REPUBLIC OF KENYA

MIGORI MUNICIPALITY

MIGORI COUNTY

Office of the Municipal Manager

DEPARTMENT OF LANDS, HOUSING, PHYSICAL PLANNING &URBAN DEVELOPMENT

URBAN CLIMATE RISK PROFILE

FOR

MIGORI MUNICIPALITY – MIGORI COUNTY

MIGORI MUNICIPALITY

MIGORI COUNTY GOVERNMENT
LAND, HOUSING AND URBAN DEVELOPMENT
MUNICIPAL MANAGER
14 JAN 2020
MIGORI MUNICIPALITY
P. O. Box 195-40400, SUNA-MIGORI

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Migori Municipality.
Under the State Department for Housing and Urban Development.
Kenya Urban Support Programme Phase II (KUSP II)

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Foreword

Climate change continues to present growing challenges to our urban areas, affecting lives, infrastructure, and the sustainability of municipal development. As urbanization accelerates, municipalities must proactively integrate climate risk considerations into planning and investment decisions. The Urban Climate Risk Profile for Migori Municipality is an important step toward building a resilient and sustainable future for our communities.

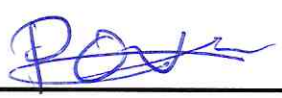
This profile provides an in-depth analysis of the climate-related hazards, vulnerabilities, and exposure within Migori Municipality and the wider Migori County. It highlights key risks such as flooding, heat stress, and water resource challenges, while also identifying opportunities to strengthen resilience through informed planning, climate-smart infrastructure, and enhanced community awareness.

The preparation of this Urban Climate Risk Profile was undertaken by the Municipality following a two-day Climate Risk Profile Training organized by the State Department for Housing and Urban Development under the Kenya Urban Support Programme Phase II (KUSP II). The training was delivered by the Global Center on Adaptation (GCA) in partnership with the World Bank, the Government of Kenya, and the Council of Governors, held on September 22–23, 2025, in Nairobi, Kenya.

We appreciate the technical guidance and capacity support provided through this collaboration, which has enabled our Municipality to generate data-driven insights for climate-resilient urban planning. This document will serve as a critical tool for policymakers, urban planners, and development partners as we align our strategies with Kenya's broader climate adaptation and sustainable urban development goals.

On behalf of the Migori Municipal Board, I commend the efforts of the Municipal Environment Officer, Mr. Eugene Odindo Otieno, and the technical team for their commitment in developing this important report. I also acknowledge the support of Migori County Government and all stakeholders who contributed valuable input to this initiative.

Together, we are laying the foundation for a resilient, inclusive, and sustainable Municipality that can withstand the impact of climate change and ensure the well-being of our municipal residents for generations to come.



Mr. Paul Odhiambo Kokello

Chairperson, Migori Municipal Board

Migori County, Kenya 2025

Executive Summary

Table 1. Summary of Pluvial Flooding risks for Migori Municipality

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Infrastructure & Services					
Stormwater Drainage	Medium	Medium	Very High	High	Very High
Water & Wastewater Management	Low	Low	High	Medium	High
Solid Waste Management	Medium	Medium	Very High	High	Very High
Transport and Mobility	Low	Low	High	Medium	High
Energy	Low	Low	Medium	Low	Medium
Economic Infrastructure	Low	Low	High	Medium	High
Social Infrastructure	Low	Low	Medium	Low	Medium
Emergency Services	Medium	Medium	Very High	High	Very High
Populations					
Urban Residents	Low	Low	Medium	Low	Medium
Informal Settlement Residents	Medium	Medium	Very High	High	Very High
Vulnerable and Marginalized Groups	Medium	Medium	Very High	High	Very High
Natural Assets					
Urban Green Infrastructure	Low	Low	High	Medium	High
Urban Blue Infrastructure	Medium	Medium	Very High	High	Very High
Peri-urban and Agricultural Systems	Low	Low	High	Medium	High

Table 2. Summary of Drought risks for Migori Municipality

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Infrastructure & Services					
Stormwater Drainage	Very Low	Low	Low	Low	Low
Water & Wastewater Management	Medium	Medium	Very High	High	Very High
Solid Waste Management	Low	Low	Medium	Low	Medium
Transport and Mobility	Low	Low	Medium	Low	Medium
Energy	Low	Low	High	Medium	High
Economic Infrastructure	Low	Low	Medium	Low	Medium
Social Infrastructure	Low	Low	High	Medium	High
Emergency Services	Low	Low	Medium	Low	Medium
Populations					
Urban Residents	Low	Low	High	Medium	High

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Informal Settlement Residents	Low	Low	Medium	Low	Medium
Vulnerable and Marginalized Groups	Medium	Medium	Very High	High	Very High
Natural Assets					
Urban Green Infrastructure	Low	Low	High	Medium	High
Urban Blue Infrastructure	Medium	Medium	Very High	High	Very High
Peri-urban and Agricultural Systems	Medium	Medium	Very High	High	Very High

Table 3. Summary of Heat Stress/Extreme Heat risks for Migori Municipality

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Infrastructure & Services					
Storm water Drainage	Low	Low	Medium	Low	Medium
Water & Wastewater Management	Low	Medium	High	High	High
Solid Waste Management	Very Low	Very Low	Low	Low	Low
Transport and Mobility	Very Low	Very Low	Low	Low	Low
Energy	Very Low	Very Low	Low	Low	Low
Economic Infrastructure	Very Low	Very Low	Low	Low	Low
Social Infrastructure	Very Low	Very Low	Low	Low	Low
Emergency Services	Very Low	Very Low	Low	Low	Low
Populations					
Urban Residents	Low	Low	Medium	Low	Medium
Informal Settlement Residents	Low	Low	High	Medium	High
Vulnerable and Marginalized Groups	Low	Low	High	Medium	High
Natural Assets					
Urban Green Infrastructure	Low	Low	High	Medium	High
Urban Blue Infrastructure	Low	Low	High	Medium	High
Peri-urban and Agricultural Systems	Low	Low	High	Medium	High

Table 4. Summary of Land degradation risks for Migori Municipality

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Infrastructure & Services					
Storm water Drainage	Medium	Medium	Very High	High	Very High
Water & Wastewater Management	Low	Low	High	Medium	High
Solid Waste Management	Low	Low	Medium	Low	Medium
Transport and Mobility	Low	Low	High	Medium	High
Energy	Low	Low	Medium	Low	Medium
Economic Infrastructure	Low	Low	High	Medium	High
Social Infrastructure	Medium	Medium	Very High	High	Very High
Emergency Services	Medium	Medium	Very High	High	Very High
Populations					
Urban Residents	Medium	Medium	Very High	Medium	Very High
Informal Settlement Residents	Medium	Medium	Very High	High	Very High
Vulnerable and Marginalized Groups	Medium	Medium	Very High	High	Very High
Natural Assets					
Urban Green Infrastructure	Medium	Medium	Medium	High	Very high
Urban Blue Infrastructure	Medium	Medium	Very High	High	Very High

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Peri-urban and Agricultural Systems	Medium	Medium	Very High	High	Very High

Table 5. Summary of Changes in Precipitation Patterns risks for Migori Municipality

