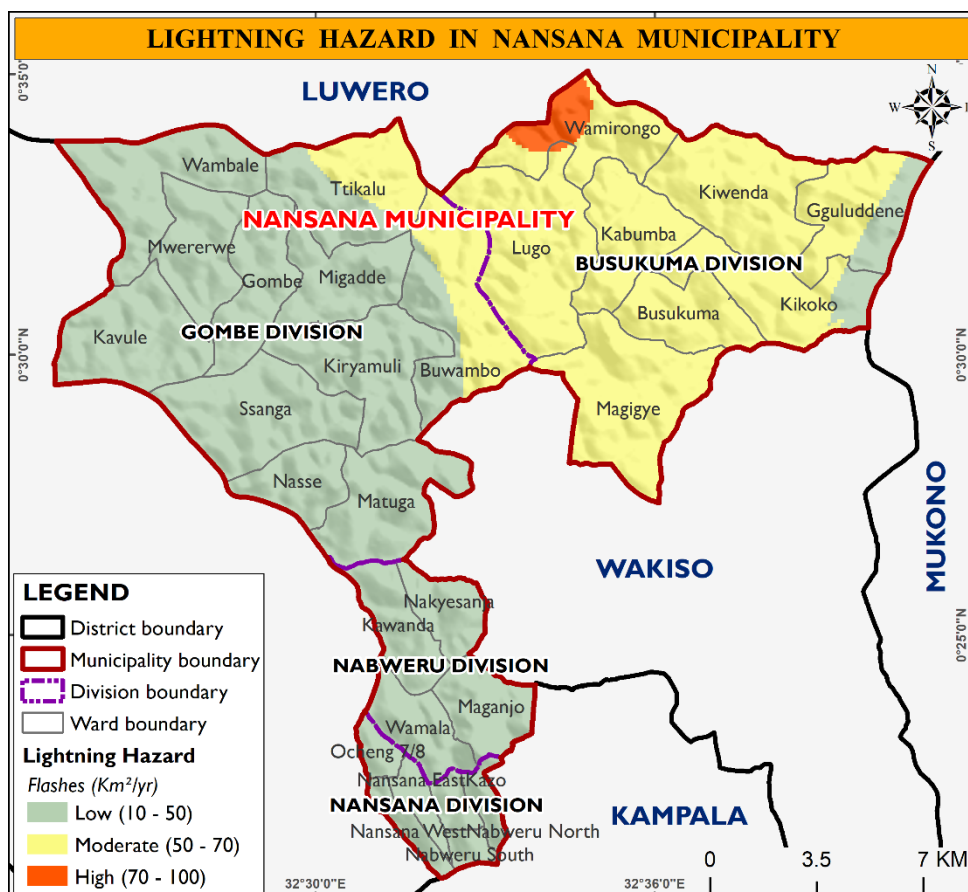
Figure 14: Lightning hazard zonation in Nansana Municipality

Windstorm Hazard

Wind is the perceptible natural movement of air. Wind is caused by differences in the atmospheric pressure. When a difference in atmospheric pressure exists, air moves from the higher to the lower pressure area, resulting in winds of various speeds. The impacts of windstorms in Nansana Municipality include air pollution, the spread of human diseases, uprooting of trees and considerable structural damage to buildings, power and telephone lines, communication masts and other urban infrastructure.

The assessment adopted the wind speed modelling approach by Morjani (2011) to develop the windstorm hazard of Nansana Municipality. Wind speed data for the municipality was obtained from the climate engine for the period 1994-2024. The spatial distribution of wind hazard intensity was done by conducting a kriging interpolation analysis and applying the Beaufort wind scale (**Table 7**).

Table 7: Beaufort wind hazard intensity scale

Beaufort scale	Description	Wind speed (m/s)	Conditions	Windstorm Hazard Class
6	Strong breeze	10.8-14.5	Large tree branches/crops in motion; whistling heard in electric/telegraph wires; difficulty using umbrellas	Very low
7	High wind, moderate gale	14.6-20.0	Whole trees in motion; difficulty when walking against the wind	Low
8	Gale	20.1-22.0	Twigs break off trees; generally, impedes progress	Moderate

Beaufort scale	Description	Wind speed (m/s)	Conditions	Windstorm Hazard Class
9	Strong/severe gale	22.1-28.0	Can cause slight structural damages	High
10	Storm, whole gale	> 28.1	Trees/crops uprooted; considerable structural damage, may be accompanied by widespread damage	Very high

The biggest part of the municipality (83%) is exposed to very low windstorm hazard, especially in Gombe and Busukuma divisions. Nansana division and some sections of Nabweru division are exposed to moderate windstorm hazard (**Figure 15**).
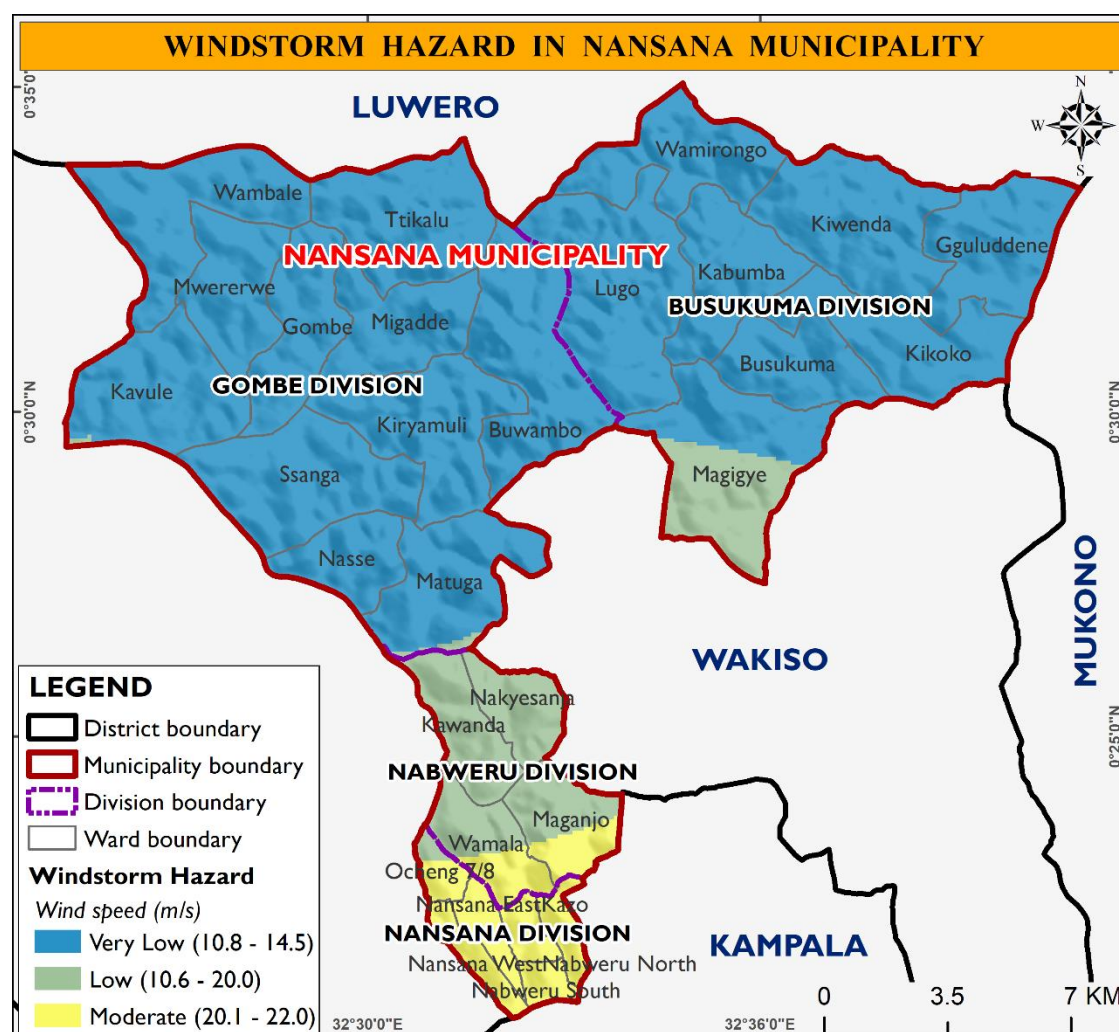
Figure 15: Windstorm hazard zonation in Nansana Municipality

2.2.4 Exposure Assessment

Exposure is defined as the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas (UNISDR, 2017). The criterion considered for exposure assessment of elements at risk was location in moderate, high, and very high hazard intensities (OPM, 2019). Exposure of the elements at risk was done based on the availability of spatial datasets. **Table 8** indicates the elements at risk and their sensitivity to the different climate hazards.

Table 8: Sensitivity of elements at risk to the different climate hazards

Sector and Element at Risk	Data Source	Drought	Floods	Hailstorms	Lightning	Windstorms
1. Agriculture						
1.1 Farmlands	Satellite Imagery, 2025	High	High	Moderate	Low	Moderate
2. Education						
2.1 Schools	MoES, 2018	Low	High	Low	Moderate	High
3. Energy						
3.1 Substations	UMEME, 2024	Low	High	Low	High	Low
3.2 Transformers	UMEME, 2024	Low	Moderate	Low	High	High
3.3 Distribution lines	UMEME, 2024	Low	Low	Low	High	High
4. Health						
4.1 Health facilities	MoH, 2024	Low	High	Low	Moderate	High
5. Land and Housing						
5.1 Buildings	OSM & Satellite Imagery, 2025	Low	High	Low	High	Moderate
6. Social development						
6.1 Human population	UBOS Census, 2014	High	High	High	High	High
7. Transportation						
7.1 Roads	UNRA, 2022	Low	High	Low	Low	Low
8. Water and Environment						
8.1 Wetlands	WMD, 2021	Moderate	High	Low	Low	Low
8.2 Forests	Satellite Imagery 2025 & NFA 2024	Moderate	High	Low	Low	Low
8.3 Water sources	MWE, 2024	High	High	Low	Low	Low

Exposure of the agriculture sector to climate hazards

a) The agriculture sector element exposed to climate hazards in Nansana Municipality is farmlands.

b) The assessment showed that 26.8 Km² (25.2%) of farmlands are exposed to drought hazard in Nansana Municipality. Gombe (43.3%) and Nabweru (21.3%) divisions have the biggest proportion of farmlands exposed to drought hazard (**Table 9**).

c) A total of 8.4 Km² (7.9%) of farmlands are exposed to flood hazard in Nansana Municipality. Nabweru (13.3%) and Nansana (12.2%) divisions have the biggest proportion of farmlands exposed to flood hazard (**Table 9**).

d) All the farmlands (100%) in Nansana Municipality are exposed to hailstorm hazard. Gombe (52.4 Km²) and Busukuma (43.9 Km²) divisions have the biggest acreage of farmlands exposed to hailstorms (**Table 9**).

e) In Nansana Municipality, 3.2 Km² (3%) of farmlands are exposed to windstorms whereas 103.4 Km² (97%) are not exposed to this hazard (**Table 9**). The exposed farmlands to windstorm hazard are located in Nabweru and Nansana divisions.

Table 9: Exposure of farmlands to drought, flood, hailstorm, and windstorm hazards in Nansana Municipality

Climate Hazards	Drought				Floods				Hailstorms		Windstorms			
Division	Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Exposed		Not Exposed	
	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%
Busukuma	2.4	5.4	41.3	94.6	3.8	8.8	40.0	91.2	43.9	100.0	0.0	0.0	43.7	100.0
Gombe	22.6	43.3	29.7	56.7	3.2	6.1	49.2	93.9	52.4	100.0	0.0	0.0	52.3	100.0
Nabweru	1.8	21.3	6.5	78.7	1.1	13.3	7.2	86.7	8.3	100.0	1.0	12.0	7.2	88.0
Nansana	0.1	3.2	2.3	96.8	0.3	12.2	2.1	87.8	2.4	100.0	2.2	93.5	0.1	6.5
Total	26.8	25.2	79.7	74.8	8.4	7.9	98.5	92.1	107.0	100.0	3.2	3.0	103.4	97.0

Figure 16 shows the exposure of farmlands to drought, flood, hailstorm, and windstorm hazards in Nansana Municipality.
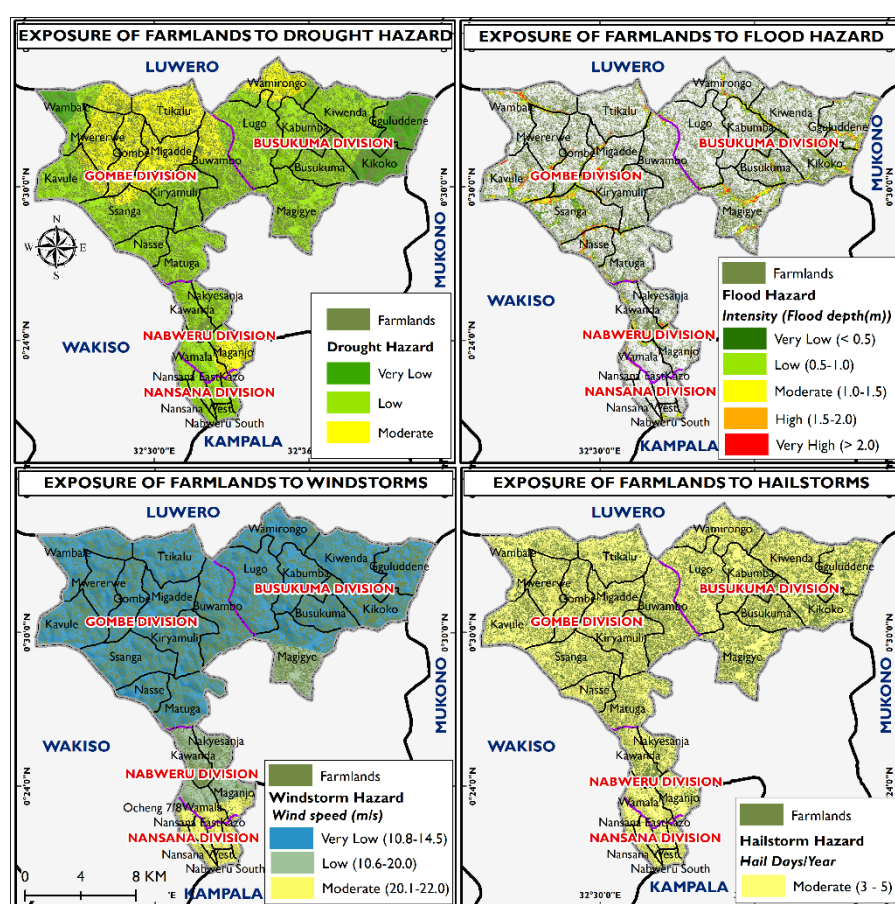
Figure 16: Exposure of farmlands to drought, flood, windstorm, and hailstorm hazards in Nansana Municipality

Exposure of the education sector to climate hazards

The education sector element exposed to climate hazards in Nansana Municipality is schools. The analysis showed that 9 schools (2.6%) in Nansana Municipality are exposed to floods whereas 337 schools (97.4%) are not exposed to floods (**Table 10**). Nansana division (4.6%) has the biggest percentage of schools exposed to floods. Schools such as Light Nyange Quality School and Alliance High School in Ochieng 7/8 ward as well as Standard Parents Namungoona P/S in Nansana West; are highly exposed to floods.

A total of 59 schools (17.2%) are exposed to lightning hazard in Nansana Municipality (**Table 10**). The schools exposed to lightning in Nansana Municipality are located in Busukuma (98%) and Gombe (13.9%) divisions.

In Nansana Municipality, 138 schools (40.2%) are exposed to windstorms whereas 205 schools (59.8%) are not exposed to this climate hazard (**Table 10**). The schools exposed to windstorms in Nansana Municipality are located in Nansana (96.3%) and Nabweru (31.8%) divisions.

Table 10: Exposure of schools to floods, lightning, and windstorms in Nansana Municipality

Climate Hazards	Floods				Lightning				Windstorms			
	Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Not Exposed	
Divisions	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Busukuma	0	0.0	49	100	48	98.0	1	2.0	0	0	49	100
Gombe	1	1.3	79	98.8	11	13.9	68	86.1	0	0	79	100
Nabweru	3	2.8	105	97.2	0	0.0	107	100.0	34	31.8	73	68.2
Nansana	5	4.6	104	95.4	0	0.0	108	100.0	104	96.3	4	3.7
Total	**9**	**2.6**	**337**	**97.4**	**59**	**17.2**	**284**	**82.8**	**138**	**40.2**	**205**	**59.8**

Figure 17 presents the schools exposed to floods, lightning and windstorms in Nansana Municipality.
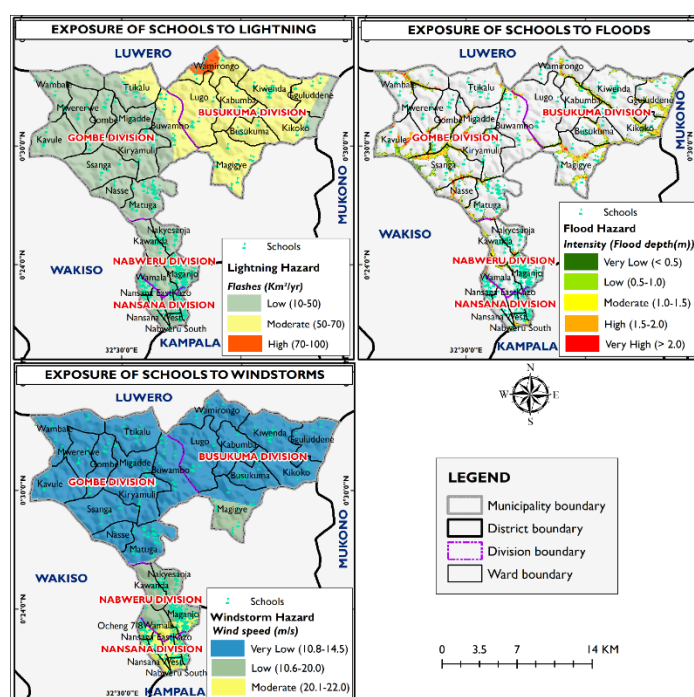
Figure 17: Exposure of schools to lightning, flood, and windstorm hazards in Nansana Municipality

Exposure of the energy sector to climate hazards

The energy sector elements exposed to climate hazards in Nansana Municipality include substations, transformers, distribution lines, and distribution poles.

Exposure of distribution substations to flood and lightning hazards: The assessment showed that 1 distribution substation of Kawanda (50%) is moderately exposed to floods whereas another distribution substation of Kawanda UETCL (50%) is not exposed to floods. Both distribution substations are found in Nakyesanja ward, Nabweru division, Nansana Municipality. Both substations are not exposed to lightning hazard. The exposure of distribution substations to floods and lightning is presented in **Figure 18**.
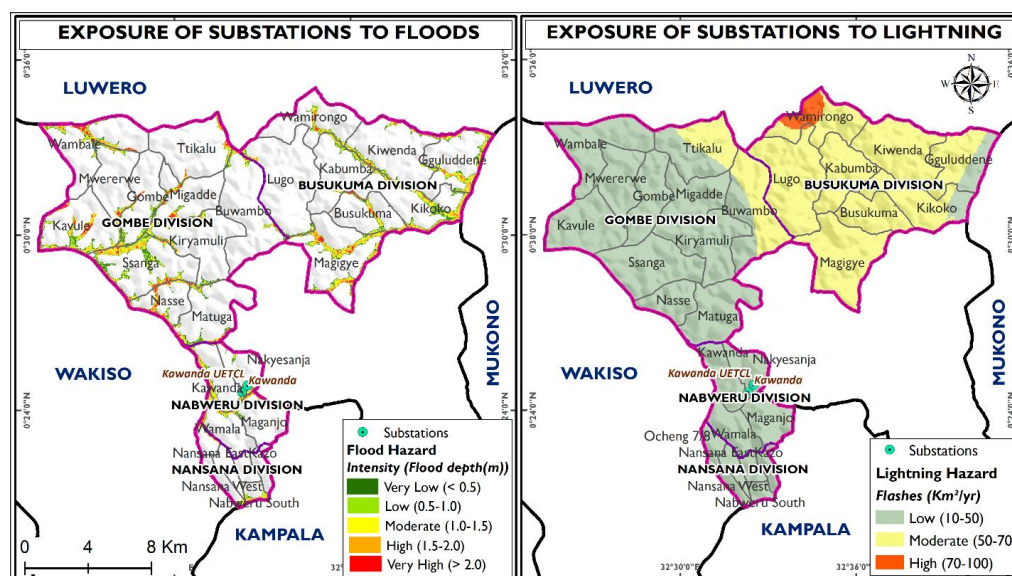
Figure 18: Exposure of distribution substations to floods and lightning in Nansana Municipality

Exposure of distribution transformers to lightning and windstorm hazards: The analysis showed that 56 distribution transformers (18.9%) are exposed to lightning hazard whereas 241 distribution transformers (81.1%) are not exposed to lightning hazard (**Table 11**). The exposed distribution transformers to lightning are located in Busukuma (92.3%) and Gombe (8.3%) divisions. A total of 88 distribution transformers (29.6%) are exposed to windstorm hazard while 209 distribution transformers (70.4%) are not exposed to this hazard (**Table 11**). Nansana (95.5%) and Nabweru (30.1%) divisions have the biggest proportion of distribution transformers exposed to windstorm hazard.