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Infrastructure & Services					
Storm water Drainage	Low	Low	High	Medium	High
Water & Wastewater Management	Medium	Medium	Very High	High	Very High
Solid Waste Management	Low	Low	High	Medium	High
Transport and Mobility	Low	Low	High	Medium	High
Energy	Low	Low	Medium	Low	Medium
Economic Infrastructure	Low	Low	High	Medium	High
Social Infrastructure	Low	Low	Medium	Low	Medium
Emergency Services	Low	Low	High	Medium	High
Populations					
Urban Residents	Low	Low	Medium	Low	Medium
Informal Settlement Residents	Medium	Medium	Very High	High	Very High
Vulnerable and Marginalized Groups	Medium	Medium	Very High	High	Very High

Category	Risk Level				
	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Natural Assets					
Urban Green Infrastructure	Low	Low	High	Medium	High
Urban Blue Infrastructure	Medium	Medium	Very High	High	Very High
Peri-urban and Agricultural Systems	Medium	Medium	Very High	High	Very High

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List of Acronyms

ASAL's	Arid and Semi-Arid Lands
CCAP	County Climate Change Action Plan
COG	Council of Governor's
CSO's	Civil Society Organizations
CIDP	County Integrated Development Plan
DRR	Disaster risk reduction
GCA	Global Center on Adaptation
GHG	Green House Gas
KUSP	Kenya Urban Support Programme
KNBS	Kenya National Bureau of Statistics
PWD	Persons with Disability
NCCAP	National Climate Change Action Plan
NDOC	National Disaster Operations Centre
NEMA	National Environmental Management Authority
PCRA	Participatory Climate Risk Assessment
RCRA	Rapid climate risk assessment
UNCED	United Nations Conference on Environment and Development
UNFCC	United Nations Framework Convention on Climate Change
VMG	Vulnerable and Marginalized Groups

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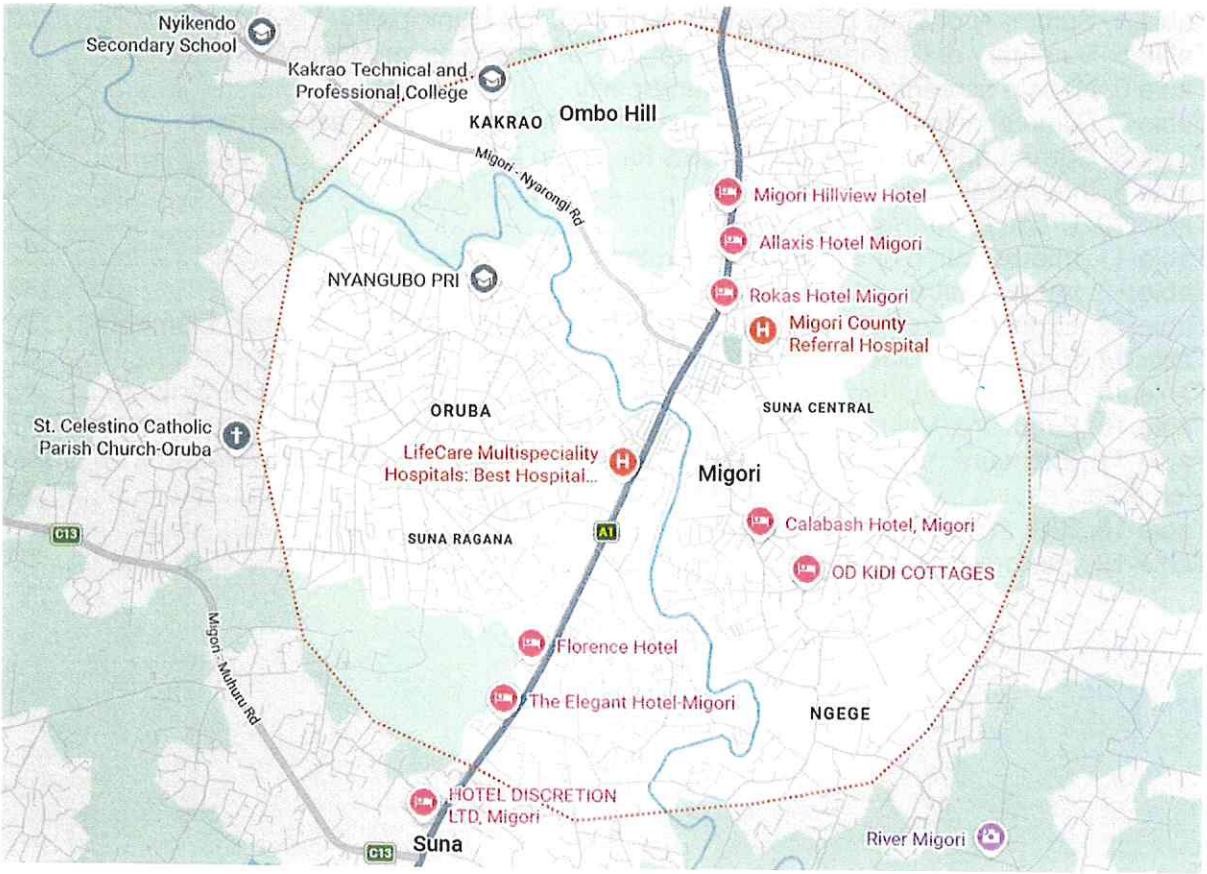
1. Context

1.1. Objective

This Urban Climate Risk Profile aims to identify, assess, and document the key climate-related risks affecting Migori Municipality. It seeks to understand the extent and impact of hazards such as flooding, drought, heat stress, Pests and diseases, change in precipitation patterns and land degradation on the Populations, urban systems, infrastructure, and communities. The profile further aims to provide evidence-based insights to guide local planning, enhance climate resilience, and inform the integration of adaptation and mitigation measures into municipal development strategies.

1.2. Urban Context

1.2.1 Geographic Area



Migori Municipality base map

The Municipality spans approximately 202.7sq km within Suna East and Suna West sub-counties. It acts as the primary administrative, political and economic capital of Migori County.

It has a rapidly expanding population (over 84,000 as of 2019) with a high demand for housing.

Urban development is a mix of high density buildings with roughly 73.6% of residential structures such as bungalows, maisonettes and huts. The economy is driven by trade

agriculture, livestock, education and jua kali (informal) sectors, including motor garages and millings. It is also a key transit town for trade between Kenya and Tanzania.

The central business district is divided by the River Migori, which faces significant pollution issues.

The Municipality operates under the Migori County Urban Institutional Development Strategy (CUIDS), focusing on upgrading infrastructure and formalizing urban growth.

1.2.1. Governance Structure

The development and management of the urban area within Migori Municipality falls under the jurisdiction of the County Government of Migori, operating through a structured system guided by the Urban Areas and Cities Act, 2011 (Revised 2019).

The Municipal Board of Migori is the primary governing body responsible for oversight, policy guidance, and decision-making on urban development matters. The Municipal Manager serves as the administrative head, coordinating the daily operations and implementation of municipal projects, including climate resilience and environmental sustainability initiatives.

The Climate Risk Profile (CRP) was developed collaboratively under the Kenya Urban Support Programme Phase II (KUSP II), with technical guidance from the State Department for Housing and Urban Development (SDHUD), in partnership with the Global Center on Adaptation (GCA), the World Bank, and the Council of Governors (CoG).

At the county level, preparation of the Integrated Development Plan (CIDP) is led by the Department of Finance, Economic Planning, and Development, working in coordination with the Department of Lands, Physical Planning, and Urban Development, and the Migori Municipal Board to ensure that climate resilience priorities identified in the RCRP are integrated into broader development frameworks.

Organogram for Migori Municipality Responsible for RCRP

National Government

|

├── **State Department for Housing and Urban Development (SDHUD)**

| └── **Kenya Urban Support Programme (KUSP II)**

| └── **Technical Partners: GCA, World Bank, CoG**

- County Government of Migori
  - Department of Lands, Physical Planning & Urban Development
    - Migori Municipal Board
      - Municipal Manager
        - Environment Officer
        - Physical Planning Officer
        - Engineer / Infrastructure Unit
        - Social Development Officer
        - Procurement Officer
        - Finance & Administration Unit
  - Department of Finance, Economic Planning & Development
    - Responsible for County Integrated Development Plan (CIDP)

1.2.2. Socio-economic Context

The Municipality spans approximately 202.7sq km within Suna East and Suna West sub-counties. It acts as the primary administrative, political and economic capital of Migori County.

It has a rapidly expanding population (over 84,000 as of 2019) with a high demand for housing.

Urban development is a mix of high density buildings with roughly 73.6% of residential structures such as bungalows, marionettes and huts. The economy is driven by trade, agriculture, livestock, education and jua kali (informal) sectors, including motor garages and millings. It is also a key transit town for trade between Kenya and Tanzania.

The central business district is divided by the River Migori, which faces significant pollution issues.

The Municipality operates under the Migori County Urban Institutional Development Strategy (CUIDS), focusing on upgrading infrastructure and formalizing urban growth.

This rapid demographic growth will intensify the demand for housing, infrastructure, health, and education services, while also heightening exposure to climate-related risks such as flooding, water scarcity, and heat stress.

Ward	Population (2019)	Estimated Population (2030)	Key Characteristics / Notes
Suna-Central	14,163	19,030	County HQ, serves as a key commercial and administrative hub.
Oruba-Ragana	16,828	21,000	Densely populated, mixed residential and institutional zones; vulnerable to flooding.
Kakrao	17, 235	22,500	Infrastructure development, agricultural base and political and administrative ward.
Wasweta 11	9,197	14,000	Semi-rural, growing residential expansion.
God jope	9,512	12,500	Agricultural area transitioning to peri-urban land use.

Note: Population projections assume an average annual growth rate of 3.5%, consistent with urban growth trends observed in Nyanza Region.

Demographic Composition

- **Youth Population (Below 35 years):** 62%
- **Female Population:** 51%
- **Average Household Size:** 3.8 persons
- **Urbanization Rate:** ~4% per annum
- **Literacy Level:** Approximately 90% (higher in urban wards)
- **Main Livelihoods:** Small-scale farming (maize, beans, sugarcane), trade, education, and real estate.

Vulnerable groups—particularly women, youth, and persons with disabilities (PWDs)—are disproportionately affected by climate impacts due to limited adaptive capacity and economic marginalization.

Projected Population Growth (2020–2040+)

Year	Estimated Population	Growth (%)
2019	99,845	—

2025	125,400	25.5%
2030	151,000	51%
2040 (Projection)	~200,000	100% increase

Population Density and Urbanization Pattern

Zone Type	Area (km²)	Population Density (people/km²)	Characteristics
Urban Core (Migori Municipality)	25.5	~3,800	High-density residential, institutional, and commercial zones.
Peri-Urban Fringe	20.0	~1,600	Transitional areas with increasing land conversion to residential and mixed use.
Rural Hinterland	26.0	~900	Predominantly agricultural with dispersed settlement patterns.

Implications for Urban Planning and Climate Resilience

- **Increased Pressure on Land and Services:** Rapid urban expansion may strain drainage, housing, and waste management systems.
- **Rising Exposure to Hazards:** Population growth in erosion-prone areas like oruba ragana increases vulnerability.
- **Need for Climate-Sensitive Urban Design:** Incorporation of green spaces, improved Stormwater systems, and sustainable housing will be vital.
- **Data-driven Planning:** Ward-level demographic data should inform infrastructure investments and adaptation priorities in the forthcoming **County Integrated Development Plan (CIDP)** and **Municipal Development Strategy**.

1.2.3. Economic Context

1. Overview

Migori Municipality serves as the economic and administrative Centre for Migori.

County, hosting the county headquarters, educational institutions (such as Migori Teachers Training College), and an expanding network of small and medium enterprises (SMEs).

The local economy is primarily driven by agriculture, trade, real estate, education, and public administration. However, the economy is increasingly diversifying as urbanization accelerates, particularly in the main urban center, which continue to attract investment in Education services, construction, hospitality, and transport sectors.

Projected economic growth is expected to average 4.5%–5% per annum through 2030, supported by infrastructure expansion, improved road connectivity, and increased access to finance for SMEs and agribusiness ventures.

2. Sectoral Contribution to the Local Economy

Sector	Current Contribution (2024)	Projected Contribution (2030)	Key Drivers and Challenges
Agriculture	46%	32%	Maize, beans, sugarcane; declining share due to urban expansion; vulnerable to erratic rainfall and land degradation.
Trade and Commerce (SMEs)	27%	29%	Growth in retail, hardware, and agri-input enterprises; digital platforms expanding market access.
Public Administration & Education	18%	20%	Rongo University Migori branch, and county government offices; stable employment source.
Real Estate & Construction	15%	18%	Rapid growth in residential and mixed-use developments; driven by demand for urban housing.
Transport and Logistics	9%	6%	Sustained by improved road networks; impacted by fuel costs and infrastructure pressure.
Hospitality & Services	8%	9%	Expanding tourism, accommodation, and restaurant services; boosted by local conferences and student population.

3. Employment by Sector (2024)

Sector	Share of Employment (%)
Agriculture	40%
Trade & SMEs	32%
Public Sector & Education	12%
Construction & Real Estate	14%

Transport	8%
Hospitality/Other Services	5%

Observation:

- Employment remains heavily dependent on agriculture and informal trade.
- The service sector and construction are expected to grow fastest over the next decade, creating new urban jobs but also increasing environmental pressures.

4 .Key Economic Zones and Growth Corridors

Zone / Centre	Economic Role	Key Characteristics
Main Highway	Commercial & Institutional Hub	Hosts major retail outlets, banks, government offices, and educational institutions.
Central Business District	Administrative & Service Centre	County HQ; growth in real estate, hotels, and hospitality services.
Industrial /Aggregation	Agricultural Production Zone	Maize, tea, sugarcane and dairy farms; transitioning to mixed land use.
Satellite centers	Peri-urban Development Corridor	Rapid residential expansion and agri-based trade.

5. Projected Economic Growth (2020–2030)

Year	Municipal GDP Estimate (Ksh Billion)	Growth Rate (%)	Main Drivers
2020	27.8	–	Agriculture, retail, and government services
2024	33.6	4.8	Construction, SMEs, education, real estate
2027	40.2	5.0	Infrastructure development and service growth

2030	47.5	5.2	Diversification and urban expansion

6. Income and Poverty Indicators

Indicator	Value (2024)	Projected (2030)	Comment
Average Monthly Income	KSh 18,500	KSh 25,000	Increase due to urban employment growth.
Poverty Rate	28%	20%	Expected decline due to job creation and SME support.
Informal-Sector Employment	65%	58%	Gradual formalization as municipal regulation improves.
Unemployment Rate	10%	8%	Reduced through youth-focused training and enterprise funding.