Table 11: Exposure of distribution transformers to lightning and windstorm hazards

Climate Hazards	Lightning				Windstorms			
	Exposed		Not Exposed		Exposed		Not Exposed	
Divisions	Number	%	Number	%	Number	%	Number	%
Busukuma	48	92.3	4	7.7	0	0.0	52	100
Gombe	8	8.3	88	91.7	0	0.0	96	100
Nabweru	0	0.0	83	100	25	30.1	58	69.9
Nansana	0	0.0	66	100	63	95.5	3	4.5
Total	56	18.9	241	81.1	88	29.6	209	70.4
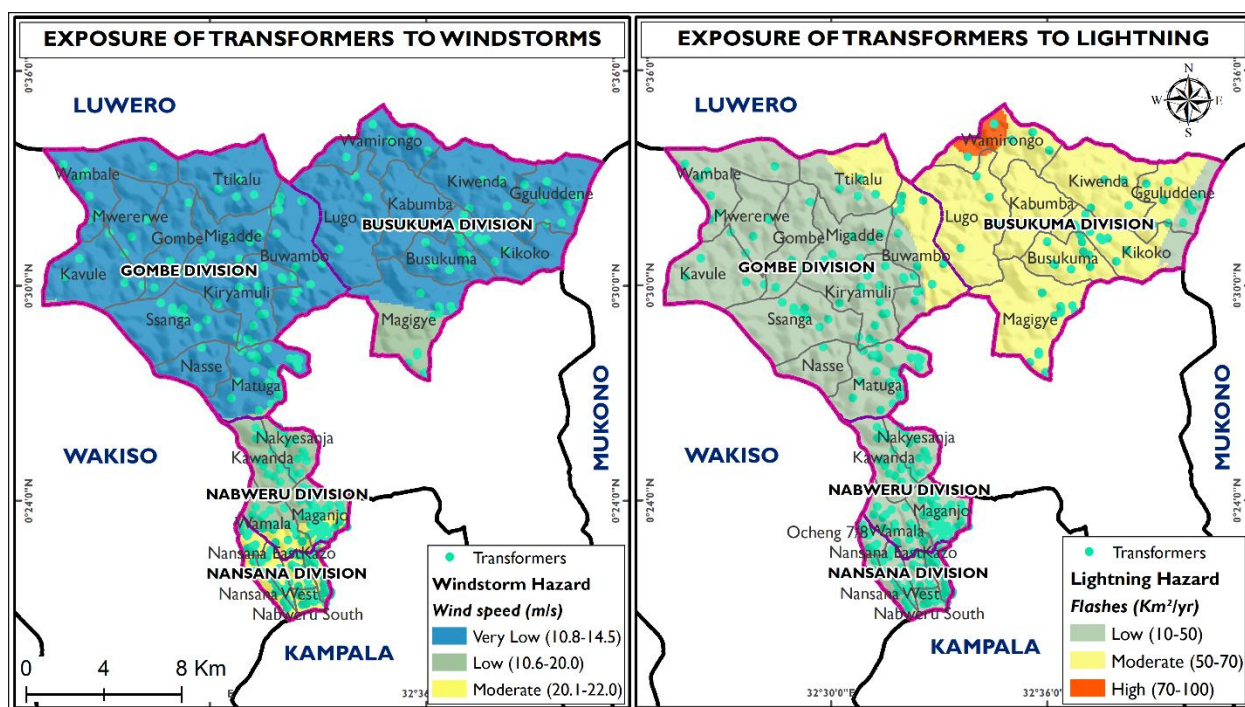
Figure 19: Exposure of distribution transformers to windstorm and lightning hazards in Nansana Municipality

Exposure of distribution lines to lightning and windstorm hazards: The assessment showed that 62.7 kilometers (22.4%) of distribution lines in Nansana Municipality are exposed to lightning hazard (**Table 12**). The exposed distribution lines to lightning hazard in Nansana Municipality are found in Busukuma (94.2%) and Gombe (9%) divisions.

A total of 30 kilometers (10.7%) of distribution lines are exposed to windstorms whereas 250.2 kilometers (89.3%) of distribution lines are not exposed to distribution lines (**Table 12**). Nabweru (17.2%) and Nansana (93.9%) divisions have the biggest proportion of distribution lines exposed to windstorm hazard.

Table 12: Exposure of distribution lines to lightning and windstorm hazards

Climate Hazards	Lightning				Windstorms			
Divisions	Exposed		Not Exposed		Exposed		Not Exposed	
	Length (Km)	%	Length (Km)	%	Length (Km)	%	Length (Km)	%
Busukuma	48.9	94.2	3.0	5.8	0.0	0.0	51.9	100
Gombe	13.8	9.0	139.0	91.0	0.0	0.0	152.8	100
Nabweru	0.0	0.0	53.2	100	9.2	17.2	44.0	82.8
Nansana	0.0	0.0	22.2	100	20.8	93.9	1.4	6.1
Total	62.7	22.4	217.5	77.6	30.0	10.7	250.2	89.3
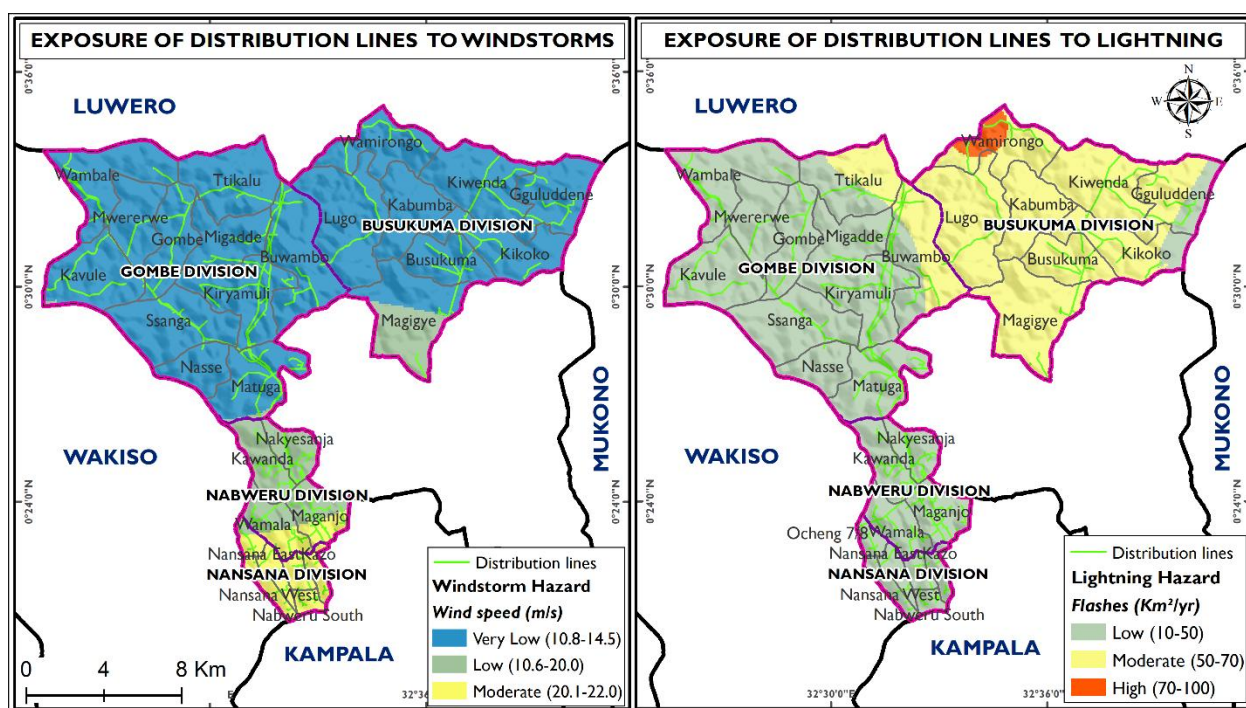
Figure 20: Exposure of distribution lines to windstorm and lightning hazards in Nansana Municipality

Exposure of the health sector to climate hazards

The health sector element exposed to climate hazards in Nansana Municipality is health facilities. All the health facilities (100%) in Nansana Municipality are not exposed to flood hazard (**Table 13**).

The assessment showed that 11 health facilities (11%) in Nansana Municipality are exposed to lightning whereas 89 health facilities (89%) are not exposed to this hazard (**Table 13**). The exposed health facilities to lightning are found in Busukuma (90%) and Gombe (10.5%) divisions.

A total of 51 health facilities (51%) are exposed to windstorms in Nansana Municipality while 49 health facilities (49%) are not exposed to this hazard (**Table 13**). The health facilities exposed to windstorms are located in Nansana (95%) and Nabweru (41.9%) divisions.

Table 13: Exposure of health facilities to floods, lightning, and windstorms in Nansana Municipality

Climate Hazards	Floods				Lightning				Windstorms			
	Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Not Exposed	
Divisions	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Busukuma	0	0	10	100	9	90	1	10	0	0	10	100
Gombe	0	0	19	100	2	10.5	17	89.5	0	0	19	100
Nabweru	0	0	31	100	0	0	31	100	13	41.9	18	58.1
Nansana	0	0	42	100	0	0	40	100	38	95	2	5
Total	0	0	102	100	11	11	89	89	51	51	49	49
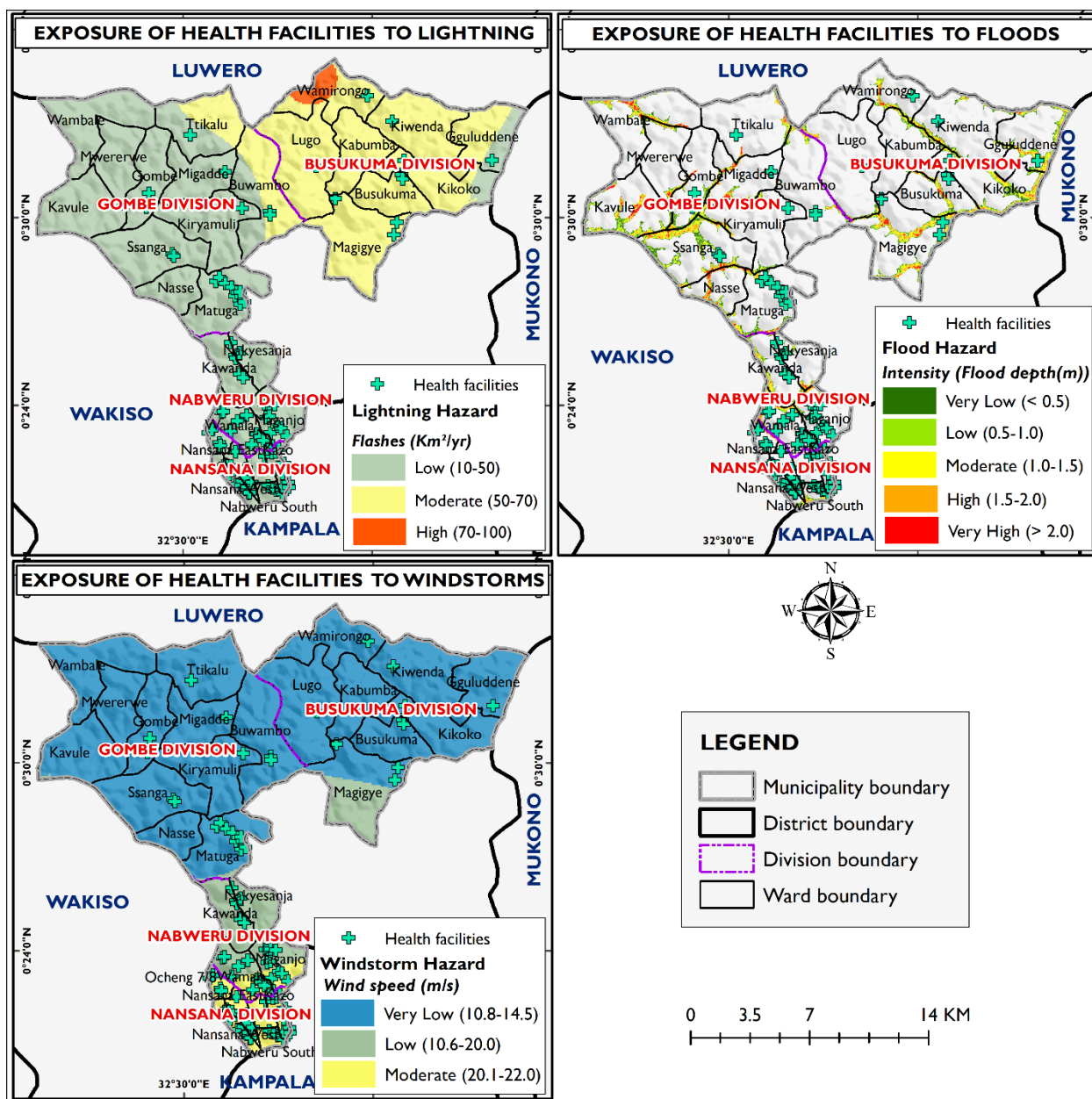
Figure 21: Exposure of health facilities to lightning, flood, and windstorm hazards in Nansana Municipality

Exposure of the land and housing sector to climate hazards

The land and housing sector element exposed to climate hazards in Nansana Municipality is buildings (both commercial and residential). The analysis showed that 7,566 buildings (4.9%) are exposed to floods whereas 147,906 buildings (95.1%) are not exposed to flood hazard (**Table 14**). Nabweru (6.9%) and Busukuma (6.1%) divisions have the biggest proportion of buildings exposed to floods.

A total of 32,731 buildings (22%) are exposed to lightning hazard while 116,272 buildings (78%) are not exposed to this hazard (**Table 14**). The buildings exposed to lightning are found in Busukuma (95.3%) and Gombe (14.2%) divisions. In Nansana Municipality, 53,059 buildings (35.6%) are exposed to windstorm hazard whereas 95,921 buildings (64.4%) are not exposed to this hazard (**Table 14**). The buildings exposed to windstorms in Nansana Municipality are found in Nansana (96.2%) and Nabweru (21.9%) divisions.

Table 14: Exposure of buildings to floods, lightning, and windstorms in Nansana Municipality

Climate Hazards	Floods				Lightning				Windstorms			
	Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Not Exposed	
Divisions	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Busukuma	1,803	6.1	27,757	93.9	26,676	95.3	1,328	4.74	0	0	27,958	100
Gombe	1,601	3.6	42,599	96.4	6,055	14.2	36,592	85.8	0	0	42,572	100
Nabweru	2,215	6.9	29,661	93.1	0	0	30,119	100	6,619	21.9	23,553	78.1
Nansana	1,947	3.9	47,889	96.1	0	0	48,233	100	46,440	96.2	1,838	3.81
Total	7,566	4.9	147,906	95.1	32,731	22	116,272	78	53,059	35.6	95,921	64.4

The exposure of buildings to floods, lightning, and windstorms in Nansana Municipality is presented in **Figure 22**.
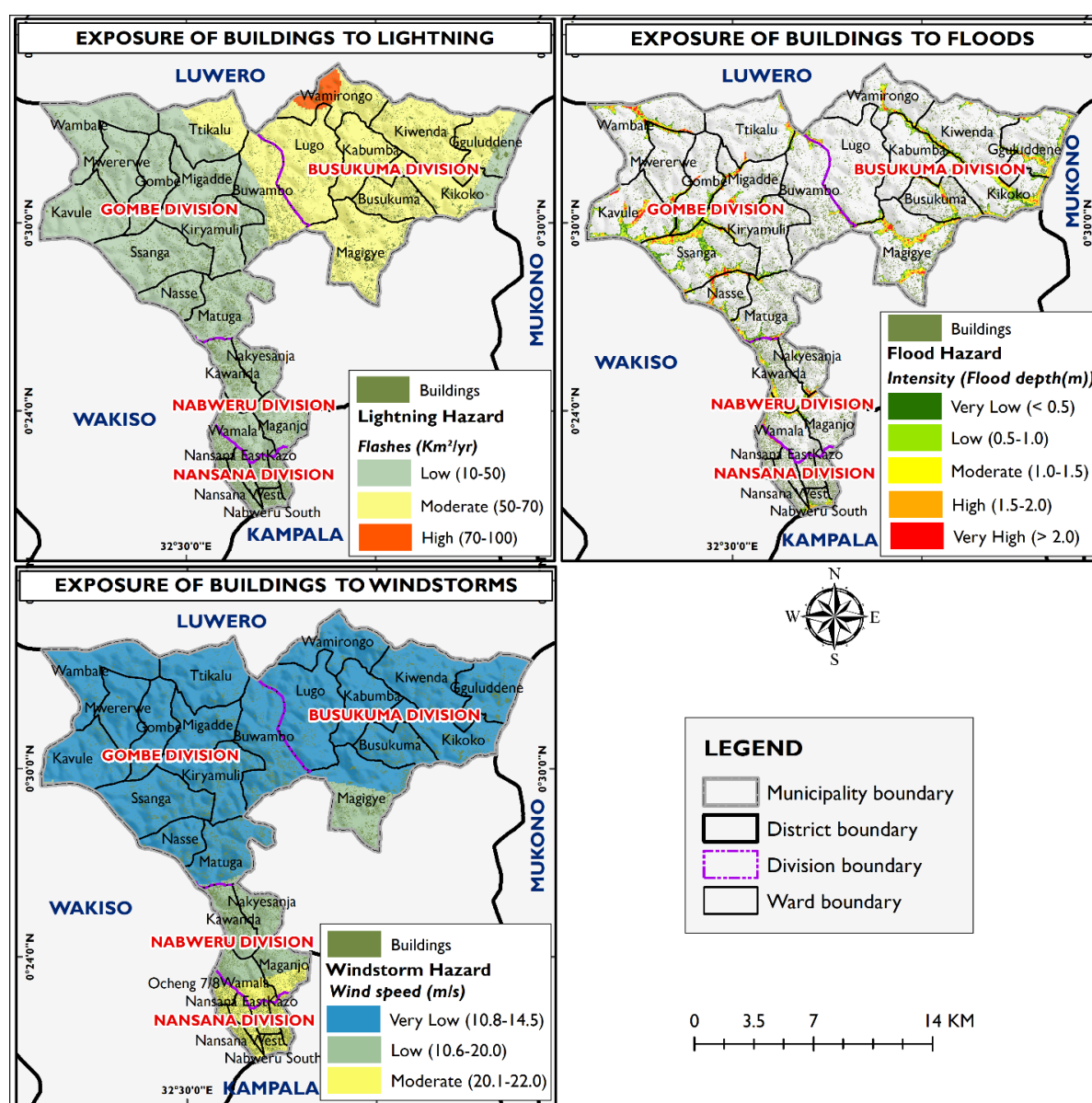
Figure 22: Exposure of buildings to lightning, flood, and windstorm hazards in Nansana Municipality

Exposure of the social development sector to climate hazards

The social development sector element exposed to climate hazards in Nansana Municipality is human population.

The assessment showed that 73,200 people (22%) are exposed to drought hazard in Nansana Municipality whereas 260,059 people (78%) are not exposed to drought hazard (**Table 15**). The biggest proportion of human population exposed to drought hazard is located in Nabweru (56.25%) and Gombe (30.2%) divisions. The wards highly exposed to drought include Maganjo, Ttikalu, Gombe, Migadde, Mwererwe, and Wamirongo (**Figure 23**).

A total of 23,944 people (7.2%) is exposed to floods whereas 309,315 people (92.8%) are not exposed to floods (**Table 15**). Busukuma (9.2%) and Nabweru (9.3%) divisions have the biggest percentage of human population exposed to floods. The wards with the biggest proportion of human population exposed to floods include Nabweru South, Nasse, Magigye, and Kikoko (**Figure 23**).

In Nansana Municipality, 43,988 people (13.2%) are exposed to lightning hazard whereas 289,271 people (86.8%) are not exposed to lightning (**Table 15**). The people exposed to lightning hazard are located in Busukuma (94.7%) and Gombe (10.2%) divisions. The wards with people that are highly exposed to lightning include Magigye, Busukuma, Kikoko, Kiwenda, Kabumba, Lugo, and Wamirongo (**Figure 23**).

The analysis showed that 156,969 people (47.1%) in Nansana Municipality are exposed to windstorm hazard whilst 176,290 people (52.9%) are not exposed to windstorms (**Table 15**). The human population exposed to windstorms is found in Nansana (96.4%) and Nabweru (25.4%) divisions. The wards with the biggest proportion of human population exposed to windstorms include Kazo, Nabweru North, Nabweru South, Nansana East, and Nansana West (**Figure 23**).