7. Major Challenges Impacting the Local Economy

- **Climate Risks:** Flooding and erratic rainfall disrupt agriculture, transport, and market activities.
- **Urban Sprawl:** Conversion of fertile agricultural land to real estate reduces productivity.
- **Waste and Infrastructure Strain:** Poor solid waste management and inadequate drainage affect business operations.
- **Energy and Water Supply:** Fluctuations in power and water reliability hinder industrial growth.
- **Access to Finance:** Small enterprises still face limited access to affordable credit.

Migori Municipality's economy is on a positive growth trajectory, transitioning from a largely agro-based economy to a diversified urban economy with strong potential in trade, real estate, and service sectors. Strategic urban planning, infrastructure investment, and climate-smart development policies will be crucial to sustain growth and enhance resilience against climate-related disruptions.

1.2.4. Land-use Context

1. Overview

The municipality's economy is transitioning from a primarily agricultural base toward a more diversified urban economy characterized by growth in trade, real estate, construction, education, and public administration. This transformation, however, is occurring within a context of increasing climate-related risks such as floods, prolonged droughts, and land degradation that affect productivity and urban infrastructure.

2. Economic Structure and Sectoral Contribution

Agriculture remains the prop of the local economy, contributing about 40% of municipal output in 2024, though its share is expected to decline to 32% by 2030 as other sectors expand. Trade and SMEs are emerging as the fastest-growing contributors, supported by youth entrepreneurship, infrastructure development, and expanding markets.

Public administration, education, and health services are major formal employers, while real estate and construction are rapidly growing due to rising housing demand. The hospitality and services sector is also expanding, driven by the increasing number of students, civil servants, and conferences held in the area.

2. Sectoral Contribution Table

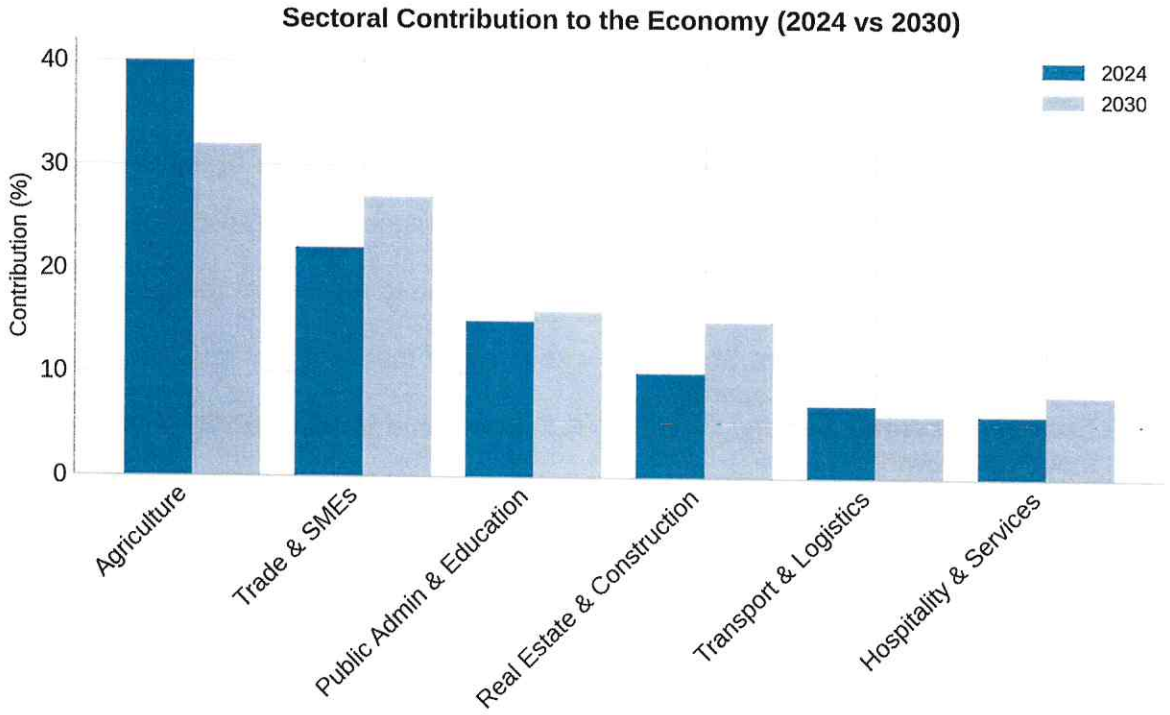


Figure 1: Sectoral Contribution to the Economy (2024 vs 2030)

Sector	Current Contribution (2024)	Projected Contribution (2030)	Key Observations
Agriculture	40%	32%	Still dominant but affected by climate variability and land conversion.
Trade & SMEs	22%	27%	Growing due to expanding urban markets.

Public Admin & Education	15%	16%	Stable; supported by public service and education sectors.
Real Estate & Construction	10%	15%	Fastest-growing; driven by housing and urban infrastructure projects.
Transport & Logistics	7%	6%	Influenced by fuel prices and urban mobility challenges.
Hospitality & Services	6%	8%	Increasing with tourism and institutional visitors.

4. Economic Growth Trends

Between 2020 and 2030, the municipal GDP is projected to grow from KSh 27.8 billion to KSh 47.5 billion, averaging about 5% annual growth. This growth is expected to be fueled by infrastructure investments, SME expansion, and continued urbanization.

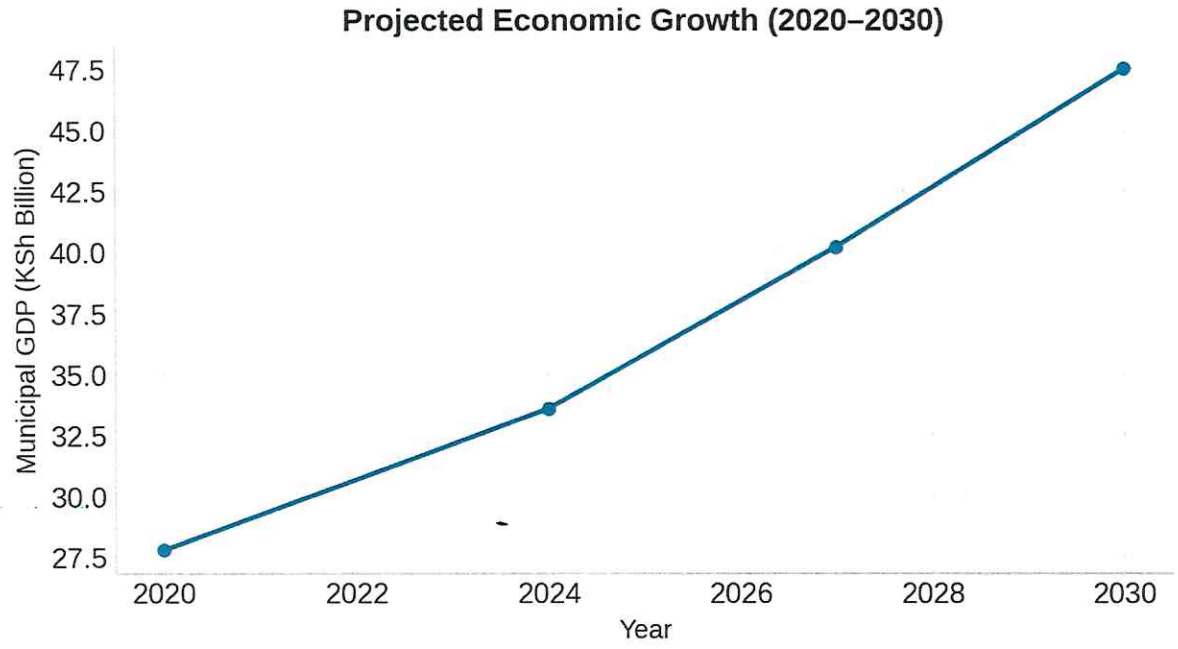


Figure 2: Projected Economic Growth (2020-2030)

5. Employment Profile

The labor market in Migori Municipality remains largely informal, with over 55% of residents engaged in agriculture and 18% in trade and small-scale enterprises. The share of construction, services, and public employment continues to rise, providing a growing number of formal jobs.

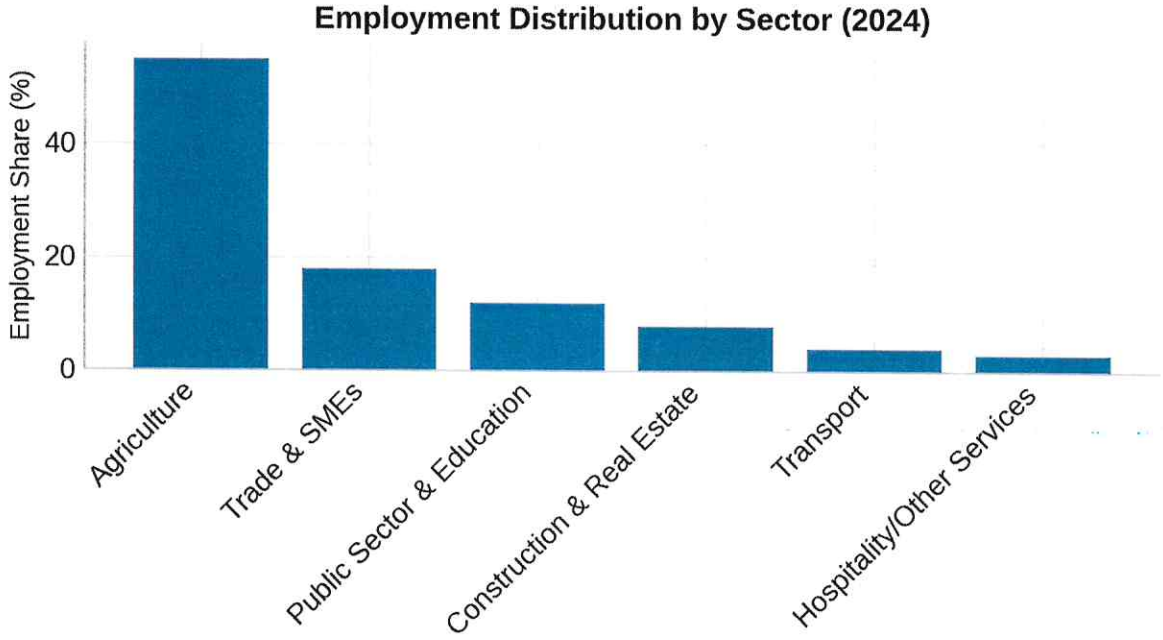


Figure 3: Employment Distribution by Sector (2024)

6. Economic Zones and Growth Corridors

The municipality comprises of distinct economic zones that play complementary roles in growth and service delivery:

Zone / Area	Economic Function	Remarks
Kakrao	Commercial, Administrative, Educational, and Health Hub	Hosts real estate, retail, financial institutions, hospitals, and polytechnics.
Suna-central	Administrative & Service Center	County HQ; rapid real estate growth & universities.
God jope	Agricultural High Potential Zone	Maize, beans, sugarcane and dairy production; vulnerable to rainfall changes.

Namba	Emerging Industrial/Light Manufacturing	Potential for value addition and logistics facilities.
Nyabisawa	Peri-urban Growth Corridors	Experiencing rapid residential and mixed-use expansion.

Key Economic Challenges

- **Climate Risks:** Unpredictable rainfall and flooding threaten agricultural yields and market access.
- **Urban Sprawl:** Conversion of fertile land to real estate reduces food production.
- **Infrastructure Pressure:** Poor drainage, traffic congestion, and waste mismanagement constrain economic efficiency.
- **Energy and Water Supply Instability:** Affects SMEs and light industries.
- **Limited Financial Access:** Especially for youth and women-led enterprises.

Migori Municipality is poised for steady economic transformation over the next decade. By 2030, it is projected to evolve into a vibrant secondary urban hub that balances growth with environmental sustainability. Strategic urban planning, investment in infrastructure, and integration of climate resilience into municipal development plans will be vital in ensuring inclusive and sustainable growth.

2.1. Key Stakeholders & Inclusiveness

The stakeholders relevant for the RCRA are mapped according to their:

Influence -the extent to which stakeholders can shape the RCRA process and outcomes,

Interest -to the degree to which they are likely to be involved in the assessment and findings.

This will guide the approach through which they could be involved in the RCRA, and subsequent planning processes.

It emphasizes multi-stakeholder engagement to ensure that climate risk identification, assessment, and prioritization reflect local realities and community needs. The process promotes inclusivity, transparency, and ownership across different governance levels — from the municipal board to community-based organizations and technical experts.

Stakeholders are engaged through consultative meetings, data validation workshops, field assessments, and participatory mapping sessions. Their inputs guide the identification of vulnerabilities, prioritization of sectors for adaptation, and validation of the final risk profile.

High	**High Influence – Low Interest** • National Treasury and Planning (Indirect through KUSP II) • Private Developers and Major Investors	**High Influence – High Interest** • Municipal Board of Migori • Global Center on Adaptation (GCA), World Bank, Council of Governors (CoG) • Municipal Manager & Technical Team • County Department of Lands, Physical Planning & Urban Development • State Department for Housing & Urban Development (SDHUD)
	Low Influence – Low Interest • General Residents not directly engaged in urban development • Informal sector groups (casual workers, micro vendors)	**Low Influence – High Interest** • Community Representatives (Youth, Women, PWDs, Farmers, Traders) • Civil Society Organizations (CSOs), NGOs • Local Business Associations
Low		High

3. Hazard Assessment

The Hazard Assessment provides a systematic analysis of the natural and human-induced hazards that affect Migori Municipality. Situated within Kenya's Nyanza region, the municipality's terrain which is characterized by, plains, and undulating slopes that creates varying exposure levels to geophysical and climatic threats.

While the area does not experience large-scale natural disasters such as earthquakes or volcanic eruptions, it faces a range of localized but recurrent hazards that have significant implications for infrastructure, livelihoods, public health, and environmental sustainability. These hazards arise from the interaction of physical geography, land-use practices, and changing climate patterns.