Table 15: Human population exposed to drought, floods, lightning, and windstorms in Nansana Municipality

Climate Hazards	Drought				Floods				Lightning				Windstorms			
Divisions	Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Not Exposed		Exposed		Not Exposed	
	Popln	%	Popln	%	Popln	%	Popln	%	Popln	%	Popln	%	Popln	%	Popln	%
Busukuma	2,572	6.8	35,158	93.2	3,489	9.2	34,241	90.8	35,712	94.7	2,018	5.3	0	0	37,730	100
Gombe	24,552	30.2	56,758	69.8	5,526	6.8	75,784	93.2	8,275	10.2	73,035	89.8	0	0	81,310	100
Nabweru	39,209	56.2	30,520	43.8	6,489	9.3	63,240	90.7	0	0.0	69,729	100	17,718	25.4	52,011	74.6
Nansana	6,866	4.8	137,624	95.2	8,440	5.8	136,050	94.2	0	0.0	144,490	100	139,251	96.4	5,239	3.6
Total	73,200	22.0	260,059	78.0	23,944	7.2	309,315	92.8	43,988	13.2	289,271	86.8	156,969	47.1	176,290	52.9
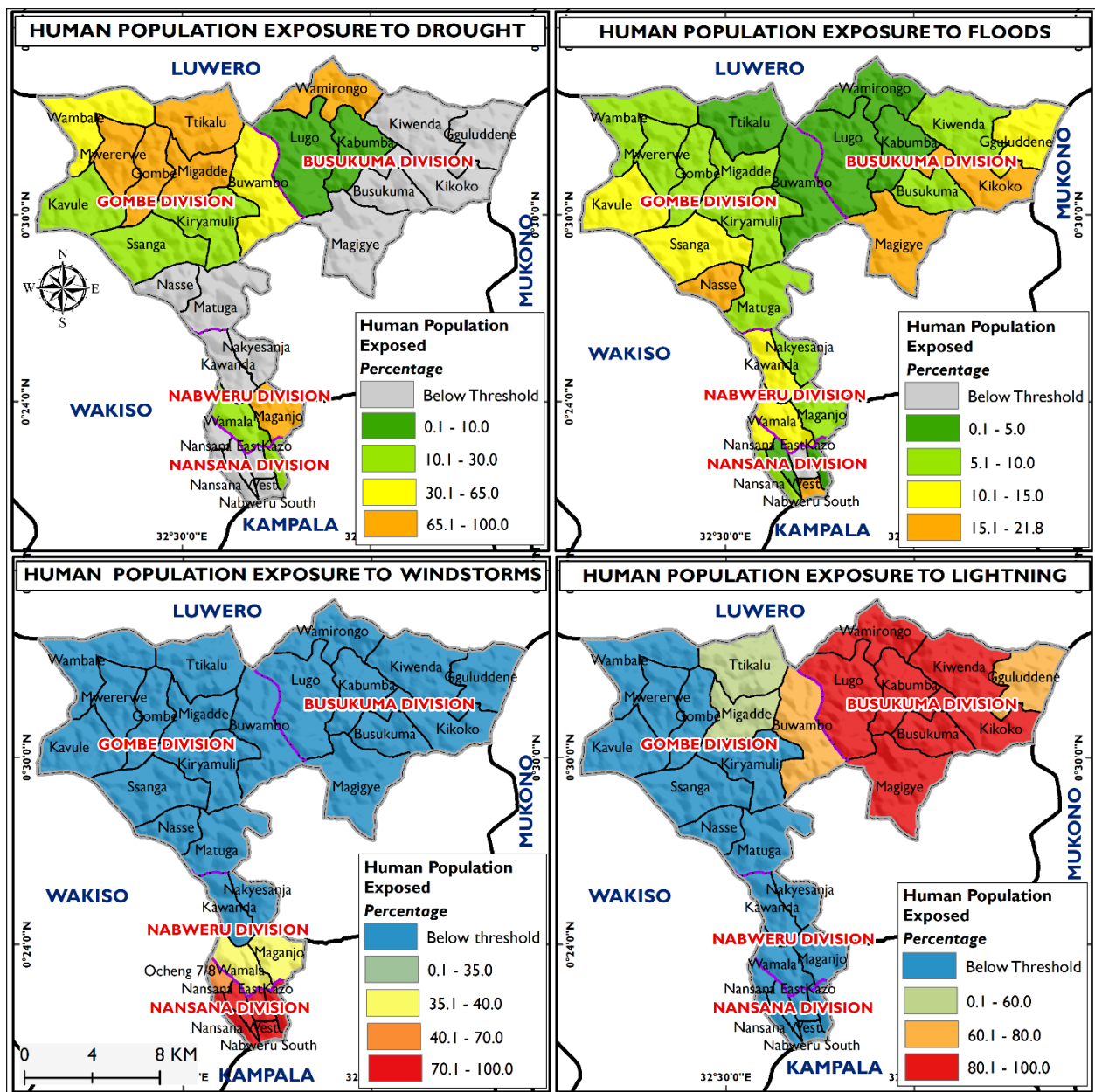
Figure 23: Human population exposure to drought, floods, lightning, and windstorms in Nansana Municipality

All the people (100%) in Nansana Municipality are exposed to hailstorm hazard. The wards with the biggest population exposed to hailstorms include Maganjo, Kazo, Matugga, Nansana East, Nansana West, Nabweru North, Nabweru South, and Ochieng (**Figure 24**).
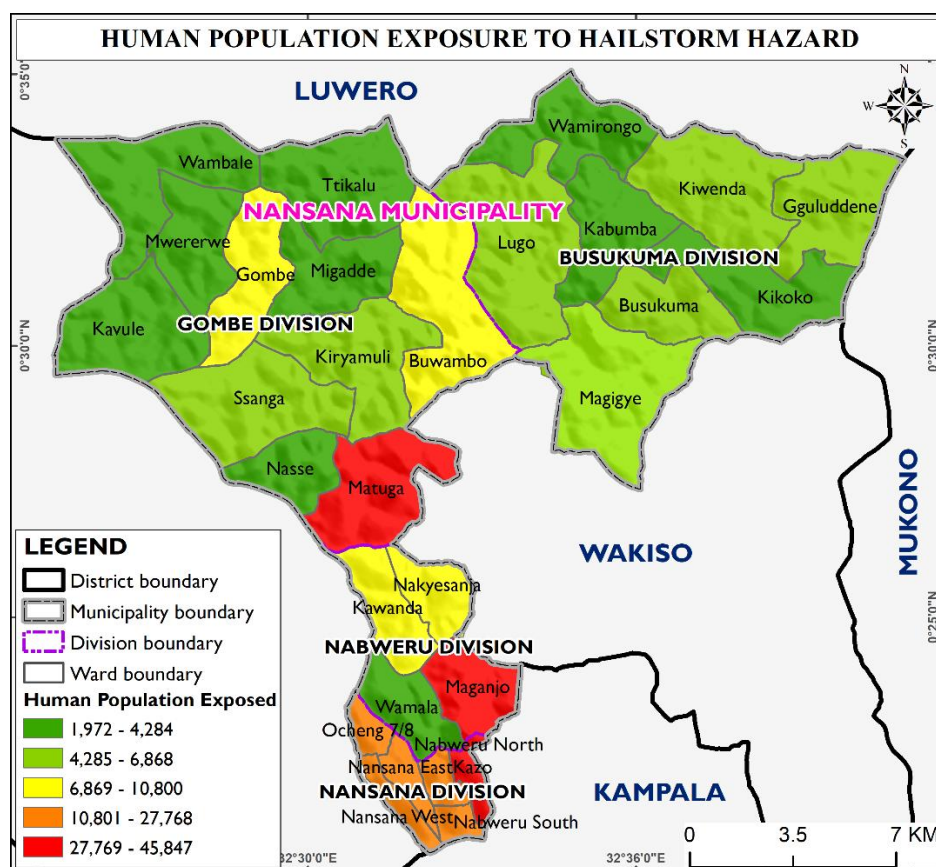
Figure 24: Human population exposed to hailstorm hazard in Nansana Municipality

Exposure of the transportation sector to floods

The transportation sector element exposed to floods in Nansana Municipality is roads.

The assessment showed that 14.4 kilometers (3%) of roads in Nansana Municipality are exposed to floods whereas 461.5 kilometers (97%) of roads are not exposed to this hazard (**Table 16**). Nabweru (3.9%) and Busukuma (3.0%) divisions have the biggest proportion of roads exposed to floods in Nansana Municipality.

Some of the road sections that are highly exposed to floods include Bukemba-Nabutiiti road in Magigye ward; Kabumba-Busukuma road in Busukuma ward; Kakoligo road in Matugga and Kawanda wards; Kasana-Guludene-Balita road in Kiwenda and Gguluddene wards; Kiryagonja-Nasse-Ssanga Road in Nasse and Ssanga wards; Serunjogi road in Wamala ward; Wabitembe road in Nakyesanja ward; and Nakiduduma-Mabanda road in Matugga ward among others.

Table 16: Exposure of roads to floods in Nansana Municipality

Division	Exposed		Not Exposed		Total	
	Length (Km)	%	Length (Km)	%	Length (Km)	%
Busukuma	3.0	3.0	96.6	97.0	99.6	20.9
Gombe	7.8	2.9	257.4	97.1	265.2	55.7
Nabweru	2.6	3.9	62.9	96.1	65.4	13.7
Nansana	1.0	2.3	44.6	97.7	45.7	9.6
Total	**14.4**	**3.0**	**461.5**	**97.0**	**475.9**	**100**

EXPOSURE OF ROADS TO FLOODS IN NANSANA MUNICIPALITY
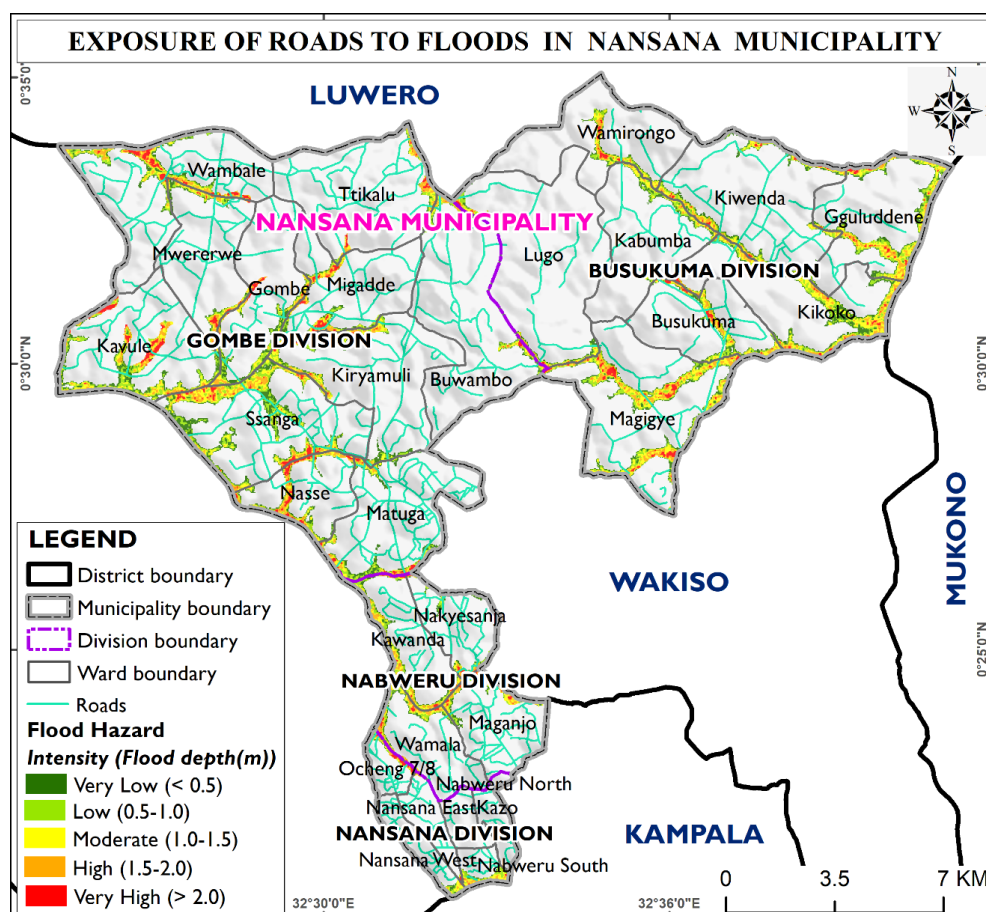
Figure 25: Exposure of roads to flood hazard in Nansana Municipality

2.2.5 Exposure of the water and environment sector to climate hazards

The water and environment sector elements exposed to climate hazards in Nansana Municipality include forests, wetlands, and water sources.

Exposure of forests to drought and flood hazards: The assessment showed that 2.8 sq.km (27.3%) of forests are exposed to drought whereas 7.4 sq.km (72.7%) of forests are not exposed to drought hazard (**Table 17**). The biggest percentage of forests exposed to drought hazard in Nansana Municipality is located in Gombe (52.1%) and Busukuma (9.8%) divisions.

A total of 0.7 sq.km (7.1%) of forests are exposed to floods while 9.5 sq.km (92.9%) of forests are not exposed to flood hazard (**Table 17**). The biggest proportion of forests exposed to floods is located in Nabweru (32.5%) and Gombe (9.1%) divisions.

Table 17: Exposure of forests to drought and floods in Nansana Municipality

Climate Hazards	Drought				Floods			
Division	Exposed		Not Exposed		Exposed		Not Exposed	
	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%
Busukuma	0.6	9.8	5.4	90.2	0.3	5.5	5.6	94.5
Gombe	2.2	52.1	2.0	47.9	0.4	9.1	3.9	90.9
Nabweru	0.0004	1.4	0.03	98.6	0.01	32.5	0.02	67.5
Nansana	0.0	0.0	0.0001	100	0.0	0.0	0.0001	100
Total	2.8	27.3	7.4	72.7	0.7	7.1	9.5	92.9
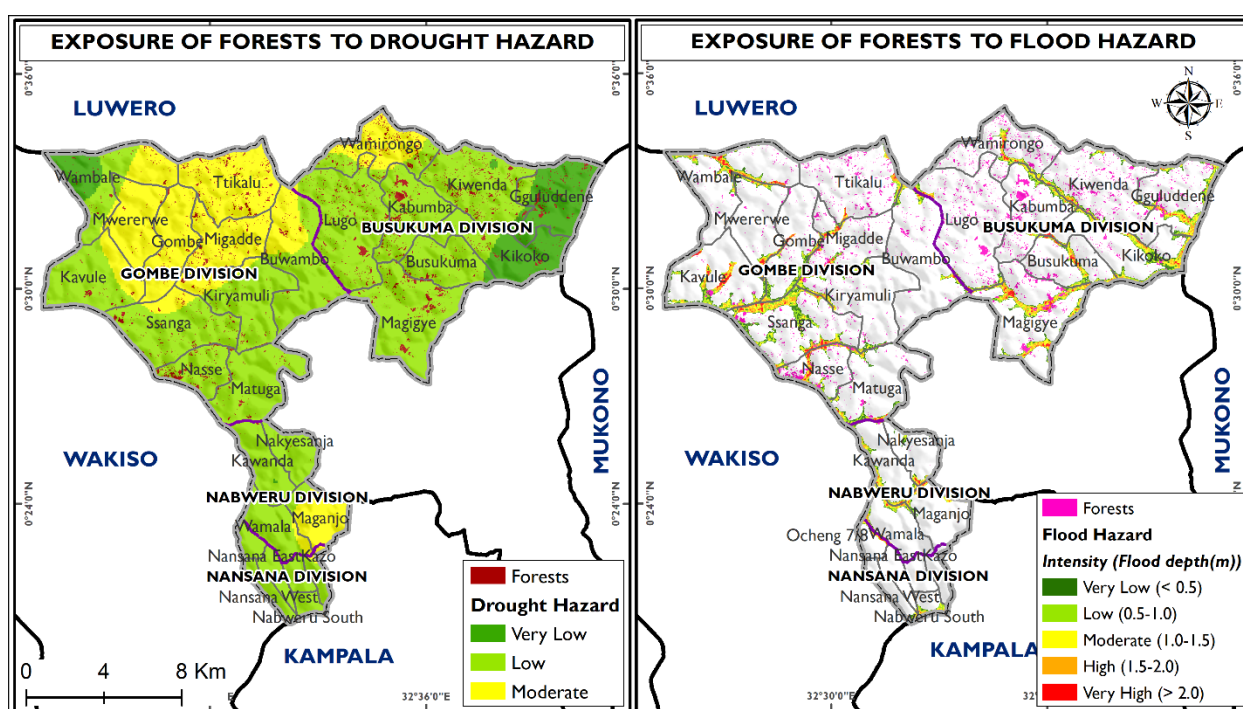
Figure 26: Exposure of forests to drought and flood hazards in Nansana Municipality

Exposure of wetlands to drought and flood hazards: The analysis showed that 15.5 sq.km (25.8%) of wetlands are exposed to drought whereas 44.7 sq.km (74.2%) of wetlands are not exposed to drought hazard (**Table 18**). The biggest percentage of wetlands exposed to drought hazard in Nansana Municipality is located in Gombe (44.9%) and Nabweru (21.6%) divisions.

A total of 18.7 sq.km (30.6%) of wetlands are exposed to floods while 42.5 sq.km (69.4%) of wetlands are not exposed to flood hazard (**Table 18**). The biggest proportion of wetlands exposed to floods is located in Busukuma (34.0%) and Nabweru (35.4%) divisions.

Table 18: Exposure of wetlands to drought and floods in Nansana Municipality

Climate Hazards	Drought				Floods			
Division	Exposed		Not Exposed		Exposed		Not Exposed	
	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%	Area (Km²)	%
Busukuma	1.5	6.3	22.8	93.7	8.4	34.0	16.3	66.0
Gombe	12.7	44.9	15.7	55.1	7.8	27.1	21.0	72.9
Nabweru	1.2	21.6	4.5	78.4	2.1	35.4	3.8	64.6
Nansana	0.0	0.0	1.8	100.0	0.5	24.3	1.4	75.7
Total	15.5	25.8	44.7	74.2	18.7	30.6	42.5	69.4
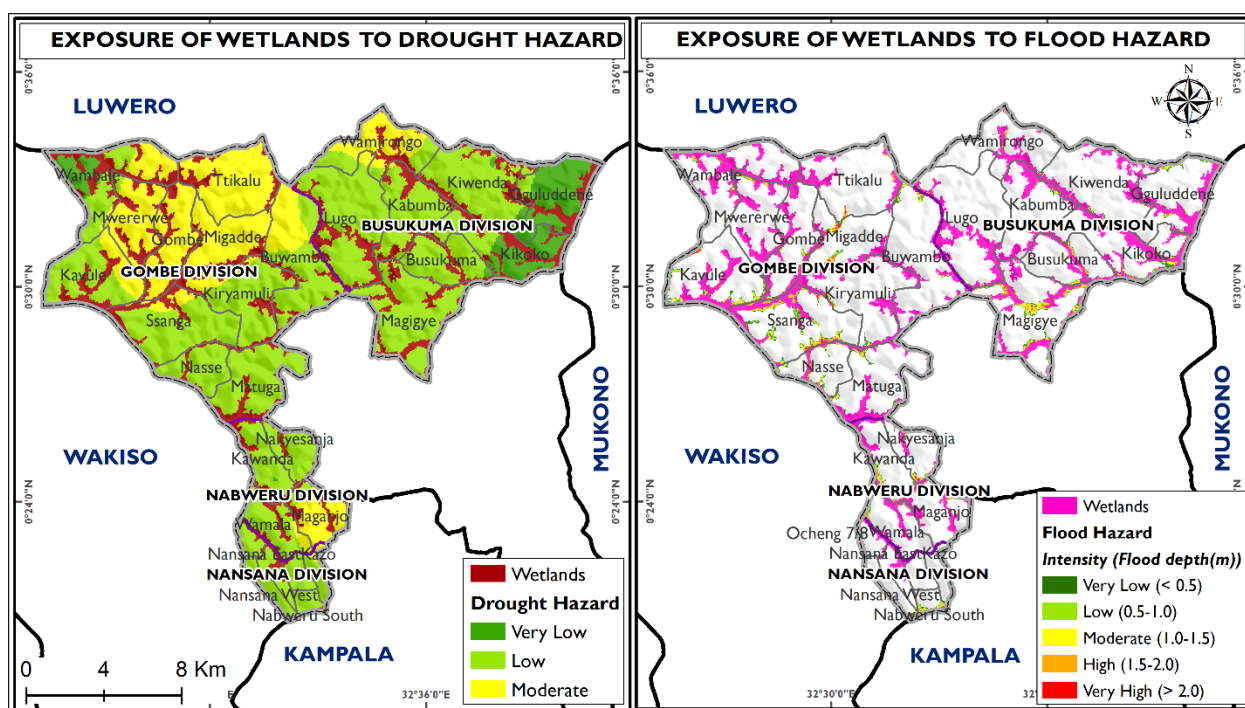
Figure 27: Exposure of wetlands to drought and flood hazards in Nansana Municipality

Exposure of water sources to drought and flood hazards: The assessment showed that 253 water sources (37.2%) are exposed to drought hazard in Nansana Municipality (**Table 19**). Nabweru (59.8%) and Gombe (40.1%) divisions have the biggest proportion of water sources exposed to drought hazard.

A total of 20 water sources (2.9%) are exposed to floods whereas 663 water sources (97.1%) are not exposed to flood hazard (**Table 19**). The biggest percentage of water sources exposed to floods in Nansana Municipality is located in Gombe (5.3%) and Nabweru (2.1%) divisions.