The assessment identifies and categorizes the municipality's hazards into three main groups:

1. **Geophysical Hazards** – including landslides, soil erosion, and localized instability caused by slope gradients, deforestation, and unregulated construction.
2. **Hydro-Meteorological Hazards** – such as erratic rainfall, flooding, drought, and heat stress, which are becoming more frequent due to climate variability.
3. **Environmental Hazards** – driven by rapid urbanization, poor waste management, water pollution, deforestation, and biodiversity loss.

The purpose of this hazard assessment is to:

- Identify key hazards affecting the municipality and their underlying causes.
- Evaluate their frequency, intensity, and spatial extent.
- Determine the level of risk and vulnerability across different sectors and locations.
- Provide a foundation for developing adaptation and mitigation measures to strengthen climate resilience.

This assessment draws on field observations, stakeholder consultations, and secondary data from relevant government agencies and climate studies. The findings highlight the urgent need for integrated land-use planning, improved infrastructure, and community-based adaptation initiatives to reduce exposure and enhance urban resilience.

3.1. Key Climate Hazards

Table 6. Hazard screening for Migori Municipality

Hazard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazard (Y/N)
Heat Stress				
Average surface temperature increase	Y	Y	N	Y
Average ocean temperature increase	N	N	N	N
Extreme heat	Y	Y	Y	Y
Marine heatwaves	N	N	N	N
Cold Stress				
Average surface temperature during winter	N	N	N	N
Extreme cold (e.g., cold spells, frost)	N	N	N	N
Snowfall and ice storms	N	N	N	N
Flooding				
Changes in precipitation patterns	Y	Y	Y	Y
Pluvial (surface level) flooding, including flash flooding and urban flooding	Y	Y	Y	Y
Fluvial (river) flooding	Y	N	N	N
Sea level rise	N	N	N	N
Coastal flooding, including storm surges	N	N	N	N
Waterlogging	Y	N	N	N
Water Stress				
Drought (meteorological, hydrological)	Y	Y	Y	Y
Groundwater salinization	Y	Y	Y	Y
Saline intrusion	N	N	N	N
Wildfire				
Wildfires & bushfires	N	N	N	N
Storms				
Extreme wind	N	N	N	N
Tropical cyclones	N	N	N	N
Sand and dust storms	N	N	N	N
Hailstorms	N	N	N	N
Mass Movement				
Landslides	Y	N	N	Y
Coastal erosion	N	N	N	N
Gully erosion	N	N	N	N
Marine Conditions				
Ocean acidification	N	N	N	N
Geophysical*				
Subsidence	N	N	N	N
Earthquakes	N	N	N	N
Volcanos	N	N	N	N

** These hazards, if present, can be highly impactful and are therefore included in the screening step, as they may significantly influence the urban planning informed by this urban climate risk profile.*

3.2. Climate Indicators and Hazard Thresholds

Table 7. Climate indicators and hazard thresholds selected for the assessment

Key Hazard	Climate Indicator	Data Source	Thresholds		
			Low	Medium	High
Pluvial Flooding	Number of days with precipitation > 50 mm	• World Bank Climate Change Knowledge Portal / Kenya Meteorological Department	< 3 days/year	3 – 6 days/year	> 6 days/year
Drought	Standardized Precipitation–Evapotranspiration Index (SPEI)	• SPEI Database / Kenya Meteorological Department	> -1.0	-1.0 to -1.5	< -1.5
Heat Stress / Extreme Urban Heat	Number of days with heat index > 35°C (mean)	• World Bank Climate Change Knowledge Portal / IPCC Data Portal	< 5 days/season	5 – 15 days/season	> 15 days/season
Land Degradation	Normalized Difference Vegetation Index (NDVI) anomaly or soil erosion rate	• FAO Global Land Degradation Information System / SERVIR East Africa	NDVI > 0.5 (stable)	NDVI 0.3–0.5 (moderate degradation)	NDVI < 0.3 (severe degradation)

Changes in Precipitation Patterns	Coefficient of Variation (CV) of seasonal rainfall	World Bank Climate Change Knowledge Portal / Kenya Meteorological Department	CV < 15% (stable rainfall)	CV 15–25% (moderate variability)	CV > 25% (high variability)

3.3. Current Hazard Levels and Climate Projections

Table 8. Current and future hazards levels for Migori Municipality

Hazard	Current (Baseline)	2050 SSP2–4.5	2050 SSP5–8.5	2100 SSP2–4.5	2100 SSP5–8.5
Pluvial Flooding	**Medium** – Frequent flash floods during long rains, drainage overflow in low-lying areas.	**High** – ↑ Intense rainfall (>50 mm/day) events expected to double; 20–30% increase in flood days.	**Very High** – Heavy rainfall events become more extreme; urban flooding more frequent and widespread.	**High** – Sustained increase in rainfall intensity; moderate adaptation may reduce severity.	**Very High** – Severe pluvial flooding becomes chronic in unplanned and poorly drained areas.
Drought	**Medium** – Periodic dry spells during short rains affecting crops and water supply.	**High** – Longer dry periods; seasonal water scarcity increases by 20–25%.	**Very High** – Severe droughts likely every 2–3 years; water stress rises sharply.	**High** – Persistent rainfall deficits; reduced soil moisture affecting agriculture.	**Very High** – Multi-year droughts and water crises likely; ecosystem and livelihood stress.
Heat Stress / Extreme Urban Heat	**Medium** - Temperatures average 18.7°C, with ~5–10 heat days > 35°C per season.	**High** – +1.5°C increase; heat index > 35°C for 15–20 days/season.	**Very High** – +2°C to +2.5°C rise; heat waves more intense and prolonged.	**High** – +2.5°C average increase; significant heat island amplificatio	**Very High** – +3°C to +4°C; extreme heat becomes a major

				n in urban cores.	urban hazard affecting health and productivity.
Land Degradation	**Medium** – Soil erosion, deforestation, and poor land-use practices increasing.	**High** – Accelerated erosion on slopes; declining soil fertility.	**Very High** – Strong link with drought and deforestation; reduced vegetation cover.	**High** – Land restoration possible but pressure from urbanization persists.	**Very High** – Irreversible degradation in unmanaged zones; reduced agricultural productivity.

For this Urban Climate Risk Profile, hazard levels should be interpreted in accordance with the table below.

Table 9. Interpretation of hazard levels

Level	Interpretation
High	Hazard events that are likely to occur with high frequency and/or intensity
Medium	Hazard events that are likely to occur with moderate frequency and/or intensity
Low	Hazard events that are likely to occur with low frequency and/or intensity

3.4. Current and Future Hazard Impact Areas

Figure 6: Multi-stakeholders engagement workshop identifying key hazards within the municipality.

4. Exposure & Vulnerability Assessment

The exposure and vulnerability assessment for Migori Municipality examines how various urban elements including infrastructure, services, populations, and natural assets are affected by climate and environmental hazards. This analysis identifies which assets are most exposed to flooding, drought, heat stress, and land degradation, and evaluates their capacity to adapt or recover from these impacts.

The result prioritizes investment and adaptation planning to enhance urban resilience, protect livelihoods, and guide sustainable land use.

4.1. Urban Elements

Table 10. Urban elements inventory

Category
Infrastructure & Services
Stormwater Drainage
Water & Wastewater Management
Solid Waste Management
Transport and Mobility
Energy
Economic Infrastructure
Populations
Urban Residents
Informal Settlement Residents
Vulnerable and Marginalized Groups

Category
Natural Assets
Urban Green Infrastructure
Urban Blue Infrastructure
Peri-urban and Agricultural Systems

4.2. Exposure, Vulnerability, and Impacts of Climate Hazards on Urban Elements

For this Urban Climate Risk Profile, exposure and vulnerability levels should be interpreted in accordance with the table below.