Table 19: Exposure of water sources to drought and floods in Nansana Municipality

Climate Hazard	Drought				Floods			
Divisions	Exposed		Not Exposed		Exposed		Not Exposed	
	Number	%	Number	%	Number	%	Number	%
Busukuma	10	5.2	182	94.8	2	1.0	192	99.0
Gombe	99	40.1	148	59.9	13	5.3	234	94.7
Nabweru	143	59.8	96	40.2	5	2.1	234	97.9
Nansana	1	33.3	2	66.7	0	0.0	3	100
Total	253	37.2	428	62.8	20	2.9	663	97.1

In terms of exposure by water source type; dam (100%), yard taps for public use (53.9%), rainwater harvest tanks (35.3%), shallow wells (31.8%), and protected springs (26.7%) have the biggest percentages exposed to drought hazard in Nansana Municipality (**Table 20**). On the other hand, protected springs (8.2%), and shallow wells (4.9%) have the biggest proportional exposure to floods in Nansana Municipality (**Table 20**).

Table 20: Exposure of the different types of water sources to drought and floods in Nansana Municipality

Climate Hazard	Drought				Floods			
Types of water sources	Exposed		Not Exposed		Exposed		Not Exposed	
	Number	%	Number	%	Number	%	Number	%
Dam	1	100.0	0	0.0	0	0.0	1	100
Deep borehole	15	24.2	47	75.8	1	1.6	61	98.4
Protected spring	16	26.7	44	73.3	5	8.2	56	91.8
Public Stand Post	0	0.0	2	100.0	0	0.0	2	100
Rainwater Harvest Tank	47	35.3	86	64.7	2	1.5	131	98.5
Shallow well	78	31.8	167	68.2	12	4.9	234	95.1
Yard tap for public use	96	53.9	82	46.1	0	0.0	178	100
Total	253	37.2	428	62.8	20	2.9	663	97.1
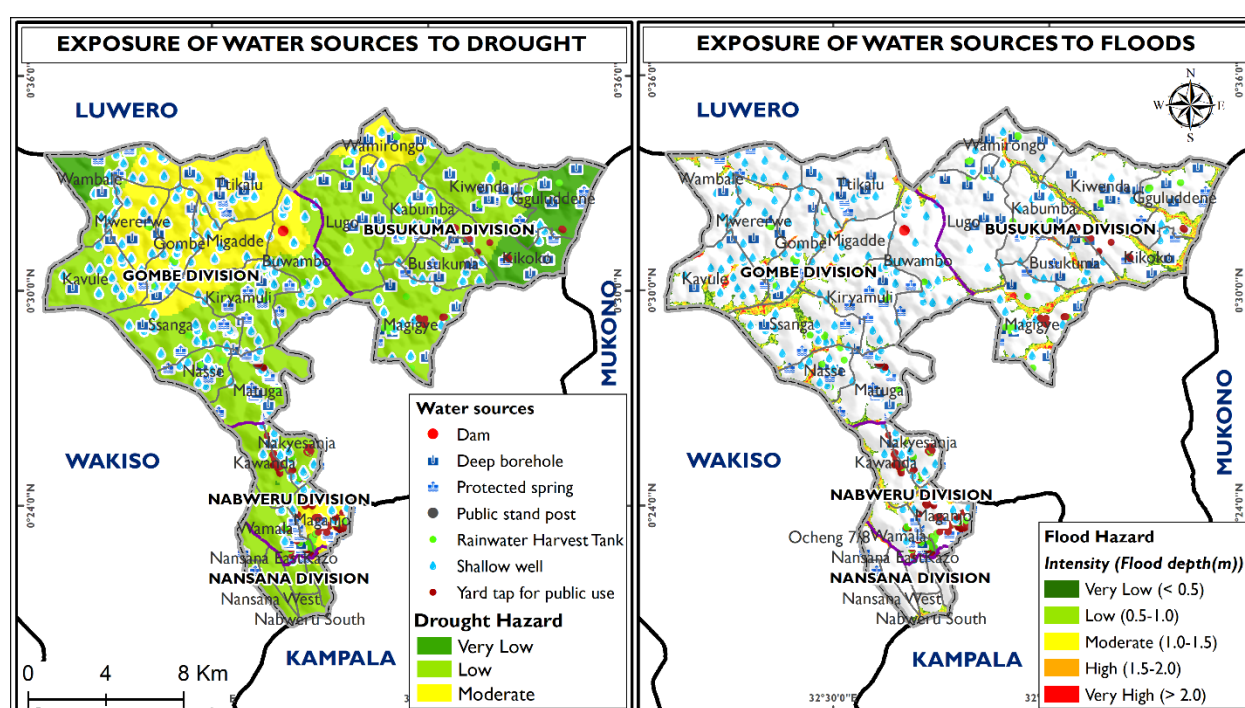
Figure 28: Exposure of water sources to drought and floods in Nansana Municipality

2.2.6 Vulnerability Assessment

Vulnerability to climate change refers to the degree to which a system, community, or individual is susceptible to, and unable to cope with, the adverse impacts of climate change, including climate variability and extremes (IPCC, 2014). Vulnerability is shaped by physical, social, economic, and political factors that affect how prepared and resilient individuals or communities are to climate-related hazards. Vulnerability is a function of exposure, the sensitivity of a household or livelihood to the stress associated with that exposure, and the adaptive capacity to recover from the impacts of that exposure.

*Vulnerability = (Exposure * Sensitivity) – Adaptive Capacity*

Exposure of communities to multi-hazards

Exposure refers to the extent to which a system is exposed to climate change-related hazards. Nansana Municipality is mostly exposed to drought, floods, hailstorms, lightning, and windstorms. These hazards were ranked, weighed and normalized to produce the exposure index. The assessment showed that the wards that have a high level of exposure (more than 80 percent) to drought, floods, hailstorms, lightning, and windstorms in Nansana Municipality include Magigye, Wamirongo, Ttikalu, Maganjo, Wamala, Nansana West, Nabweru South, Migadde, and Busukuma (**Figure 29**).
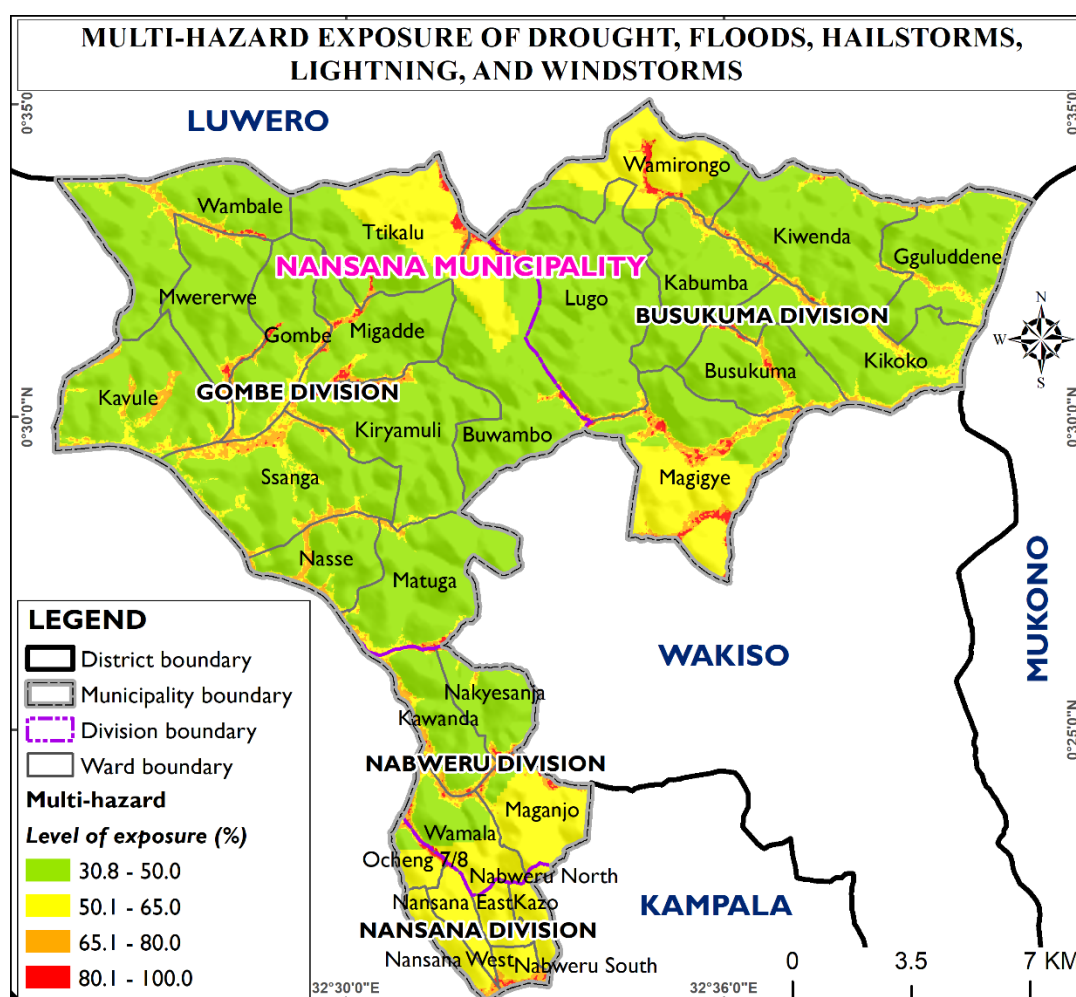
Figure 29: Multi-hazard exposure of communities to drought, floods, hailstorms, lightning, and windstorms in Nansana Municipality

Sensitivity of communities to multi-hazards

Sensitivity describes the socio-economic or demographic characteristics that can make people susceptible to the negative effects of exposure (Declet-Barreto et al., 2020). The sensitivity indicators that were assessed at ward level are presented in **Table 21**. These indicators were ranked, weighed and normalized to produce the sensitivity index.

Table 21: Sensitivity indicators to multi-hazards in Nansana Municipality

No	Sensitivity indicators	Description	Data source	Hotspot wards
1.	Access to health services	Access to health services reflects a community's ability to prevent, respond to, and recover from climate-related health impacts such as heat stress, disease outbreaks, and injuries from extreme weather.	Key Informant Interviews, 2025	Kabumba, Kikoko, Wamirongo, Mwererwe, Ssanga, and Wambale
2.	Community awareness and preparedness	Community awareness and preparedness reflect how well individuals and groups understand climate risks and their capacity to take timely action.	Key Informant Interviews, 2025	Moderate in the entire municipality
3.	Degradation of rivers	Degradation of rivers signifies the reduced ability of freshwater ecosystems to absorb and adapt to climate impacts, thereby increasing the vulnerability of communities that rely on these rivers for water, food, and livelihoods.	Key Informant Interviews, 2025	Magigye, Ssanga, Maganjo, Kiwenda, and Lugo
4.	Dependency on climate-sensitive sectors e.g., agriculture	Dependency on climate-sensitive sectors highlights how heavily communities rely on industries like agriculture, fisheries, and tourism, which are directly affected by climate variability, making them more vulnerable to disruptions caused by extreme weather events, changing temperatures, and shifting ecosystems.	Key Informant Interviews, 2025	Magigye, Ssanga, Lugo, Wamirongo, Wambale, Mwererwe, Kavule, Kiryamuli, Gombe, and Ttikalu
5.	Dependence on surface water	Dependency on surface water reveals how reliant communities are on rivers, wetlands, and reservoirs that are highly vulnerable to changing climate, increasing their risk of water scarcity and reduced water quality under climate stress.	Key Informant Interviews, 2025	Wamirongo, Kikoko, and Ocheng 7/8
6.	Drainage systems	The design and capacity of drainage systems determine how well a community can manage increased rainfall, flooding, and storm surges, with inadequate or poorly maintained systems heightening vulnerability to climate-induced water-related hazards.	Key Informant Interviews, 2025	Kiwenda, Busukuma, Ocheng 7/8, Lugo, Kabumba, Nansana East, Nansana West, and Maganjo
7.	Housing quality	Housing quality reflects how well homes can protect occupants from climate-related hazards like floods, with poor-quality housing increasing the risk of damage, displacement, and health impacts during climate shocks.	Key Informant Interviews, 2025	Ocheng 7/8, Wamirongo, Kikoko, Nabweru North, and Nabweru South
8.	Income levels	Income levels influence a community's ability to prepare for, respond to, and recover from climate impacts, with	UBOS, 2021	Wamirongo, Kabumba, Gguluddene, Wambale,

No	Sensitivity indicators	Description	Data source	Hotspot wards
		lower-income populations often lacking the resources needed for adaptation, making them more vulnerable to climate-related risks.		Mwererwe, Kavule, Gombe, Ttikalu, Nasse, and Migadde
9.	Population density	High-density areas can amplify the impacts of climate hazards such as heatwaves, and disease spread while straining infrastructure and emergency response systems, increasing overall community vulnerability.	UBOS, 2024	Nabweru North, Nabweru South, Nansana West, Kazo, Ocheng 7/8, Maganjo, Matugga, and Nansana East
10.	Unemployment	Unemployment reflects limited economic resilience and reduced access to resources, making individuals and communities less able to adapt to or recover from climate-related events such as floods	Key Informant Interviews, 2025	Nabweru North, Nabweru South, Nansana West, Kazo, Ocheng 7/8, Matugga, Ssanga, Buwambo, Ttikalu, Nasse, and Kiryamuli
11.	Wetland degradation	Wetland degradation weakens the natural buffers that wetlands provide against climate impacts like flooding, storm surges, and droughts, reducing ecosystem resilience and increasing the vulnerability of both human and ecological communities that depend on them.	WMD, 2021	Nabweru North, Ocheng 7/8, Ttikalu, Kiryamuli, Nansana East, Gombe, Kiwenda, Busukuma, Wamirongo, Kabumba, Wambale, Mwererwe, Migadde, Lugo, Matugga, Buwambo, Maganjo, Magigye, Nakyesanja, Kikoko, and Wamala

The wards that have a high sensitivity to multi-hazards (i.e., drought, floods, hailstorms, lightning, and windstorms) include Lugo, Magigye, Busukuma, Kiwenda, Nakyesanja, Maganjo, Wamala, Nansana North, and Nansana East.
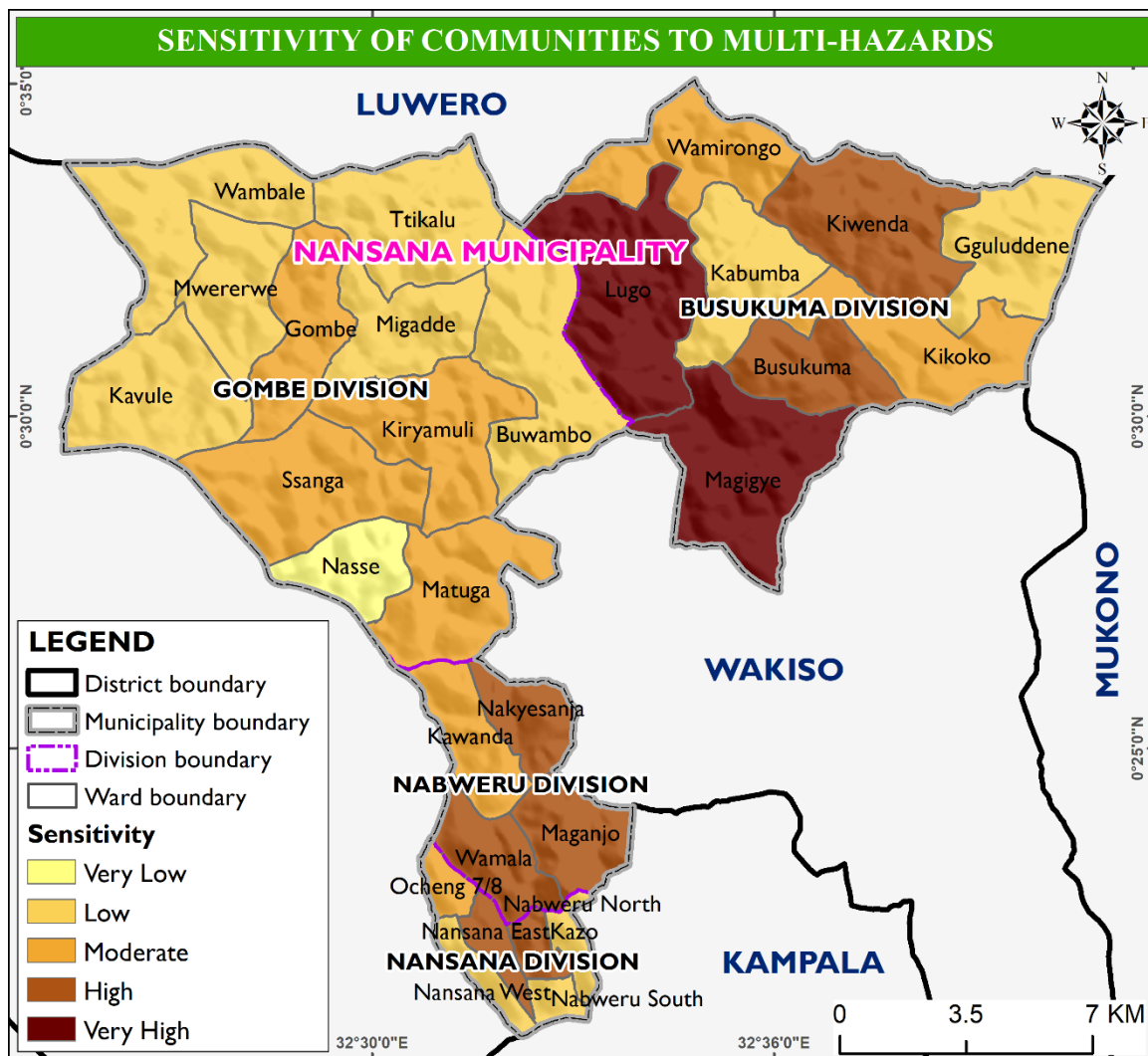
Figure 30: Sensitivity of communities to multi-hazards in Nansana Municipality

Adaptive capacity of communities to multi-hazards

Adaptive capacity is defined as the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences of climate change (IPCC, 2023). The adaptive capacity indicators that were assessed at the ward level are shown in **Table 22**. These adaptive capacity indicators were ranked, weighed and normalized to produce the adaptive capacity index.

Table 22: Adaptive capacity indicators to multi-hazards in Nansana Municipality

No	Adaptive capacity indicators	Description	Data source	Hotspot wards
1.	Access to clean water and sanitation	Access to clean water and sanitation ensures that communities can maintain good health and hygiene, reducing the risk of waterborne diseases during extreme weather events, and enabling better resilience to climate-induced health challenges.	Key Informant Interviews, 2025	Nabweru North, Nabweru South, Ocheng 7/8, Gguluddene, Kabumba, Lugo, Wamirongo, and Matugga
2.	Access to credit	Access to credit allows individuals and communities to invest in resilience-building measures, such as climate-smart agriculture, infrastructure improvements, or emergency preparedness, providing the financial resources needed to recover and adapt to climate-related disruptions.	Key Informant Interviews, 2025	Gguluddene, Kabumba, and Wamirongo
3.	Access to early warning information	Access to early warning information enables communities to prepare for and respond effectively to climate-related hazards, such as storms, floods, or heatwaves, by providing timely alerts and guidance that help reduce risks, protect lives, and minimize damage.	Key Informant Interviews, 2025	Ocheng 7/8, Nansana East, Nansana West, Gguluddene, Wamirongo, Nabweru North, Nabweru South, Lugo, Matugga, Kazo, Kikoko, Gombe, Kavule, Kiryamuli, Migadde, Mwererwe, Nasse, Ssanga, Ttikalu, Wambale, and Buwambo
4.	Access to renewable energy e.g., solar	Access to renewable energy provides communities with a sustainable and reliable energy source, reducing dependence on fossil fuels, minimizing greenhouse gas emissions, and enhancing resilience by ensuring energy availability during climate-related disruptions like storms or power outages.	Key Informant Interviews, 2025	Ocheng 7/8, Gguluddene, Wamirongo, Lugo, Matugga, Kikoko, Gombe, Kavule, Kiryamuli, Migadde, Mwererwe, Nasse, Ssanga, Ttikalu, Wambale, Buwambo, Kabumba, Busukuma, Kiwenda, Kawanda, and Maganjo
5.	Awareness of climate risks and adaptation practices	Awareness of climate risks and adaptation practices reflects how well individuals and communities understand climate-related challenges and the actions they can take to mitigate risks, enabling them to make informed decisions and implement strategies that enhance resilience to changing climate conditions.	Key Informant Interviews, 2025	Gguluddene, Wamirongo, Lugo, Kikoko, Kabumba, Busukuma, Kiwenda, and Magigye
6.	Diverse livelihood options	Diverse livelihood options provide communities with multiple sources of income and resources, allowing them	Key Informant Interviews, 2025	Lugo, Ocheng 7/8, Wambale, Nabweru North,

No	Adaptive capacity indicators	Description	Data source	Hotspot wards
		to better withstand climate shocks, and adapt by shifting to more resilient economic activities when needed.		Nabweru South, Kazo, and Nakyesanja
7.	Education levels	Higher levels of education enable individuals and communities to better understand climate risks, access information, and adopt effective adaptation strategies, thereby enhancing their ability to respond to and recover from climate-related challenges.	Key Informant Interviews, 2025	Nabweru North, Nabweru South, Kazo, Gguluddene, Wamirongo, and Busukuma
8.	Extension services	Extension services provide farmers, communities, and local businesses with essential knowledge, skills, and resources to adopt climate-resilient practices, improve productivity, and enhance the ability to cope with changing climate conditions.	Key Informant Interviews, 2025	Wamirongo, Gguluddene, Busukuma, and Ocheng 7/8
9.	Good environmental management practices	Good environmental management practices promote sustainable resource use, reduce environmental degradation, and enhance ecosystem resilience, enabling communities to better withstand and adapt to climate impacts.	Key Informant Interviews, 2025	Nabweru South, Ocheng 7/8, Nabweru North, Kazo, Nansana East, Nansana West, Kawanda, and Maganjo
10.	Healthcare infrastructure	Robust and well-maintained healthcare systems improve a community's ability to respond to climate-related health challenges, such as heatwaves, disease outbreaks, and extreme weather events, by providing timely medical care, disease prevention, and emergency services.	Key Informant Interviews, 2025	Nabweru South, Ocheng 7/8, Kazo, Nabweru North, Nansana East, Nansana West, Wamirongo, Gguluddene, Kikoko, Wambale, Mwererwe, Nasse, Kavule, Kiryamuli, Ssanga
11.	Proper waste disposal	Proper waste disposal helps prevent environmental degradation, reduces the risk of disease outbreaks, and ensures cleaner, healthier living conditions, enabling communities to better withstand the health and environmental impacts of climate change, such as flooding	Key Informant Interviews, 2025	Ssanga, Nabweru South, Ocheng 7/8, Kazo, Nabweru North, Nansana East, Nansana West, Wamirongo, Gguluddene, Kikoko, Kavule, Nakyesanja, Kabumba, Wamala, Matugga, Migadde, and Buwambo
12.	Rainwater harvesting	Rainwater harvesting provides an alternative and supplemental water source, reducing dependence on traditional sources such as rivers especially during the dry season.	Key Informant Interviews, 2025	Ocheng 7/8, Wamirongo, Nabweru South, Nabweru North, Nansana East, Nansana West, Gguluddene, Kikoko, Kabumba, and Lugo
13.	Social networks	Strong, connected communities are better able to share resources, information, and support during climate events, helping individuals and groups recover more quickly and effectively from climate impacts	Key Informant Interviews, 2025	Ocheng 7/8, Wamirongo, Gguluddene, Kikoko, Kabumba, and Kiwenda
14.	Urban greening initiatives	Urban greening initiatives enhance cities' resilience by increasing green spaces, improving air quality, reducing	Key Informant Interviews, 2025	Kazo, Matugga, Ocheng 7/8, Wamirongo, Gguluddene, Kikoko, Kabumba, Kiwenda,

No	Adaptive capacity indicators	Description	Data source	Hotspot wards
		heat island effects, and providing natural buffers against extreme weather, all of which help communities better cope with climate-related challenges.		Nabweru South, Nabweru North, Nansana East, Nansana West, Lugo, Busukuma, Magigye, Ssanga, and Nasse
15.	Wetland and ecosystem restoration	Wetland and ecosystem restoration enhances the natural ability of wetlands to absorb climate impacts such as flooding, while supporting biodiversity, improving water quality, and strengthening the resilience of communities that rely on these ecosystems.	Key Informant Interviews, 2025	Kazo, Ocheng 7/8, Nabweru South, Nabweru North, Nansana East, Nansana West, Matugga, Wamirongo, Gguluddene, Kikoko, Kabumba, Kiwenda, Lugo, Busukuma, Magigye, Ssanga, Maganjo, Nakyesanja, Wamala, and Kawanda

The wards that have a very high adaptive capacity to multi-hazards (i.e., drought, floods, hailstorms, lightning, and windstorms) include Gombe, Buwambo, Kawanda, and Maganjo (**Figure 24**). On the other hand, Ocheng 7/8, Nansana East, Kazo, Nabweru South, Wamirongo, and Gguluddene have a very low adaptive capacity to multi-hazards.
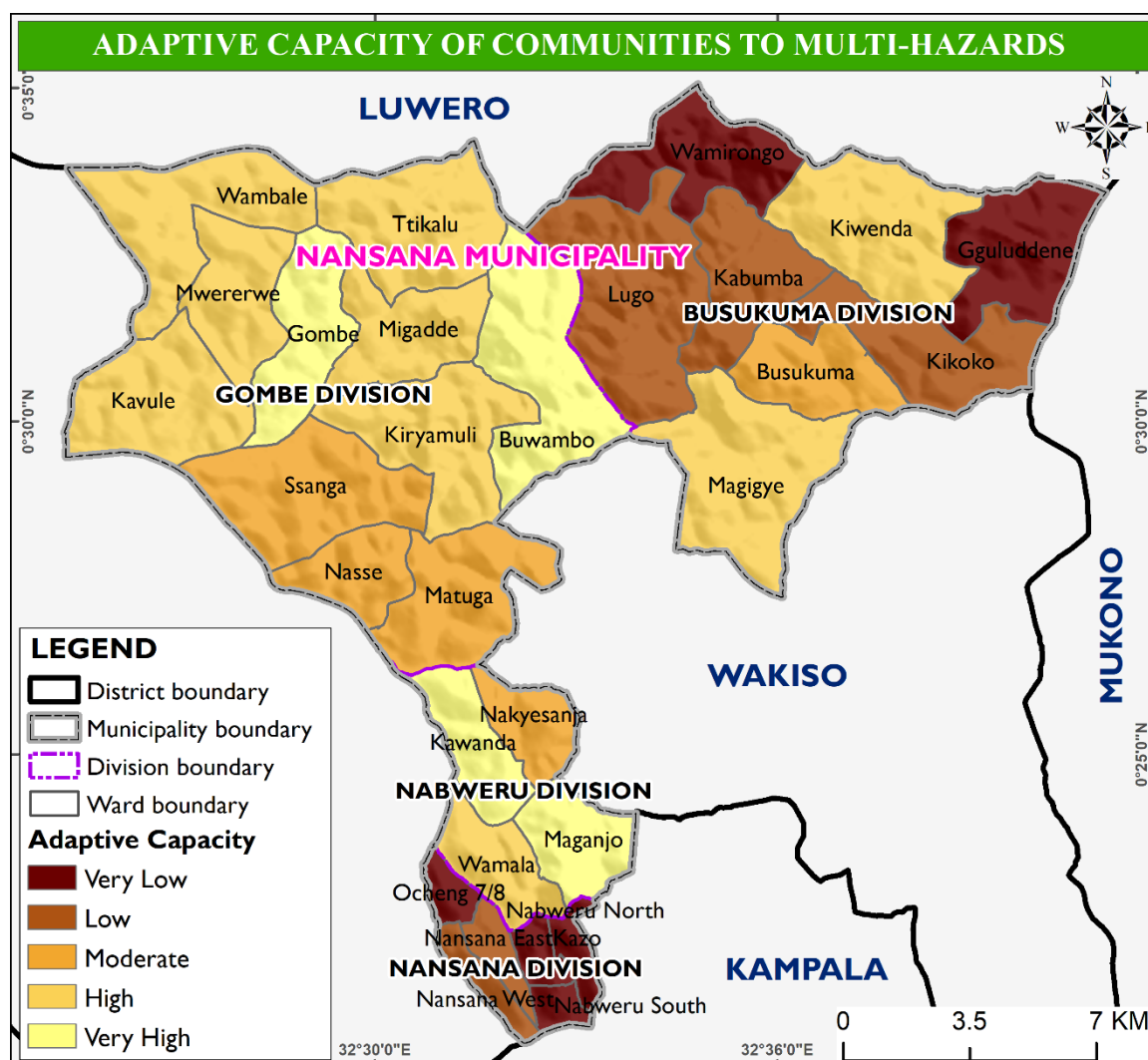
Figure 31: Adaptive capacity of communities to multi-hazards in Nansana Municipality

Vulnerability of communities to multi-hazards

The communities that are highly vulnerable to multi-hazards (i.e., drought, floods, hailstorms, lightning, and windstorms) in Nansana Municipality are found in Nabweru South, Kazo, Nabweru East, Wamirongo, Lugo, Ocheng 7/8, and Magigye.
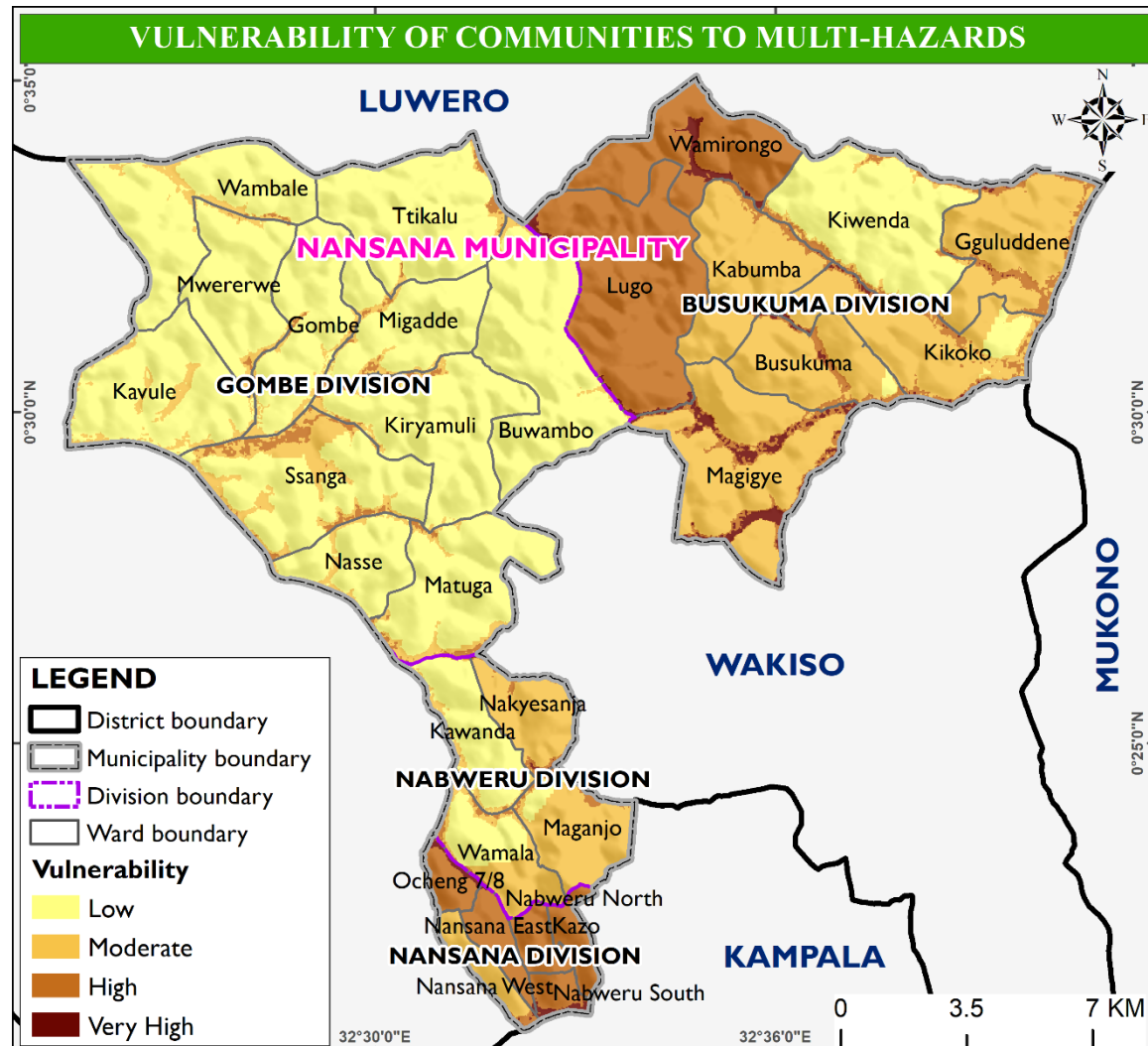
Figure 32: Vulnerability of communities to multi-hazards in Nansana Municipality

2.2.7 Impacts of climate change on the different sectors

Climate change has significantly impacted the agriculture, education, energy, health, land and housing, manufacturing, social development, trade, transportation, water and environment, and waste management sectors of Nansana Municipality (**Table 23**).

Table 23: Impacts of climate change by sector in Nansana Municipality

Sectors	Impacts of climate change by sector
Agriculture	• Reduced crop yield • Reduced livestock productivity • Destruction of croplands • Increased prevalence of pests, parasites, and diseases • Reduced quality of forage available to grazing livestock
Education	• Damage to school buildings, rendering them unsafe or unusable • Displacement disrupts children's education and causes psychosocial stress • Disruption of academic calendars, leading to increased absenteeism and dropout rates
Energy	• Power shortages due to reduced hydropower generation in hydroelectric plants • Damage to energy infrastructure • Higher energy consumption, especially for cooling
Health	• Increased prevalence of malaria • Reduced water quality and sanitation lead to outbreak of waterborne diseases such as typhoid • Food insecurity contributes to higher rates of malnutrition, particularly among children, pregnant women, and individuals with compromised immune systems
Land and housing	• Damage to homesteads • Displacement of communities • Loss of lives • Land degradation through increased soil erosion
Manufacturing	• Reduced agricultural outputs affect the availability of raw materials for manufacturing processes • Damage to the manufacturing facilities and related infrastructure such as factories, warehouses, and transportation networks • Power shortages affect manufacturing operations and increase reliance on alternative, often more expensive energy sources
Social development	• Displacement of communities • Destruction of school and health facilities infrastructure • Loss of lives • Changing climate patterns contribute to the spread of diseases, such as malaria and waterborne illnesses, due to increased temperatures and flooding
Trade	• Reduced export of key commodities such as coffee, tea, and cocoa • Damage to infrastructure such as roads and bridges disrupts supply chains, increases transportation costs, and hampers the timely delivery of goods to both domestic and international markets • Exporters face challenges meeting stringent environmental and sustainability standards imposed by trading partners, potentially limiting market access for non-compliant products
Transportation	• Erosion and degradation of roads, bridges, and culverts • Flooded or damaged roads hinder the movement of goods and people, affecting trade and access to essential services • Transport disruptions increase the cost of goods and services due to delays and the need for alternative, often longer, routes • Damaged infrastructure and congestion lead to longer travel times and increased fuel consumption, contributing to higher greenhouse gas emissions
Water and environment	• Degradation of ecosystems such as wetlands, and forests • Habitat loss and a decline in biodiversity • Reduced availability of water resources • Deterioration of water quality

Sectors	Impacts of climate change by sector
	• Soil degradation through erosion and nutrient depletion
Waste management	• Inadequate waste disposal practices result in solid waste clogging drainage systems, reducing their capacity to channel stormwater effectively • Organic waste decomposition in landfills emits methane, a potent greenhouse gas contributing to global warming • Poor waste management practices, such as open dumping and inadequate landfill operations, increase the emission of greenhouse gases • Increased use of plastics in agriculture, driven by changing climate, leads to microplastics infiltrating soils, posing risks to ecosystems and human health.

Figure 33: Flooding at Namulonge Town council

3.   CHAPTER FOUR: CLIMATE ACTION OPTIONS

3.1   Introduction

The prioritised climate action options in this plan are meant to reduce the Greenhouse Gas emissions (mitigation) and facilitate climate change adaptation in Nansana Municipality. These actions target 10 sectors here referred to as result areas. These are: Energy, Transportation, Trade and industry, Agriculture, Environment, ICT, Land and housing, social development (Communities), Education, and Sports and Health.

3.1.1   Energy

Apart from contributing to greenhouse gas emissions, the energy infrastructure in Nansana Municipality is vulnerable to multiple climate hazards. Notably, 18.9% of distribution transformers are exposed to lightning, and 29.6% to windstorms. Substations are moderately exposed to flooding, particularly in flood-prone wards like Nakyesanja. These disruptions increase the risk of blackouts, equipment damage, and safety hazards. To enhance energy reliability and safety amid increasing climate risks, this area promotes a transition from vulnerable, carbon-intensive infrastructure to clean and resilient energy systems. It prioritizes the adoption of solar, biogas, and energy-saving technologies, and encourages climate-resilient energy infrastructure across both public and private sectors.

Outcome
A low-carbon energy system that enhances efficiency and promotes clean energy is promoted.

Outputs
Outputs for the energy sector interventions are;
1.   Energy efficiency improved
2.   Access to renewable energy enhanced
3.   Emissions from infrastructure reduced

Climate Actions (Mitigation and Adaptation)

Short-term actions:
Action 1: Run community campaigns on how to reduce energy use at household and institutional levels. This is aimed at increasing awareness of efficient energy use, cleaner cooking technologies, and responsible consumption in homes, schools, and businesses. This will complement the municipality's ongoing climate vulnerability awareness and mindset change initiatives.
Action 2: Advocate for use of LED bulbs for lighting to replace inefficient lighting in public building.
Action 3: Establish technical training partnerships with vocational institutes to train solar/biogas technicians.

Medium-term:
Action 1: Conduct energy audits to assess energy use in public facilities, industries, and businesses to identify inefficiencies and recommend upgrades.
Action 2: Require compliance with national energy efficiency standards for all new constructions and major renovations (developing and implementing a municipal energy transition strategy, which will set standards and guide enforcement of efficiency requirements in all infrastructure development).

Action 3: Promote adoption of renewable energy (solar, biogas) technologies in households/institutions in peri-urban areas.

Action 4: Promote energy cooperatives by organising communities to foster joint ownership of renewable systems and enhance community participation co-own and manage small-scale solar or biogas systems.

Action 5: Install solar lighting in public spaces (along key municipal roads and trading centers).

Action 6: Promote energy-efficient technologies in schools and health centres (focus on productive energy use in institutions, aiming to equip schools and public offices with energy-saving cookstoves or renewable systems).

Action 7: Establish off-grid systems in remote areas (The energy programme supports off-grid solar and biogas systems in underserved divisions like Busukuma and Gombe, promoting inclusive access and resilience).

Long-term:

Action 1: Upgrade insulation, ventilation, and lighting systems in municipal and community buildings to reduce energy demand (Promotes energy-efficiency retrofits in community and municipal facilities through audits, standards, and awareness campaigns to reduce municipal energy demand)

Action 2: Demonstrate solar water pumping systems for smallholder farmers in high-drought-risk zones like Gombe and Nabweru. In line with the municipality's sustainable energy diversification strategy, demonstration of solar-powered agricultural systems supports urban–peri-urban climate resilience.

Action 3: Integrate climate-responsive and energy-efficient design standards into local building ordinances. The Municipal Energy Transition Strategy will mainstream climate-responsive building codes and align local construction by-laws with national energy efficiency policies.

3.1.2 Transportation

The transport sector contributes to climate change and about 14.4 km of roads (3%) in Nansana are exposed to floods, with hotspots in Nabweru and Busukuma. Flooding has already disrupted transportation and access to services, especially in high-risk areas like Katooke and Kawanda. Given the vulnerability of key roads to flooding and the disruption of public mobility, this area supports the development of resilient transport infrastructure. It emphasizes low-emission mobility (e.g., walking, cycling, electric vehicles), flood-resistant road design, and smart traffic systems to minimize emissions and safeguard access.

Outcome
Low-emission and efficient urban transport system is established

Output
The outputs are;
1. Awareness and low-emission usage increased
2. Infrastructure for clean transport developed
3. Integrated sustainable planning enhanced

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Educate on cycling, walking & public transport using community meetings. Launch the "Move Green Nansana" campaign to promote walking, cycling, and public transport safety through community dialogues, school road-safety clubs, and local media.

Action 2: Promote shared mobility. Establish a pilot shared-mobility hub near Nansana Town Council Hall and Nabweru Division to coordinate car-pooling, taxi sharing, and regulated ride-hailing.

Action 3: Restrict high-emission vehicles by designating zones where diesel vehicles are banned or taxed. (Designate low-emission corridors along key trading centers (e.g., Nansana-Wamala-Katooke Road) and enforce traffic management bylaws to discourage aging diesel vehicles)

Action 4: Conduct low-carbon campaigns by publicize emission reduction benefits through posters, community radios, and influencer-led awareness drives (Run municipal-wide "Clean Air Nansana" campaigns combining billboards, boda-boda unions, and social media influencers to raise awareness of emission impacts and benefits of green mobility).

Medium-term:

Action 1: Introduce electric boda bodas in partnership with startups (Pilot an e-mobility partnership with electric-boda startups (e.g., Spiro or Ampersand) to replace 5 % of commercial motorcycles with battery-powered ones in Gombe and Nabweru Divisions).

Action 2: Develop integrated pedestrian and cycling networks within new GKMA road upgrades and establish tree-lined green corridors along market roads and schools.

Action 3: Install solar-powered adaptive traffic signals at key junctions (e.g., Nansana Lukadde and Nabweru Main Road) to optimize flow and cut idling emissions.

Action 4: Launch an e-bus demonstration corridor between Nansana Town and Kampala Central in collaboration with GKMA-UDP and private transport unions.

Action 5: Integrate green transport in urban plans (Include low-carbon mobility zoning in the forthcoming MPDP, linking land-use and transport for emissions reduction.

Action 6: Establish smart metered parking in Nansana CBD and around municipal markets using e-payment platforms to manage congestion.

Action 7: Install vehicle emission monitoring stations and enforce annual checks to track emissions from transport.

Long-term:

Action 1: Provide e-vehicle charging points in public areas, markets, and fuel stations (Develop municipal e-charging infrastructure at major public facilities (markets, town hall, taxi parks) powered by solar mini-grids through PPPs)

Action 2: Incorporate mixed-use zoning within the updated Municipal Physical Development Plan, encouraging walkable, compact communities to reduce commuting distances.