Table 11. Interpretation of exposure and vulnerability levels

Level	Exposure Level Interpretation	Vulnerability Level Interpretation
High	Few or no critical urban elements lie within the hazard footprint or area of impact.	The urban element is vulnerable to the climate hazard due to high natural sensitivity – considering physical and non-physical characteristics – and limited adaptive capacity.
Medium	A moderate number or a mix of low- and medium-value urban elements are located within the hazard footprint.	The urban element is somewhat vulnerable to the climate hazard due to moderate sensitivity and adaptive capacity.
Low	A large number and high-value urban elements (e.g., critical infrastructure, dense neighborhoods, major economic assets) are located within the hazard footprint.	The urban element is minimally vulnerable to the climate hazard due to limited sensitivity and/or a high degree of adaptive capacity.

For this Urban Climate Risk Profile, the following matrix summarizes likely impacts on each urban element by combining the assigned exposure and vulnerability levels.

Table 12. Impact Matrix

		Vulnerability Level		
		Low	**Medium**	**High**
Exposure Level	**High**	Moderate	Major	Catastrophic
	Medium	Minor	Moderate	Major
	Low	Insignificant	Minor	Moderate

Table 13. Exposure, Vulnerability, and Impacts of Pluvial Flooding on Urban Elements

Hazard: Pluvial flooding

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• Urban drainage channels (Migori) are undersized, informal open drains present; low-lying pockets (Nyabisawa, Namba, God Jope and Migori Town areas) collect runoff and backflow. Frequent blockage by solid waste reduces conveyance capacity.	**High**	**Sensitivity:** Major — drains are shallow/undersized and many roads drain into low points. **Adaptive Capacity:** • Low — limited municipal maintenance budget, few retention ponds, no large stormwater storage.	**High**	**Catastrophic**
Water & Wastewater Management	• Piped networks in cores; many peri-urban areas depend on boreholes and septic systems. Flooding overwhelms soak-away pits,	**Medium**	• **Sensitivity:** Medium — partial piped/sanitation exists but many systems are informal (septic/pits) that are vulnerable to inundation. **Adaptive Capacity:** • Low–Medium — some institutional management (MIWASCO) but limited treatment and flood-resilient infrastructure.	**Medium**	**Moderate**
Solid Waste Management	• Main dumpsite (Lichota Area) located in low area; open dumping and poor collection lead to blocked drains and increased surface water contamination during floods.	**High**	• **Sensitivity:** High — unlined dumps and informal burning increase contamination risk when inundated. **Adaptive Capacity:** • Low — irregular collection fleet, informal recycling; limited engineered transfer stations.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Transport and Mobility	• Urban roads and some rural access roads become impassable during pluvial events; small bridges over Migori, Onyinjo subject to scouring. Key pedestrian routes flood (no continuous non-motorized infrastructure).	**Medium**	• **Sensitivity:** High — key arterial and feeder roads cross low points. **Adaptive Capacity:** • Low — maintenance is reactive; limited alternative routes and weak design standards for drainage capacity.	**Medium**	**Moderate**
Energy	• Overhead power lines & utility poles run through peri-urban slopes; substations located in accessible urban nodes that can be surrounded by flood water.	**Medium**	• **Sensitivity:** Medium — poles can be undermined by erosion; substations tolerate some water but prolonged inundation risks service outages. **Adaptive Capacity:** • Medium — Kenya Power maintains networks but localized resilience measures are limited.	**Medium**	**Moderate**
Economic Infrastructure	• Awendo markets, shops and commercial premises concentrated in CBDs and market yards that flood, disrupting trade and minimize access	**High**	• **Sensitivity:** High — businesses suffer stock losses, supply chain interruption. **Adaptive Capacity:** • Low–Medium — some insurance/stock shifting for larger businesses but most SMEs are informal with little buffer.	**High**	**Catastrophic**
Social Infrastructure	• Schools, health centres (Migori Level 5), and government offices in town centres are reachable but roads to	**Medium**	• **Sensitivity:** Medium — critical services affected by access loss rather than total asset loss.	**Medium**	**Moderate**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	them flood at times; some facilities sit in moderate-low ground.		**Adaptive Capacity:** • Medium — institutions have contingency practices but limited formal flood proofing.		
Emergency Services	• Single fire station (Migori) and police posts; limited amphibious response and no dedicated local early-warning for pluvial events. Shelters are informal (churches, schools).	**Medium**	• **Sensitivity:** High — response time hindered by flooded roads. **Adaptive Capacity:** • Low — limited resources, no mapped evacuation routes or dedicated shelters.	**High**	**Major**
Populations					
Urban Residents	• Majority live in formal and peri-urban neighborhoods; many households in low points face periodic inundation; population density rising (urbanization).	**Medium**	• **Sensitivity:** Medium — property damage and health risk when flooded. **Adaptive Capacity:** • Medium — some households can cope (savings, kin networks) but many cannot.	**Medium**	**Moderate**
Informal Settlement Residents	• High concentration of informal housing in low-lying Kakrao & Oruba areas with poor drainage and insecure land tenure; limited access to services.	**High**	• **Sensitivity:** Very High — lightweight housing, no sanitation, high exposure to water contamination and displacement. **Adaptive Capacity:** • Very Low — low income, limited options to relocate.	**High**	**Catastrophic**
Vulnerable and	• Tend to live in lower quality housing and have weaker mobility/resources to evacuate or protect assets.	**High**	• **Sensitivity:** Very High — health & livelihood impacts disproportionate; evacuation access limited.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Marginalized Groups			**Adaptive Capacity:** • Very Low — limited savings, social protection coverage.		
Natural Assets					
Urban Green Infrastructure	• Street trees, small parks and riparian vegetation are sparse/fragmented; green cover provides limited attenuation of runoff.	**Medium**	• **Sensitivity:** Medium — degraded green cover reduces infiltration. **Adaptive Capacity:** • Low–Medium — potential to expand green infrastructure but constrained by land pressure	**Medium**	**Moderate**
Urban Blue Infrastructure	• Migori, Nyasare and Onyinjo rivers have narrowed riparian zones in places; overflow during intense storms causes local inundation and contamination.	**High**	• **Sensitivity:** High — river channels modified and banks vulnerable to erosion. **Adaptive Capacity:** • Low — limited riverbank restoration or buffer enforcement.	**High**	**Catastrophic**
Peri-urban and Agricultural Systems	• Low-lying farm plots and roadside plots receive runoff; soils already eroding on slopes and terraces; agricultural drains often fail under heavy surface flows.	**Medium**	• **Sensitivity:** Medium — crop damage, soil loss. **Adaptive Capacity:** • Low–Medium — traditional terraces exist but severely stressed; limited investment in retention structures.	**Medium**	**Moderate**