Action 3: Support transit-oriented development focusing on development around future GKMA rapid-transit and e-bus routes to minimize car dependence.

3.1.3 Trade and Industry

Industrial zones in Nansana are at risk due to unreliable energy supply, limited climate-proof infrastructure, and flood hazards, which can halt operations, damage goods, and worsen waste management issues. To reduce climate-related disruptions to economic productivity, this area focuses on greening industrial processes. It promotes energy efficiency, circular economy practices, clean technologies, and climate-smart waste treatment to build sustainable and resilient trade and industry ecosystems.

Outcome

A sustainable and climate-smart trade system and a low-emission, resource-efficient industrial sector that promotes local economic resilience and green innovation is established.

Outputs

Outputs are;

1. Improved efficiency and reduce emissions in trade logistics
2. Policy and incentives for sustainable trade strengthened
3. Industrial emissions and pollution reduced
4. Circular and energy-efficient production promoted
5. Sustainable supply chains promoted

Climate Actions (Mitigation and Adaptation)

Short-term actions:

Action 1: Enforce a municipal bylaw on eco-friendly packaging, requiring markets, shops, and factories to phase out single-use plastics and adopt biodegradable or recyclable materials.

Action 2: Engage communities in sustainable trade (Launch "Green Market Nansana" initiative to train traders, vendors, and cooperatives on eco-labeling, waste segregation, and sustainable business practices in markets like Nansana Town and Nabweru.)

Action 3: Track and report emissions in trade activities (Establish a Municipal Green Business Registry that records emissions, energy use, and waste footprints of industries and large markets).

Action 4: Train manufacturers on green technologies (Organize annual "Clean Production and Eco-Innovation Clinics" for manufacturers, SMEs, and artisans on energy efficiency, waste minimization, and pollution control).

Action 5: Sourcing of local raw materials to reduce transport emissions (Support local supplier linkages through the "Buy Nansana" campaign, connecting industries with local producers of raw materials to shorten supply chains and cut transport emissions).

Medium-term:

Action 1: Provide platforms for green entrepreneurs using hybrid vehicles for goods transport by creating a Municipal Green Business Innovation Hub to incubate eco-enterprises, including startups using electric and hybrid delivery vehicles.

Action 2: Transition trade hubs to renewable energy by retrofitting municipal markets and industrial parks with solar mini-grids for lighting, cold storage, and security systems.

Action 3: Adopt digital invoicing and energy-efficient technologies in markets powered by solar or biomass systems, linked to the Digital Transformation Programme.

Action 4: Promote water and material reuse (Implement an industrial water recycling program in small-scale factories and markets, promoting reuse and greywater treatment).

Action 5: Encourage certification in green production through training and collaboration with UNBS and MoTIC.

Action 6: Integrate green procurement standards into all municipal purchasing, favouring suppliers with eco-friendly packaging, renewable energy use, or low emissions.

Action 7: Digitize inventory and shipping systems (Develop a smart logistics tracking system for goods and waste transport, enabling real-time monitoring of energy use and emissions) under the Digital Transformation Programme.

Action 8: Conduct lifecycle assessments of products (Partner with research institutions to undertake lifecycle analyses for key locally produced goods).

Action 9: Foster public-private collaboration in green innovation (Establish a Green Industry Council comprising manufacturers, municipal officials, and academia to drive co-funded climate innovation projects).

Long-term:

Action 1: Adopt municipal building codes requiring all industrial and commercial warehouses to meet green building and energy-efficiency standards.

Action 2: Enforce environmental penalties and licensing conditions for industries violating emission or waste disposal standards under NEMA guidelines.

Action 3: Invest in carbon offset programs for trade (e.g., reforestation) (Implement the "Trade for Trees" carbon offset scheme, requiring major industries to support tree planting in Nabweru and Busukuma divisions).

Action 4: Upgrade to energy-efficient machinery (Facilitate industrial retooling programs for SMEs and light industries to acquire low-emission, energy-efficient equipment through green credit lines)

Action 5: Develop a circular economy industrial cluster where waste from one firm becomes raw material for another (e.g., plastics, paper, organics).

3.1.4   Agriculture

Over 25% of farmlands in Nansana Municipality are exposed to droughts, and about 8% to floods. Divisions like Gombe and Nabweru bear the brunt of these hazards, impacting food security and livelihoods for communities reliant on agriculture. To address increasing agricultural vulnerability, this result area supports climate-smart farming, irrigation systems, agroforestry, and sustainable land management. It promotes practices that enhance soil health, water conservation, and productivity under changing climate conditions.

Outcome
Climate-resilient urban and peri-urban agriculture systems are established

Outputs
Outputs are;
1. Climate-smart agriculture practices promoted
2. Water use and soil conservation improved
3. Value chains and access to green markets enhanced

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Roll out the "Climate-Smart Farmers Initiative" targeting peri-urban farmers in Gombe, Nabweru, and Busukuma divisions, focusing on resilient practices (drought-tolerant crops, efficient water use, and pest management).

Action 2: Integrate agroforestry demonstration plots within municipal greenbelt zones and promote fruit-tree and nitrogen-fixing species on farms.

Action 3: Distribute subsidized rainwater-harvesting tanks and train farmers in on-farm water retention structures (trenches, ridges, and micro-catchments).

Action 4: Conduct municipal soil-and-water conservation campaigns combining extension visits and radio talk shows on terracing, mulching, and contour farming.

Action 5: Promote the use of compost and green manure (Launch the "Zero-Waste Fertility Programme" to promote composting of market organic waste and its redistribution to urban gardens and smallholders).

Action 6: Establish farmer-field schools on improved post-harvest handling-solar drying, hermetic storage, and value addition to reduce losses.

Medium-term:
Action 1: Install community solar-powered micro-irrigation systems in dry-season vegetable hubs (e.g., Gombe and Nansana Town).

Action 2: Develop communal water-storage ponds and valley tanks integrated into urban drainage and flood-control schemes.
Action 3: Monitor soil health regularly (Establish a Municipal Soil-Health Monitoring to track fertility, organic matter, and erosion in agricultural zones)
Action 4: Establish climate-resilient storage facilities (reinforcing buildings and using sustainable materials, and operational strategies like implementing solar power, efficient water management), and link farmers to climate-smart markets.

Long-term:
Action 1: Support climate certification for farmers (like a farm adopting reduced tillage to improve soil health and sequester carbon, or a farmer using agroforestry, which integrates trees into their cropping system to enhance biodiversity and carbon capture).

3.1.5   Water and Environment

About 37.2% of water sources in Nansana Municipality are exposed to drought, with highest exposure in Nabweru and Gombe. Wetlands and forests are being degraded, weakening natural buffers against floods and heatwaves. This area focuses on restoring and protecting ecosystems including wetlands, forests, and rivers to enhance natural climate defences. It includes strengthening environmental governance, improving waste management, and promoting community-based conservation and green infrastructure.

Outcome
The urban environment is restored and protected to support sustainable ecosystems and community wellbeing.

Outputs
Outputs are;
1. Environmental awareness and stewardship are promoted
2. Natural ecosystems restored and protected
3. Sustainable planning and enforcement strengthened
4. Organic and inorganic waste processing improved
5. Waste disposal infrastructure established

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Sensitize communities on environmental management (Launch the "Clean and Green Nansana" community outreach programme to educate households, traders, and schools on waste reduction, energy efficiency, and pollution control).
Action 2: Raise awareness on ecosystem conservation for DRR (Conduct awareness campaigns on ecosystem-based disaster risk reduction (Eco-DRR) focusing on the role of wetlands, forests, and drainage systems in flood mitigation).
Action 3: Integrate sustainable land use and restoration education into parish-level community meetings and schools, using visual materials and model restoration plots.
Action 4: Engage religious and cultural leaders in conservation (Form a Municipal Faith & Culture Alliance for the Environment to mobilize faith-based institutions and traditional leaders in tree planting, clean-up drives, and anti-litter campaigns).
Action 5: Control illegal waste dumping (Establish community waste collection and recycling centers run by organized youth and women groups in Nabweru, Busukuma, and Nansana Town).

Action 6: Enforce environmental protection laws/regulations (Strengthen enforcement of environmental regulations).
Action 7: Train municipal enforcement taskforces and local environment committees on environmental inspection, data collection, and sanctions.

Medium-term:
Action 1: Restore and protect wetlands, riverbanks and forests to improve environmental resilience and service delivery.
Action 2: Promote large-scale urban tree planting programmes (Roll out the "Million Trees for Nansana" campaign, planting urban trees along streets, schools, and public spaces with private-sector partnerships).
Action 3: Mainstream environmental safeguards and green infrastructure in the Municipal Physical Development Plan and annual budgets.
Action 4: Monitor emissions and pollution hotspots using mobile sensors to map and track waste burning, air quality, and industrial discharges.
Action 5: Regularly develop climate risk zoning maps (Produce and update climate risk and flood vulnerability maps integrating rainfall, drainage, and land-use data).
Action 6: Survey and install permanent boundary markers and signage for wetlands and riverbanks, coupled with buffer-zone planting.

Long-term:
Action 1: Establish green belts, parks, and gardens (create a strategic plan that includes community involvement and clear policies to manage urban sprawl, preserve nature, and create public green spaces for recreation and well-being).

3.1.6   Information, communication and technology (ICT)

While ICT is not directly exposed climate change risk, the municipality lacks advanced systems for real-time monitoring, early warning, and data-driven decision-making. This limits rapid response to climate risks and hinders public awareness. ICT is leveraged to build climate intelligence-early warning systems, climate data platforms, digital outreach, and smart solutions across sectors. This area strengthens digital infrastructure and literacy to support risk reduction and adaptive planning.

Outcome
A digitally connected and informed municipality using ICT for climate adaptation, early warning, and resilience is leveraged

Outputs
Outputs are;
   1. Climate and disaster early warning systems improved
   2. Community digital literacy enhanced
   3. ICT integrated into climate planning and governance

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Establish community-based early warning systems integrated with UNMA forecasts and localized for flood-prone zones such as Nabweru and Gombe, including rainfall and flood alerts.
Action 2: Use SMS alerts and community radios for dissemination, translate warnings into local languages/formats.

Action 3: Conduct ICT-for-Climate training for local leaders, youth, and farmers to improve use of digital tools for reporting, coordination, and knowledge-sharing on adaptation measures.

Medium-term:
Action 1: Establish a Municipal Smart Control and Command Centre to integrate data from rainfall gauges, flood sensors, traffic systems, and solid waste monitoring.
Action 2: Introduce mobile applications for urban farmers offering seasonal forecasts, pest alerts, and market information linked to the Ministry of Agriculture's e-extension platforms.
Action 3: Provide solar-powered ICT labs and tablets to schools and community organizations for environmental learning, digital literacy, and climate information access.
Action 4: Launch a "Digital Inclusion for Resilience" initiative to train women and youth in digital entrepreneurship, GIS mapping, and online climate awareness campaigns.
Action 5: Adopt GIS-based mapping tools to analyse flood risks, land-use changes, and infrastructure vulnerability; integrate findings into the Municipal Physical Development Plan.
Action 6: Digitalize permitting and reporting systems (create electronic workflows that automate the process, improve accuracy, and provide better oversight).
Action 7: Optimize transport and waste systems (use technology like GPS and smart sensors to plan efficient routes and monitor waste levels which also reduces fuel consumption and travel time).
Action 9: Develop a centralized "Municipal Climate Information Repository" to store local data on rainfall, temperature, pollution, and community impacts.

Long-term:
Action 1: Create the "Nansana Climate Portal" - an open-access digital platform providing real-time data, GIS maps, early warning updates, and planning tools for municipal staff, researchers, and the public.
Action 2: Operationalize the climate portal as a decision-support and engagement tool-hosting municipal dashboards, carbon inventories, adaptation best practices, and citizen feedback channels.

3.1.7 Land, Housing and Urban Development

Housing structures particularly in informal settlements like in Nabweru, 7/8 are vulnerable to floods, windstorms, and poor drainage. Many areas also face wetland encroachment and lack enforcement of building codes. The focus is on climate-resilient urban planning, flood-proof housing, sustainable land use, and enforcement of building codes. It also promotes equitable access to secure and climate-safe housing, especially in informal or vulnerable settlements, while protecting fragile ecosystems like wetlands from encroachment.

Outcome

A resilient and inclusive urban settlement system with climate-proof land use and housing infrastructure is developed

Outputs
Outputs are;
1. Climate-resilient and inclusive housing promoted
2. Climate risk integrated into urban planning
3. Enforcement and monitoring strengthened

Climate Actions (Mitigation and Adaptation)

Short-term actions:

Action 1: Encourage participatory planning for housing, land use planning and urban development (Establish Community Urban Forums to involve residents, landlords, and private developers in participatory physical development planning, zoning, and infrastructure prioritization.).

Action 2: Promote use of eco-friendly construction materials (stabilized soil blocks, bamboo, compressed bricks, recycled aggregates) in municipal infrastructure and housing projects.

Action 3: Undertake geospatial risk-based land and slope assessments to identify flood- and landslide-prone zones for zoning updates and resettlement plans.

Action 4: Enforce planning and construction standards (Strengthen enforcement of the Physical Planning Act (2010) and Building Control Regulations through routine inspections and penalties for non-compliance).

Action 5: Monitor informal developments in hazard risk zones using a GIS-based informal settlement monitoring system to track encroachment and hazards in wetland and riparian areas.

Action 6: Establish a land and housing climate task force to coordinate land, housing, environment, and disaster response units.

Medium-term:

Action 1: Enforce climate-smart building guidelines (elevated foundations, ventilation, insulation, rainwater harvesting systems, green roofs).

Action 2: Retrofit public and community facilities (schools, health centers, markets) in flood zones using raised plinths and proper drainage.

Action 3: Implement a "Resilient Homes Fund" to subsidize retrofitting of informal and low-cost houses with durable, climate-proof materials.

Action 4: Develop zoning that avoids hazard high-risk zones (Update the Municipal Physical Development Plan with hazard-based zoning that restricts construction in wetland buffers and floodplains).

Action 5: Restrict developments in wetlands and floodplains including green spaces in urban planning.

Action 6: Improve land tenure systems for resilience by streamlining land registration and digitization of the municipal land records to secure tenure and reduce disputes.

Action 7: Build local capacity for urban climate planning by training municipal planners, surveyors, and engineers in climate-risk mapping, GIS analysis, and resilient infrastructure design.

Long-term:

Action 1: Promote mixed-use development to reduce emissions to help reduce emissions by minimizing the need for transportation (Adopt mixed-use, compact, and transit-oriented urban designs that combine residential, commercial, and public spaces to reduce travel distances and emissions).

Action 2: Integrate green building codes requiring energy-efficient lighting, ventilation, and solar systems in all new municipal and private developments.

Action 3: Implement density-based land-use policies encouraging vertical development, infill, and redevelopment of existing urban cores.

3.1.8   Social development (Communities)

Communities, especially women, youth, and persons with disabilities, are highly sensitive to climate impacts due to low incomes, dependence on natural resources, and poor access to services. This cross-cutting result area fosters inclusive climate action, empowering marginalized

groups through awareness, skills training, green jobs, and social protection. It strengthens community networks and participation in climate adaptation planning and response.

Outcome
Community resilience and inclusion in climate action is enhanced

Outputs
Outputs are;
1. Community awareness and participation in climate adaptation and DRR increased
2. Community livelihoods and support systems strengthened
3. Public health, social infrastructure, and well-being improved

Climate Actions (Mitigation and Adaptation)
Short-term actions:

Action 1: Integrate resilient and energy-efficient housing guidelines into building approvals-requiring flood-proof foundations, insulation, and ventilation for climate-smart living.

Action 2: Elevate structures in flood-prone areas (Implement the "Safe Home Retrofit" programme to raise foundations and install flood-resistant materials for houses in high-risk parishes like Nabweru and Gombe).

Action 3: Support low-income housing retrofits (Subsidize low-income housing retrofits using locally available eco-materials, supported by micro-loans or partnerships with NGOs).

Action 4: Develop zoning that avoids high-risk zones (Enforce hazard-informed zoning regulations that restrict development within buffer zones and direct new growth to safer areas).

Action 5: Restrict development in wetlands and floodplains (Apply municipal bylaws to prohibit encroachment on wetlands and riparian zones, with regular inspections and signage demarcating protected areas).

Action 6: Digitize land records and issue tenure certificates to informal dwellers to strengthen ownership, reduce disputes, and enhance investment in resilient infrastructure.

Action 7: Build local capacity for urban climate planning (Train municipal staff, parish committees, and community leaders in urban resilience planning, GIS mapping, and community adaptation strategies).

Medium-term:

Action 1: Strengthen community safety nets (cash-for-work, food-for-work, micro-insurance).

Action 2: Improve access to sanitation and clean water in vulnerable parishes by expanding piped-water connections and eco-toilets in underserved settlements (e.g., Nabweru North, Gombe) through partnerships with NWSC and NGOs.

Action 3: Promote rainwater harvesting and greywater recycling at the household level (Provide incentives for rooftop rainwater harvesting and reuse systems via municipal bylaw and training campaigns).

Action 4: Promote green jobs and entrepreneurship for marginalized groups (Launch a "Green Jobs and Climate Entrepreneurship Hub" to train youth and women in recycling, solar installation, eco-packaging, and sustainable crafts).

Action 5: Provide vocational training for youths and women in climate-smart sectors by integrating climate-smart vocational courses in local institutes (e.g., tailoring with eco-materials, solar system maintenance, waste recycling).

Action 6: Establish local funds for community-led adaptation and recovery (Operationalize the "Community Climate Action Grants" to finance small-scale adaptation projects like tree planting, drainage rehabilitation, or early warning systems.

Action 7: Advocate integrating climate change education into school curricula (Work with the Ministry of Education to embed climate change topics in Nansana's primary and secondary school programs through clubs and local projects).

Long-term:
Action 1: Establish green social spaces (parks, gardens) for recreation and carbon sinks (Develop the "Nansana Green Social Parks Network"-community parks, tree-lined walkways, and wetlands turned into eco-parks with public participation). Integrate green space planning into the Municipal Physical Development Plan, ensuring every division reserves land for community parks.
Action 3: Promote household and institutional gardens (school and health facility gardens) as part of the city's urban greening and nutrition initiatives.

3.1.9   Education and Sports

A significant number of schools (40.2%) in Nansana Municipality are exposed to windstorms, while 2.6% are flood-prone. Infrastructure vulnerabilities, combined with limited climate education, reduce adaptive capacity among students. This result area strengthens resilience through climate education, school infrastructure upgrades, and community mobilization via sports. It fosters environmental stewardship and integrates disaster risk education, ensuring inclusive participation of girls and youth with disabilities.

Outcome

Climate change awareness, environmental education, and adaptive capacity among learners and youth are improved.

Outputs

Outputs are;
1. Climate education and environmental awareness integrated into school curricula and co-curricular activities
2. Capacity building in schools strengthened
3. Inclusive school and community-based climate action initiatives implemented

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Roll out the "Climate Smart Schools Initiative" across all divisions—using debates, drama, and environmental clubs to raise awareness about local climate challenges (e.g., floods, waste, air pollution).
Action 2: Produce and distribute age-appropriate climate learning kits (comics, posters, videos) in English and local languages, aligned with the National Climate Change Curriculum.
Action 3: Organize inter-school sports and climate awareness events (e.g., "Green Games Nansana").
Action 4: Train teachers, sports coaches, and school administrators on integrating climate action into education and extracurricular activities.

Medium-term:
Action 1: Create the "Green Champions and Sports Leaders Programme" to nurture youth talent in athletics and environmental stewardship; establish climate clubs in every school.

Long-term:
Action 1: Promote lifelong learning and community engagement through school-community partnerships by integrating community resources into the curriculum.
Action 2: Establish parent-teacher climate committees and volunteer programs to support school greening, community clean-ups, and mentorship in sustainability initiatives.

3.1.10   Health

Health facilities are highly sensitive to floods and moderately to windstorms and lightning. Climate-sensitive diseases (e.g., waterborne illnesses) are expected to rise with worsening climate trends. To enhance public health resilience, this result area focuses on climate-proofing health systems, improving disease surveillance, and ensuring access to essential services during extreme events. It includes awareness campaigns and infrastructure upgrades to safeguard vulnerable populations.

Outcome
Resilience of the health system and communities to climate-related health risks and emergencies is improved.

Outputs
Outputs are;
1. Health system capacity strengthened
2. Access to climate-resilient health infrastructure and services improved
3. Community awareness and adoption of climate-smart health practices increased

Climate Actions (Mitigation and Adaptation)
Short-term actions:
Action 1: Train health workers on the identification and management of climate-sensitive diseases to enhance diagnosis and management of climate-linked diseases (malaria, cholera, typhoid, heat stress).
Action 2: Conduct community sensitization on disease prevention (Organize parish-level community dialogues and radio campaigns on disease prevention, emphasizing sanitation, safe water use, and vector control).
Action 3: Promote sanitation and hygiene in relation to climate change (Launch the "Clean Communities, Healthy Homes" initiative linking waste management, drainage cleaning, and hygiene to climate adaptation goals.
Action 4: Provide clean water and improved sanitation in health centers (install solar-powered boreholes, rainwater harvesting systems, and improved latrines in all public health centers).
Action 5: Carry out public health campaigns on nutrition, hygiene, and climate-related disease prevention, and promote household-level climate-sensitive health practices (e.g., Safe water storage, mosquito control, clean cooking).

Medium-term:
Action 1: Develop and implement community-based early warning systems for climate-induced health outbreaks (e.g., cholera, malaria).
Action 2: Improve disease surveillance and reporting systems in health facilities (Digitalize disease surveillance and reporting using DHIS2 and mobile tools to enable real-time data sharing between health centres and municipal headquarters).
Action 3: Upgrade health facilities with rainwater harvesting systems and flood-proof infrastructure (Retrofit municipal health centres with elevated plinths, drainage systems, and renewable energy for continuous operation during floods).

Action 4: Provide pictorial IEC materials and mobile devices to community health volunteers for use during climate-related health outreach.

Long-term:
Action 1: Integrate climate change and public health response planning into the municipal health strategy. Mainstream climate risk and adaptation planning into the next Municipal Health Sector Strategic Plan to align health goals with the Climate Action Plan.
Action 2: Create the "Climate-Health Dialogue Platform" bringing together health officials, civil society, academia, and communities to share lessons and innovations.
Action 3: Construct new climate-resilient health centers in underserved and vulnerable in Gombe, Busukuma, and Nabweru divisions.
Action 4: Establish rapid response units (emergency coordination center) and equip health centers for health emergencies.

3.2 Implementation Plan

Table 24: Implementation plan

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
RESULT AREA: 1. Energy	**Output 1.1** Energy efficiency improved.	1. Run community campaigns on how to reduce energy use at household and institutional levels.	Entire municipality	S			NMC, MEMD
Outcome 1: **A low-carbon energy system that enhances efficiency and promotes clean energy is promoted**		2. Advocate for use of LED bulbs for lighting to replace inefficient lighting in public building.	Nansana & Nabweru	S			NMC
		3. Roll out clean cookstove programs targeting low-income households, reducing exposure to indoor air pollution and deforestation.	Entire municipality				MEMD, CREEC
		4. Conduct energy audits to assess energy use in public facilities, industries, and businesses to identify inefficiencies and recommend upgrades.	Nansana East, Kawanda		M		NMC
		5. Upgrade insulation, ventilation, and lighting systems in municipal and community buildings to reduce energy demand	Nansana Division			L	MEMD
		6. Require compliance with national energy efficiency standards for all new constructions and major renovations.	Entire municipality		M		NMC
	Output 1.2 Access to renewable energy improved.	1. Promote solar & biogas in peri-urban areas	Busukuma, Gombe		M		MEMD, NMC
		2. Demonstrate solar water pumping systems for smallholder farmers in high-drought-risk zones like Gombe and Nabweru.	Busukuma, Gombe, Nabweru			L	NMC, MAAIF

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		3. Promote energy cooperatives by organising communities to co-own and manage small-scale solar or biogas systems.	Busukuma, Gombe		M		MEMD
		4. Establish technical training partnerships with vocational institutes to train solar/biogas technicians.	All divisions	S			CREEC, NMC
	Output 1.3 Emissions from infrastructure reduced.	1. Install Solar lighting in public spaces	Nabweru, Nansana		M		NMC
		2. Advocate for energy-efficient tech in schools and health centres	All divisions		M		NMC
		3. Promote solar water heating in institutions like health centres	Gombe, Busukuma		M		NMC
		4. Establish off-grid systems in remote areas	Wamala, Kabumba		M		NMC
		5. Integrate climate-responsive and energy-efficient design standards into local building ordinances.	Entire municipality			L	MoLHUD
RESULT AREA: 2. Transportation	**Output 2.1** Awareness and low-emission usage increased.	1. Educate on cycling, walking & public transport using community meetings.	Entire municipality	S			NMC, MoWT
Outcome 3: **Low-emission and efficient urban transport system is established**		2. Promote shared mobility	Nansana & Nabweru	S			NMC
		3. Restrict high-emission vehicles by designating zones where diesel vehicles are banned or taxed	Nansana Central	S			NMC
		4. Conduct low-carbon campaigns by Publicize emission reduction benefits through posters, community radios, and influencer-led awareness drives.	All divisions	S			NMC

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		5. Introduce electric boda bodas in partnership with startups	Nansana, Maganjo		M		NMC, MoWT
	Output 2.2 Infrastructure for clean transport developed	1. Develop pedestrian & cycling lanes	Nabweru, Nansana		M		NMC
		2. Create green corridors	Gombe, Busukuma		M		NMC
		3. Implement intelligent traffic lights to reduce idling	Nansana Central		M		NMC
		4. Transition to electric taxis/buses	All divisions		M		MoWT
		5. Provide e-vehicle charging points in public areas, markets, and fuel stations.	Nabweru, Nansana			L	MoWT
	Output 2.2 Integrated sustainable planning enhanced.	1. Promote mixed-use neighbourhoods.	Gombe, Busukuma			L	MoLHUD
		2. Transit-oriented development.	Nabweru			L	NMC
		3. Green transport in urban plans.	Entire municipality		M		NMC
		4. Use digital tools to guide vehicles to parking areas, minimizing search emissions.	Nansana		M		NMC
		5. Install vehicle emission monitoring stations and enforce annual checks to track emissions from transport.	Municipality-wide				NMC, MoWT
RESULT AREA: 3. Trade and Industry	**Output 3.1** Climate-smart and low-carbon trade practices promoted.	1. Promote trade of climate-friendly goods (e.g., solar tech, eco-products)	Entire municipality	S			NMC, MoTIC
Outcome 3: **A sustainable and climate-smart trade system that supports low-emission growth and local economic resilience is established**		2. Support SMEs that reduce transport emissions by sourcing and selling locally.	Entire municipality	S			NMC
		3. Adopt eco-friendly packaging (biodegradable/recyclable)	Entire municipality	S			NMC

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		4. Educate traders, youth, and women groups about green consumerism and entrepreneurship-sustainable trade.	Entire municipality	S			NMC
		5. Provide platforms for green entrepreneurs	Nansana & Nabweru		M		NMC, MoTIC
	Output 3.2 Improved efficiency and reduce emissions in trade logistics.	1. Use hybrid vehicles for goods transport	Busukuma, Nabweru		M		MoTIC
		2. Transition trade hubs to renewable energy	Nabweru, Nansana		M		MEMD, NMC
		3. Track and report emissions in trade activities	Entire municipality	S			NMC
		4. Design energy-efficient warehouses	Gombe, Busukuma			L	MoTIC
		5. Encourage digital systems (e-invoicing) to reduce paper use and inefficiencies.	Municipality-wide		M		NMC, MoTIC
	Output 3.3 Policy and incentives for sustainable trade strengthened.	1. Develop incentives for green trade	Entire municipality		M		MoTIC, NMC
		2. Introduce fines for uncontrolled emissions, effluent discharge, or poor waste handling.	Entire municipality			L	NEMA, NMC
		3. Support local climate-resilient markets	Busukuma, Gombe		M		NMC
		4. Promote circular economy in business models	Nabweru, Nansana		M		NMC
		5. Invest in carbon offset programs for trade (e.g., reforestation)	Lugo, Wamala			L	NMC, NFA
	Output 3.4 Industrial emissions and pollution reduced.	1. Install filtration and ventilation systems	Nansana Division		M		NMC, NEMA

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		2. Capture and reuse waste heat	Nansana Division	S			NMC
		3. Prevent untreated wastewater discharge	Entire municipality				NEMA
		4. Use low-carbon/recycled raw materials	Entire municipality	S			MoTIC
		5. Upgrade to energy-efficient machinery	Nabweru Division			L	MEMD, UMA
	Output 3.5 Circular and energy-efficient production promoted.	1. Implement closed-loop recycling systems	Industrial clusters in Nansana			L	UMA, NMC
		2. Use solar thermal/biomass for heating	Nansana, Gombe		M		MEMD
		3. Promote water and material reuse	Entire municipality		M		NEMA
		4. Train manufacturers on green technologies	Nansana & Nabweru	S			UMA, MoTIC
		5. Encourage certification in green production	Entire municipality		M		UMA
	Output 3.6 Sustainable supply chains promoted.	1. Source local raw materials to reduce transport emissions	Entire municipality	S			MoTIC
		2. Introduce climate criteria in procurement policies	Nansana		M		NMC
		3. Digitize inventory and shipping systems	Municipality-wide		M		
		4. Conduct lifecycle assessments of products	Entire municipality		M		
		5. Foster public-private collaboration in green innovation	Gombe, Nansana		M		
RESULT AREA 4: Agriculture	**Output 4.1** Climate-smart agriculture practices promoted.	1. Train farmers in CSA practices	Busukuma, Gombe	S			MAAIF, NMC

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
Outcome 4: **Climate-resilient urban and peri-urban agriculture systems are established**		2. Promote agroforestry and intercropping	Gombe, Busukuma	S			NFA, MAAIF
		3. Upscale drought-tolerant crop varieties	Gombe, Busukuma	S			NARO-, NMC
		4. Encourage crop rotation and conservation farming	Busukuma	S			NMC
		5. Integrate livestock with CSA practices	Gombe, Nansana		M		MAAIF
	Output 4.2 Water use and soil conservation improved.	1. Water harvesting in farms	Busukuma	S			NMC
		2. Promote small-scale irrigation	Busukuma & Gombe		M		MAAIF
		3. Educate on soil conservation (terracing, mulching)	Gombe, Nansana	S			NMC
		4. Construct/expand water storage facilities	Gombe, Busukuma		M		MoWE
		5. Monitor soil health regularly	Entire municipality		M		NARO
	Output 4.3 Value chains and access to green markets enhanced.	1. Promote use of compost and green manure	Entire municipality	S			MAAIF
		2. Establish climate-resilient storage facilities.	Gombe, Busukuma		M		NMC
		3. Train on post-harvest handling.	Nabweru, Nansana	S			MAAIF
		4. Link farmers to climate-smart markets.	Entire municipality		M		NMC, MoTIC
		5. Support climate certification for farmers.	Gombe, Busukuma			L	NMC, MAAIF
RESULT AREA 5: Water and Environment	**Output 5.1** Environmental awareness and stewardship is promoted.	1. Sensitize communities zero waste policies and environmental management.	Entire municipality	S			NMC, NEMA

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
Outcome 5: **The urban environment is restored and protected to support sustainable ecosystems and community wellbeing**		2. Raise awareness on ecosystem conservation for disaster-risk management.	Entire municipality	S			NMC
		3. Educate communities on sustainable land use practices.	Nansana, Nabweru	S			NEMA, NMC
		4. Conduct school and youth-led eco-campaigns.	All divisions	S			NMC-Education Department
		5. Engage religious and cultural leaders in conservation.	Entire municipality	S			NMC
		6. Educate communities on compostable packaging use.	Entire municipality	S			NMC
	Output 5.2 Natural ecosystems restored and protected.	1. Restore and protect wetlands and forests.	Busukuma, Gombe		M		NEMA, NFA
		2. Promote large-scale urban tree planting.	Entire municipality		M		NMC, NFA
		3. Establish green belts, parks, and gardens.	Gombe, Nansana			L	NMC
		4. Demarcate and protect wetland boundaries.	Nabweru, Nansana		M		NEMA
		5. Control illegal dumping in natural areas	All divisions	S			NMC
	Output 5.3 Sustainable planning and enforcement strengthened.	1. Enforce environmental protection laws.	Entire municipality	S			NEMA, NMC
		2. Integrate environmental protection in urban plans.	All divisions		M		NMC, MoLHUD
		3. Monitor emissions and pollution hotspots.	Nansana Central		M		NEMA

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		4. Develop climate risk zoning maps.	Busukuma, Nabweru		M		NMC
		5. Train enforcement teams on environmental compliance.	Municipality-wide	S			NMC, NEMA
	Output 5.4 Organic and inorganic waste processing improved.	1. Establish decentralized composting sites.	Busukuma & Gombe		M		NMC, NEMA
		2. Set up anaerobic digesters for biogas.	Nabweru & Nansana		M		NMC, NEMA
		3. Build recycling facilities.	Nabweru, Nansana		M		NMC
		4. Promote biodegradable packaging.	Entire municipality	S			NMC
		5. Promote reuse of greywater.	Busukuma, Gombe	S			NMC
		6. Promote waste segregation at source.	Entire municipality	S			NMC
		7. Promote return schemes for bottles/containers.	Entire municipality	S			NMC
	Output 5.5 Waste disposal infrastructure improved.	1. Seal closed landfill sites to prevent methane leakage.	Entire municipality	S			NMC
		2. Manage landfill runoff to prevent surface and ground water contamination.	Nansana West	S			NEMA
		3. Strengthen waste collection systems.	Entire municipality		M		NMC
		4. Implement waste audit systems.	Entire municipality		M		NMC
		5. Train waste workers.	All divisions				
		6. Establish visible waste collection points.	Entire municipality	S			NMC
RESULT AREA 6: ICT	**Output 6.1** Climate and disaster early warning systems improved.	1. Develop local early warning systems.	Entire municipality	S			NMC, UNMA

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
Outcome 6: **A digitally connected and informed municipality using ICT for climate adaptation, early warning, and resilience is leveraged.**		2. Install automatic weather stations.	Nabweru, Gombe		M		UNMA
		3. Set up ICT-based control rooms.	Nansana, Nabweru		M		NMC, UNMA
		4. Use SMS alerts and community radios for dissemination.	All divisions	S			NMC
		5. Translate warnings into local languages/formats.	Entire municipality	S			NMC
	Output 6.2 Community digital literacy enhanced.	1. Train leaders and communities on ICT for climate.	Gombe, Busukuma	S			NMC
		2. Promote digital apps for farming/weather information.	Busukuma, Gombe		M		NMC, MAAIF
		3. Equip schools and CBOs with ICT tools.	Nansana & Nabweru		M		NMC, MoICT
		4. Use digital platforms to share adaptation practices.	Municipality-wide	S			NMC
		5. Support women and youth ICT inclusion.	Nabweru, Gombe		M		MoGLSD
	Output 6.3 ICT integrated into climate planning and governance.	1. Use GIS for risk mapping and planning.	Entire municipality		M		NMC
		2. Digitalize permit and reporting systems.	Nansana Central		M		NMC
		3. Develop a municipal climate portal.	Entire municipality			L	NMC
		4.Use AI to optimize transport and waste systems.	Nansana, Nabweru		M		NMC
		5. Archive local climate data for research.	Entire municipality		M		NMC, Academia

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
RESULT AREA 7: Land and housing Outcome 7: **A resilient and inclusive urban settlement system with climate-proof land use and housing infrastructure is developed**	**Output 7.1** Climate-resilient and inclusive housing promoted.	1. Promote resilient building design by encouraging raised foundations, flood-proof materials, and wind-resistant roofs in high-risk zones.	Entire municipality		M		MoLHUD, NMC
		2. Require buildings in wetland-adjacent zones to include plinth elevations and proper drainage	Nabweru, Nansana		M		NMC
		3. Encourage participatory planning for housing by Involving local communities, especially informal settlers, in developing safe housing layouts.	Busukuma, Gombe	S			NMC
		4. Promote compressed earth blocks, stabilized soil bricks, and recycled aggregates.	Entire municipality	S			MoLHUD
		5. Support low-income housing retrofits.	Nabweru North, Kazo		M		NMC
	Output 7.2 Climate risk integrated into urban planning.	1. Develop zoning that avoids high-risk zones.	Entire municipality		M		NMC, MoLHUD
		2. Restrict development in wetlands and floodplains.	Nabweru, Busukuma		M		NEMA
		3. Promote mixed-use development to reduce emissions.	Nansana, Gombe			L	NMC
		4. Include green spaces in urban planning.	All divisions		M		NMC
		5. Conduct risk-based land assessments.	Busukuma, Nabweru	S			NMC, MoLHUD

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
	Output 7.3 Enforcement and monitoring strengthened	1. Enforce planning and construction standards.	Entire municipality	S			NMC, MoLHUD
		2. Improve land tenure systems for resilience.	Busukuma, Gombe		M		NMC
		3. Monitor informal development in risk zones.	Nabweru, Nansana	S			NMC
		4. Build local capacity for urban climate planning.	Municipality-wide		M		NMC
		5. Establish a land and housing climate task force.	Nansana Central	S			NMC
RESULT AREA 8. Social development (Communities)	**Output 8.1** Community awareness and participation in climate adaptation and DRR increased	1. Sensitize communities about climate change and disaster preparedness.	Entire municipality	S			NMC, MoGLSD
Outcome 8: **Community resilience and inclusion in climate action is enhanced**		2. Train communities in sustainable practices like agroforestry.	Busukuma, Gombe	S			NMC, MAAIF
		3. Advocate for integration of climate change education into school curricula.	Nansana & Nabweru Divisions		M		MoES, NMC
		4. Conduct regular community workshops on DRR and first aid.	All divisions	S			NMC, OPM
		5. Promote inclusive planning by engaging youth, women, and persons with disabilities.	Gombe, Nabweru	S			MoGLSD, NMC
	Output 8.2 Community livelihoods and support systems strengthened	1. Support vulnerable groups to diversify income sources (e.g., green enterprises)	Nabweru North, Gombe, Busukuma	S			MoGLSD, NMC
		2. Support community-based enterprises in recycling, organic farming, eco-tourism	Nansana, Gombe	S			NMC

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		3. Establish local funds for community-led adaptation & recovery projects	Busukuma, Gombe		M		NMC, MoGLSD
		4. Provide vocational training for youth and women in climate-smart sectors	Nabweru, Nansana		M		NMC, MoGLSD
		5. Promote green jobs and entrepreneurship for marginalized groups	Nabweru South, Gguluddene		M		MoGLSD, NMC
	Output 8.3 Public health, social infrastructure, and well-being improved	1. Promote rainwater harvesting and greywater recycling at household level	Entire municipality		M		MoWE, NMC
		2. Establish green social spaces (parks, gardens) for recreation and carbon sinks	Nansana, Gombe			L	NMC
		3. Train communities in psychosocial support post-disaster	All divisions	S			MoGLSD, OPM
		4. Improve access to sanitation and clean water in vulnerable parishes	Busukuma, Nabweru		M		MoWE, NMC
		5. Strengthen community safety nets (cash-for-work, food-for-work, micro-insurance)	Gombe, Busukuma		M		MoGLSD, NMC
RESULT AREA 9. Education and Sports	**Output 9.1** Climate education and environmental awareness integrated into school curricula and co-curricular activities	1. Conduct school-based climate change sensitization sessions	All divisions, focusing on Masoli, Nabweru South, Nansana West	S			Municipal Education Office, Schools, NGOs (e.g., CBOs)
Outcome 9: **Community resilience and inclusion in climate action is enhanced**		2. Develop and distribute learner-friendly climate materials	Nabweru, Gombe, Kazo	S			Municipal Education Office, Ministry of Education, NGOs

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		3. Organize inter-school sports and climate awareness events ("Green Games")	Nabweru, Nansana East & West	S			Municipal education and sports office, Schools, NGOs
		4. Train teachers, sports coaches, and administrators on integrating climate action	Gguluddene, Kazo, Masoli		M		Ministry of Education, Teacher Tr, NGOs
		5. Establish environment and climate clubs in schools	All divisions		M		Municipal Environment Office, Schools, NGOs
	Output 9.2 Capacity building in schools strengthened	1. Train school management teams on climate-resilient infrastructure	All public schools (focus: Nabweru North, Busukuma)		M		Municipal Engineering Department, School Management Boards
		2. Provide training for teachers on participatory climate learning	Kazo, Gguluddene		M		Ministry of Education, NGOs, Vocational Institutes
		3. Integrate climate themes into sports events and clubs	All divisions		M		Municipal Sports Office, Schools, Youth Councils
		4. Facilitate climate leadership programs targeting youth	Nansana East, Kazo		M		NGOs (e.g., UNICEF), Youth Councils, Schools

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		5. Organize climate-focused debates and quizzes in schools	Nabweru North, Gombe		M		Schools, Municipal Education Office
	Output 9.3 Inclusive school and community-based climate action initiatives implemented	1. Initiate talent development programs in sports and climate leadership	Nansana West, Kazo	S			Municipal Sports Office, NGOs, Community Leaders
		2. Promote school-community tree planting and clean-up drives	Nansana West, Nabweru South, Masoli	S			Municipal Environment Office, Schools, CBOs
		3. Establish school-community partnerships for local climate projects	Gombe, Busukuma		M		Municipal Education Office, CBOs, Schools
		4. Engage youth groups in school-based climate monitoring	All divisions		M		Youth Councils, Schools, Municipal Environment Office
		5. Promote lifelong learning and community engagement events	All divisions (focus: peri-urban parishes)			L	Municipal Education Office, NGOs, Community Centres
RESULT AREA 10. Health Outcome 10: **Resilience of the health system and communities to climate-related health risks and emergencies is improved**	**Output 10.1** Health system capacity strengthened	1. Train health workers on climate-sensitive disease management	Entire Municipality	S			NMC, MoH
		2. Improve disease surveillance and reporting systems	Nansana & Nabweru Divisions		M		NMC, MoH

Result Areas & Outcomes	Outputs/Objectives	Climate actions to reduce Greenhouse Gasses	Priority areas/Divisions or Parishes	Short-term	Medium-term	Long-term	Responsibility
		3. Equip health centres with climate-related emergency supplies	Busukuma & Gombe		M		NMC, MoH
		4. Support health workers with climate-health education toolkits	All Divisions	S			NMC, MoH
		5. Develop rapid response units for climate-induced health emergencies	Nansana HQ		M		NMC, MoH, OPM
	Output 10.2 Access to climate-resilient health infrastructure and services improved	1. Provide clean water and improved sanitation in health centres	Kawanda, Gombe	S			NMC, MoH, MoWE
		2. Upgrade health centres with rainwater harvesting and flood-proofing	Nansana & Nabweru		M		NMC, MoH, MoLG
		3. Construct climate-resilient health centres in vulnerable areas	Kazo, Gguluddene			L	NMC, MoH, MoFPED
		4. Equip health centres for climate-related emergencies	Busukuma		M		NMC, MoH
		5. Improve waste management systems at health facilities	All Divisions		M		NMC, NEMA
	Output 10.3 Community awareness and adoption of climate-smart health practices increased	1. Conduct community sensitization on climate-related health risks	Nabweru & Gombe	S			NMC, MoH
		2. Carry out public health campaigns on hygiene and disease prevention	All Divisions	S			NMC, MoH, NGOs
		3. Promote household climate-sensitive practices (safe water, mosquito nets, clean cooking)	Kawanda, Busukuma	S			NMC, MoH
		4. Develop community-based early warning systems	Entire Municipality		M		NMC, UNMA
		5. Establish municipal platforms for public dialogue on climate and health	Nansana HQ			L	NMC, MoH, Media Outlets

3.3 Implementation Arrangements

3.3.1 Overall Coordination framework

Nansana Municipal Council will serve as the lead entity responsible for implementing the Climate Action Plan. A Municipal Climate and Disaster Taskforce, chaired by the Department of Natural Resources, will be established. This taskforce will comprise technical representatives from relevant departments including Works, Health, Physical Planning, Community Development, and Education. The taskforce will be responsible for overseeing plan implementation, mobilizing resources, coordinating activities, conducting monitoring and evaluation, and reporting progress. It will report directly to the Town Clerk.

3.3.2 Division-Level Coordination

Implementation at the division level will be guided by Environment and Natural Resources Committees. Health and Sanitation Committees at the division level will also support implementation. These committees will mobilize local communities, enforce climate actions, and report to the municipal taskforce.

3.3.3 Roles of stakeholders

The stakeholder in the implementation of the climate action plan includes government institutions, non-governmental organizations, community groups, academic institutions, and private sector actors. Each stakeholder will play a unique role ranging from leadership, policy formulation, enforcement, technical support, and funding, to community mobilization, education, innovation, and public awareness. This multi-stakeholder approach will ensure inclusive, participatory, and effective climate action by leveraging diverse expertise, resources, and community knowledge.

Table 25: Roles of stakeholders

Stakeholder	Roles
Nansana Municipal Council (Technical & Political Wings)	Leadership, planning, and oversight role in the implementation of the climate actions
NEMA (National Environment Management Authority)	Enforcement of environmental regulations and technical support to the municipality
UNMA (Uganda National Meteorological Authority)	Climate data and early warning information
Ministry of Water and Environment (MWE)	Policy guidance, technical support, water/climate services
NGOs & Development Partners (e.g., GKMA-UDP, YCAF)	Technical support, funding, community engagement
CBOs, Community Groups	Grassroots mobilization, community-led implementation
Academic and Research Institutions	Technical research, data generation, M&E support
Private Sector	Investment in green technology, innovation, job creation
Religious and Cultural Leaders	Behavioural change and public sensitization
Youth and Women's Groups	Target groups for inclusion, climate champions
Farmers' Associations & Cooperatives	Adoption of CSA and resilient practices
Schools & Educational Institutions	Early climate education and innovation
Media Houses	Information dissemination and public awareness
CSOs & Indigenous Knowledge Holders	Social accountability, traditional adaptation techniques

3.4 Costing of Climate Actions

The table below provides a detailed breakdown of costs to realize the climate action outputs to guide planning, investment mobilization, and effective implementation of climate resilience activities.

Table 26: Costing of climate action outputs (in millions of UGX)

Result Area	Output	2026	2027	2028	2029	2030	Total (UGX)
1. Energy	1.1 Energy efficiency campaigns	151.4	119.6	105.2	112.2	121.0	609.4
	1.2 Renewable energy access	115.8	112.5	113.1	153.4	192.5	687.3
	1.3 Emission control technology	292.3	245.2	159.2	151.4	151.5	999.6
2. Transportation	2.1 Awareness campaigns	123.3	123.5	75.2	65.3	65.2	452.5
	2.2 Clean transport infrastructure	213.5	264.0	226.3	268.2	179.1	1,151.1
	2.3 Planning enhancement	105.8	114.6	113.5	112.4	111.2	557.5
3. Trade and Industry	3.1 Climate-smart trade initiatives	132.4	130.5	129.1	123.4	80.1	595.5
	3.2 Sustainable logistics	56.2	53.9	53.6	53.2	53.1	270.0
	3.3 Trade policy support	51.2	51.2	51.2	51.1	51.1	255.9
	3.4 Emission reduction support	96.8	80.3	75.6	75.6	73.4	401.7
	3.5 Circular production incentives	119.7	108.1	102.3	102.1	85.1	517.3
	3.6 Sustainable supply chain programs	158.3	150.0	100.0	100.0	50.0	558.3
4. Agriculture	4.1 Climate-smart agriculture	156.0	146.1	146.1	146.1	146.1	740.4
	4.2 Water & soil conservation	196.2	148.2	140.2	140.1	140.0	764.7
	4.3 Value chain development	146.2	98.2	98.2	98.2	98.2	539.0
5. Environment	5.1 Environmental awareness	125.3	120.8	110.4	110.4	110.4	577.3
	5.2 Ecosystem restoration	145.6	145.6	120.7	104.2	102.1	618.2
	5.3 Urban planning enforcement	118.6	118.6	118.6	118.6	118.6	593.0
	5.4 Organic/inorganic waste processing	289.4	270.6	193.5	193.5	193.5	1,140.5
	5.5 Wate management infrastructure developed	114.9	113.4	198.3	198.1	198.0	822.7
6. ICT	6.1 Early warning systems	186.1	135.2	94.6	94.6	94.6	605.1

Result Area	Output	2026	2027	2028	2029	2030	Total (UGX)
	6.2 Digital literacy training	91.4	91.4	91.4	91.4	91.4	457.0
	6.3 ICT integration into planning	99.3	99.3	99.3	99.3	99.3	496.5
7. Land & Housing	7.1 Climate-resilient housing	186.4	152.4	189.7	188.8	159.7	877.0
	7.2 Climate risk integration	98.7	98.7	98.7	98.7	98.7	493.5
	7.3 Enforcement monitoring	87.9	87.9	87.9	87.9	87.9	439.5
8. Social Development	8.1 Community participation	148.2	148.2	98.9	98.9	98.9	593.1
	8.2 Livelihood support programs	179.2	179.2	198.2	198.2	198.2	953.0
	8.3 Health & well-being	163.6	143.8	143.8	143.8	95.3	690.3
9. Education and Sports	9.1 Climate education and environmental	147.0	94.8	94.8	94.8	94.8	526.2
	9.2 Capacity building in schools	78.6	78.6	78.6	78.6	78.6	393.0
	9.3 School-based climate action initiatives	147.6	147.6	147.6	147.6	147.6	738.0
10. Health	10.1 Health system capacity strengthened	187.4	187.4	139.2	139.2	89.4	742.6
	10.2 Climate-resilient health infrastructure	185.9	148.5	177.8	177.8	164.6	854.6
	10.3 Climate-smart health community awareness and adoption	136.4	96.4	96.4	96.4	96.4	522.0
Total =22,233,300							

The total cost of this climate action plan is 22,233,300 = (Twenty-two million two hundred thirty-three thousand three hundred Uganda shillings).

3.5   Resource mobilization

The implementation of this climate action plan will rely on:
1. Municipal budget allocations through annual budgets aligned to the Climate Action Plan
2. Central government transfers and sector conditional grants for environmental, health, and infrastructure projects
3. Development partner contributions through project-based and technical support programs
4. Private sector investments in renewable energy, housing, waste management, and urban agriculture
5. Community contributions in the form of labor, materials, or voluntary services for local initiatives
6. Innovative financing mechanisms such as climate bonds, carbon credit trading, and green funds

Table 27: Funding sources and use

Sources	Use
Local Revenue	Partial funding for implementation, e.g., emergency budgeting, quick response
Development Partners	Infrastructure, capacity building, early warning systems, innovation projects (e.g., Youth Climate Action Fund)
Government Grants & Sectoral Ministries (e.g., MEMD, MAAIF, MoLHUD)	Programmatic support for specific result areas like agriculture, housing, and energy
Private Sector Contributions	Investment in green businesses, public-private partnerships
Community Contributions	Volunteering, local labor, community-owned adaptation initiatives

3.6   Mechanism to Disseminate climate information

To ensure that timely, reliable, and actionable climate information reaches decision-makers, communities, and relevant stakeholders to enhance preparedness, resilience, and informed climate action in Nansana Municipality, the following climate information sharing channels will be utilized.

3.6.1   Early Warning Systems (EWS)
1. Automated SMS and Radio Alerts: Bulk SMS platforms and local FM radios will disseminate warnings on extreme weather events (storms, floods, heatwaves).
2. Weather Stations: Installed stations will continuously monitor local conditions, providing real-time updates to municipal authorities and the public.
3. EWS Mobile Application: A municipal EWS app will deliver forecasts, alerts, and safety advice to residents, community leaders, and institutions.

3.6.2   Community-Based Information Channels
1. Community Meetings (Barazas): Local leaders and municipal staff will organize regular community sensitization meetings, especially before and during rainy seasons.
2. Religious and Social Institutions: Information shared through churches, mosques, schools, and social clubs using noticeboards, bulletins, and announcements.
3. Town Council Noticeboards: Climate updates, emergency alerts, and guidance notices posted at municipal and division offices.

3.6.3 ICT and Digital Platforms

Social Media (WhatsApp, Facebook, Twitter): Nansana Municipal Council official accounts will broadcast climate-related information, advisories, and risk alerts.

Website and Online Portals: The municipal website will host climate bulletins, advisories, seasonal forecasts, and emergency contact information.

3.6.4 Institutional Networks

Disaster Committees and Focal Persons: Sectoral and divisional DRR committees will cascade climate information to wards, schools, businesses, and local institutions.

Schools and Health Facilities: Climate alerts and preparedness information shared through school clubs and health centres.

3.6.5 Materials

Posters, Brochures, and Flyers: Distributed in marketplaces, health centres, schools, and churches, carrying simplified climate forecasts, preparedness tips, and emergency contacts.

IEC (Information, Education, and Communication) Materials: Targeted messages in local languages for vulnerable groups like women, elderly, and persons with disabilities.

3.6.6 Feedback and Two-Way Communication

The municipality will provide feedback communication mechanism to allow communities to, report local weather observations, hazards, and incidents; ask questions or seek clarifications through hotlines, social media, and EWS app features; and engage in participatory meetings to review the usefulness and clarity of information.

4. Chapter Five: Monitoring, Evaluation, and Learning

4.1 Introduction

Effective implementation of climate action plan requires a strong and inclusive Monitoring, Evaluation, and Learning (MEL) system. The MEL framework will ensure that progress is systematically tracked, outcomes are evaluated, and valuable lessons are documented and integrated into future planning and decision-making processes. The specific objectives of the MEL include:

1. Monitor the progress of actions across all result areas and sectors.
2. Evaluate the effectiveness and efficiency of interventions.
3. Identify and share best practices and lessons learned.
4. Promote community feedback and inclusive learning.
5. Enable evidence-based decision-making for adaptive management

4.2 Institutional responsibility

To achieve the objectives of the MEL, a coordinated structure has been established, assigning clear roles and responsibilities to key actors at different levels of the municipal system. These actors range from municipal leadership and departmental focal persons to grassroots community representatives, technical experts, and development partners. Each actor plays a distinct and complementary role, contributing to the overall effectiveness, accountability, and responsiveness of climate actions within the municipality.

Table 28: MEL structure and Roles

Actor	Role in MEL
Municipal Climate & Disaster Taskforce	Provides strategic oversight of the entire MEL system. It will be responsible for supervising MEL activities, ensuring alignment with municipal priorities, compiling and consolidating progress reports from various sectors and divisions, and submitting comprehensive municipal climate and disaster reports to national and regional authorities.
Departmental Focal Persons	Act as sector-level MEL leads within their respective departments. They track and compile sector-specific indicators related to climate actions, verify the accuracy and completeness of data, and report their findings to the Municipal Climate & Disaster Taskforce for consolidation.
Division-level Committees	Function at the grassroots level to gather local climate-related data, monitor project activities, and support community-based reporting mechanisms. They also relay community feedback and localized challenges to the departmental focal persons, ensuring that grassroots realities are reflected in higher-level reports.
Community Representatives	Represent community interests in the MEL process by actively participating in data collection, providing feedback on project performance, reporting issues, and participating in community-based monitoring activities. They ensure that local knowledge, experiences, and priorities are integrated into the MEL system.
Academia & Research Institutions	Offer specialized technical expertise to support MEL processes. They assist with the design of data collection tools, carry out independent studies, perform data analysis, and support the evaluation of climate interventions to generate evidence-based recommendations for improved policy and programming.
Development Partners	Play a financial and technical support role by co-funding MEL activities, providing technical assistance for evaluations, and contributing to capacity building. They also support joint evaluations and learning sessions to improve program effectiveness and impact.

4.2.1   MEL indicators

Indicator Type	Examples
Input Indicators	Number of climate projects funded; staff trained
Output Indicators	Number of trees planted; early warning systems installed
Outcome Indicators	Reduction in flood impacts, increased renewable energy adoption
Impact Indicators	Improved food security, reduced disaster-related losses

4.2.2   Tools and approaches

1. Quarterly progress reports
2. Annual review workshops
3. Community scorecards
4. GIS and remote sensing
5. Mobile-based data collection (e.g., KoboToolbox)
6. Before-and-after assessments

4.2.3   Learning and Feedback Mechanisms

1. Community feedback sessions at division level
2. Knowledge sharing workshops with stakeholders
3. Integration of indigenous knowledge into adaptation strategies
4. Documentation of success stories and lessons learned

4.2.4   Reporting and communication

1. Regular reports submitted to the Town Clerk and Municipal Council
2. Annual Climate Action Progress Reports shared with stakeholders
3. Dashboards or portals for real-time tracking (to be developed)
4. Public briefings via radio, community meetings, and social media

4.2.5   Adaptive Management

1. Use MEL findings to revise strategies and reallocate resources
2. Identify underperforming interventions for redesign or discontinuation
3. Integrate climate projections and emerging data to update plans

4.2.6   Risk Management

Potential implementation risks include limited funding, political interference, climate disasters, and low community participation. Risk mitigation strategies include:

1. Diversified financing and partnerships
2. Strengthening local ownership and participation
3. Institutionalizing climate action in municipal policies
4. Regular scenario planning and adaptive management approaches

Table 6: Climate Action Monitoring, Evaluation, and Learning Framework (2026-2030)

Outcome/Result Areas	Outputs	Indicators	Means of Verification	Baseline (2024)	Target 2026	Target 2027	Target 2028	Target 2029	Target 2030
1. Energy	1.1 Energy efficiency improved	% reduction in municipal energy consumption	Energy audit reports	0%	5%	10%	15%	20%	25%
	1.2 Access to renewable energy enhanced	% of households using renewable energy	Household surveys, utility records	10%	15%	20%	30%	40%	50%
	1.3 Emissions from infrastructure reduced	% reduction in emissions from public infrastructure	Emissions monitoring reports	0%	5%	10%	20%	30%	40%
2. Transportation	2.1 Awareness and low-emission transport use increased	% of population using low-emission transport	Traffic surveys, commuter records	5%	10%	20%	30%	40%	50%
	2.2 Infrastructure for clean transport promoted	Km of new bicycle lanes and pedestrian paths	Infrastructure records	5	10	15	20	25	30
	2.3 Integrated sustainable planning enhanced	No. of integrated urban transport plans developed	Municipal planning documents	0	1	2	3	4	5
3. Trade and Industry	3.1 Climate-smart and low-carbon trade practices promoted	% of markets adopting eco-friendly practices	Market surveys, inspection reports	5%	10%	20%	30%	40%	50%
	3.2 Improved efficiency and reduced emissions in logistics	% reduction in emissions from trade transport	Emissions audit reports	0%	5%	10%	20%	30%	40%

Outcome/Result Areas	Outputs	Indicators	Means of Verification	Baseline (2024)	Target 2026	Target 2027	Target 2028	Target 2029	Target 2030
	3.3 Policies and incentives for sustainable trade strengthened	No. of policies developed and implemented	Policy review documents	0	1	2	3	4	5
	3.5 Industrial emissions and pollution reduced	% reduction in emissions from local industries	Industrial audit reports	0%	5%	10%	20%	30%	40%
	3.6 Circular and energy-efficient production promoted	% of industries applying circular production	Industry surveys	5%	10%	20%	30%	40%	50%
	3.7 Sustainable supply chains promoted	% of businesses adopting green supply chains	Trade association reports	5%	10%	20%	30%	40%	50%
4. Agriculture	4.1 Climate-smart agriculture practices promoted	% of farmers adopting climate-smart practices	Agricultural extension reports	10%	20%	30%	40%	50%	60%
	4.2 Water use and soil conservation improved	% of farms implementing soil/water conservation	Farm surveys	5%	15%	25%	35%	45%	55%
	4.3 Value chains and access to green markets enhanced	No. of farmers accessing green value chains	Market records	50	100	150	200	250	300
5. Environment	5.1 Environmental awareness and stewardship promoted	% of residents aware of climate and environmental issues	Community surveys	30%	50%	60%	70%	80%	90%
	5.2 Natural ecosystems restored and protected	Area (ha) of green and natural spaces restored	Environmental agency reports	10	20	30	40	50	60
	5.3 Sustainable planning and enforcement strengthened	No. of enforcement actions on illegal environmental practices	Municipal records	10	20	30	40	50	60

Outcome/Result Areas	Outputs	Indicators	Means of Verification	Baseline (2024)	Target 2026	Target 2027	Target 2028	Target 2029	Target 2030
	5.4 Organic and inorganic waste processing improved	Tons of waste processed annually	Waste processing plant reports	5,000	7,000	10,000	12,000	14,000	16,000
	5.5 Waste disposal infrastructure developed	No. of improved/rehabilitated waste disposal sites	Municipal reports	2	3	5	7	8	10
6. ICT	6.1 Climate and disaster early warning systems improved	% of population receiving timely early warnings	Communication system reports	20%	40%	60%	70%	80%	90%
	6.2 Community digital literacy enhanced	% of citizens trained on digital tools for climate adaptation	Training reports	10%	20%	30%	40%	50%	60%
	6.3 ICT integrated into climate planning and governance	No. of plans integrating ICT-based climate tools	Planning reports	1	2	3	4	5	6
7. Land & Housing	7.1 Climate-resilient and inclusive housing promoted	% of new houses built to climate-resilient standards	Building permits, inspections	10%	20%	30%	40%	50%	60%
	7.2 Climate risk integrated into urban planning	% of plans incorporating climate risk assessments	Urban plans	10%	25%	40%	55%	70%	85%
	7.3 Enforcement and monitoring strengthened	No. of land use and housing violations acted upon	Municipal records	10	20	30	40	50	60
8. Social Development	8.1 Community awareness and participation in climate action increased	% of population participating in climate adaptation activities	Community activity records	15%	25%	35%	45%	55%	65%

Outcome/Result Areas	Outputs	Indicators	Means of Verification	Baseline (2024)	Target 2026	Target 2027	Target 2028	Target 2029	Target 2030
	8.2 Community livelihoods and support systems strengthened	No. of households benefiting from livelihood programs	Program reports	200	400	600	800	1000	1200
	8.3 Public health, social infrastructure and well-being improved	% of public spaces upgraded with climate-resilient features	Infrastructure upgrade reports	10%	20%	30%	40%	50%	60%
9. Education and Sports	9.1 Climate education and environmental awareness integrated into school curricula and co-curricular activities	No. of schools with integrated climate education	MoES curriculum records, inspection reports	5	20	35	50	65	80
	9.2 Capacity building in schools strengthened	No. of teachers and school leaders trained on climate-resilient education	Training reports, attendance sheets	0	150	300	450	600	750
	9.3 School-based climate action initiatives implemented	No. of functional school-community climate clubs/projects	School activity reports, MoES reports	3	10	25	40	55	70
10. Health	10.1 Health system capacity strengthened	No. of health workers trained in climate-health	MoH training reports, certification lists	20	80	120	150	180	200
	10.2 Climate-resilient health infrastructure improved	No. of health centres upgraded with climate-resilient infrastructure (e.g., water harvesting, solar, flood-proofing)	Infrastructure audit reports, MoH & NMC assessments	2	5	8	11	13	15
	10.3 Climate-smart health community awareness and adoption enhanced	% of households adopting safe water, sanitation, and clean energy practices	Household survey reports, MoH outreach logs	15%	25%	35%	45%	55%	65%

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