Table 14. Exposure, Vulnerability, and Impacts of Drought on Urban Elements

Hazard: Drought

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• Stormwater systems provide little buffering for dry-season water supply; retention basins absent so no drought storage.	**Medium**	• **Sensitivity:** Medium — limited role in drought adaptation. **Adaptive capacity:** **Adaptive Capacity:** • Low — lack of multifunctional storage.	**Medium**	**Moderate**
Water & Wastewater Management	• Municipal piped network in cores supplemented by boreholes; many peri-urban and rural households depend on shallow wells and springs. Reduced recharge lowers borehole yields; some springs and shallow wells historically dry up during prolonged dry spells.	**Medium**	• **Sensitivity:** High — water infrastructure reliant on surface/groundwater recharge. **Adaptive capacity:** **Adaptive Capacity:** Medium — MIWASCO provides management but limited storage/resilience (few reservoirs/treated surface storage).	**High**	**Major**
Solid Waste Management	• Reduced water can increase concentration of wastes in informal dumps; however direct drought exposure is low.	**Low**	• **Sensitivity:** Low. **Adaptive capacity:** **Adaptive Capacity:** • Low — service disruptions possible due to resource constraints.	**Low**	**Insignificant**
Transport and Mobility	• Roads and bridges not directly water-supply dependent; drought reduces river flows (less scouring) but also increases dust and road surface deterioration.	**Low**	• **Sensitivity:** Low–Medium. **Adaptive Capacity:** • Medium — routine maintenance possible but costs rise.	**Low**	**Insignificant**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Energy	• Small-scale energy users (pumped water supply, pumps for irrigation) see increased demand from borehole pumping; higher diesel/electricity costs.	**Medium**	• **Sensitivity:** Medium — increased energy demand for water supply and irrigation; grid reliability affects pumps. **Adaptive Capacity:** • Medium — some institutional capacity to manage but limited backup.	**Medium**	**Moderate**
Economic Infrastructure	• Markets, agro-processing units and agribusiness (tea/coffee nurseries, horticulture) rely on steady water supply; irrigation systems limited.	**High**	• **Sensitivity:** High — agricultural value chains sensitive to yield loss and water scarcity. **Adaptive Capacity:** • Medium — some larger farms have irrigation or better access to credit; smallholders are less resilient.	**High**	**Catastrophic**
Social Infrastructure	• Schools, hospitals need reliable water for sanitation and hygiene; limited on-site storage increases risk of service disruption.	**High**	• **Sensitivity:** High — critical services impacted by lack of water for sanitation and clinical needs. **Adaptive Capacity:** • Medium — can implement rationing but limited reserves....	**High**	**Catastrophic**
Emergency Services	• Firefighting and health response require water; drought reduces available water sources and complicates response.	**Medium**	• **Sensitivity:** Medium — emergency effectiveness compromised. **Adaptive Capacity:** • Low — no dedicated drought contingency water reserves	**Medium**	**Moderate**
Populations					

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Urban Residents	□ Urban households rely heavily on piped water from MIWASCO and community boreholes; drought reduces yields and increases rationing. □ High dependence on river-fed water treatment works; reduced river flows during drought directly affect urban water availability.	**High**	**Sensitivity:** • High — limited on-site water storage in most rental units and flats. • High — rising population density increases demand during shortages. **Adaptive Capacity:** **Medium** — some households purchase water from vendors or store in small tanks; affordability is limited for low-income households.	**High**	**Catastrophic**
Informal Settlement Residents	• Dependence on shallow wells, springs, informal water vendors and communal taps, many of which dry during prolonged droughts. • Located in areas without formal water infrastructure; water scarcity immediately raises costs and burden on women/youth for collection.	**High**	**Sensitivity:** • **Very High** — limited sanitation, poor drainage, and overcrowding increase health risks when water is scarce. • **High** — limited financial capacity to buy vendor water during drought. **Adaptive Capacity:** • **Low** — minimal water storage, low incomes, limited resilience infrastructure, and often no formal connection to MIWASCO networks.	**High**	**Catastrophic (for prolonged drought)**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Vulnerable and Marginalized Groups	• Typically live in areas with poor service coverage or depend on communal water sources that dry faster. • □ Disproportionately affected by rising water prices during scarcity.	**High**	**Sensitivity:** • Very High — infant care, elderly care, disability needs heighten dependence on reliable water. • High — marginalized groups often lack capacity to queue for water or purchase emergency supplies. **Adaptive Capacity:** • **Low** — limited income, limited access to climate-information, and fewer safety nets.	**High**	**Catastrophic**
Natural Assets					
Urban Green Infrastructure	□ Drought causes die-off of trees, drying of parks and urban vegetation; increased wildfire risk in peri-urban forest patches. □ Urban heat island effect worsens as vegetation loses moisture.	**Medium**	**Sensitivity:** □ Drought causes die-off of trees, drying of parks and urban vegetation; increased wildfire risk in peri-urban forest patches. □ Urban heat island effect worsens as vegetation loses moisture.	**Medium**	**Moderate**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			Adaptive Capacity: • **Medium** — county can support replanting and watering, but budget and water constraints limit action.		
Urban Blue Infrastructure	□ River flows (e.g., Migori, Nyasare, Onyinjo) significantly drop during drought; wetlands and springs shrink or dry completely. □ Urban runoff and pollution intensify due to low water volume.	**High**	**Sensitivity:** □ High — heavy dependence on consistent river flow for domestic supply and municipal treatment works. □ Wetlands are already degraded by agriculture and urban expansion. **Adaptive Capacity:** • **Low/Medium**— limited wetland protection, siltation control, or regulated abstraction.	**High**	**Catastrophic**
Peri-urban and Agricultural Systems	□ Heavily reliant on rainfall and shallow groundwater; drought sharply reduces yields (coffee, tea, vegetables). □ Competition for water between agriculture and domestic use increases.	**High**	**Sensitivity:** □ Very High — crops like vegetables, bananas, and dairy systems are extremely water-sensitive. □ Heavy reliance on seasonal rivers that nearly dry during severe droughts.	**High**	**Catastrophic (if drought is prolonged)**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			Adaptive Capacity: • **Medium/Low** — few farmers have irrigation; adoption of drip irrigation and water-efficient systems is slowly growing.		

Table 15. Exposure, Vulnerability, and Impacts of Heat Stress on Urban Elements

Hazard: Heat Stress

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage		**Medium**	**Sensitivity:** • **Medium** — drains deteriorate faster under thermal stress.	**Medium**	**Moderate**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	□ Heat stress accelerates evaporation, drying drains and sediment traps, increasing accumulation of debris. □ Concrete surfaces expand and crack under prolonged high temperatures.		**Adaptive Capacity:** • **Medium** — maintenance possible but may be irregular; limited shading/vegetation reduces resilience.		
Water & Wastewater Management	□ Higher temperatures increase evaporation in water pans and reduce surface water reliability. □ Increased water demand (cooling, sanitation) stresses municipal supply systems.	**Medium**	**Sensitivity:** • **High** — demand spikes outstrip storage; pipes and treatment systems degrade faster under heat. **Adaptive Capacity:** • **Medium** — MIWASCO can ration and optimize supply, but limited storage capacity remains a constraint.	**High**	**Major**
Solid Waste Management	• High temperatures accelerate decomposition and odor emissions from dumpsites. □ Increased risk of spontaneous fires at informal dumpsites.	**Medium**	**Sensitivity:** • **Medium** — waste handling becomes more hazardous; public health risks rise. **Adaptive Capacity:** • Low — informal dumpsites lack fire-control and monitoring systems.	**Medium**	**Moderate**
Transport and Mobility		**Medium**	**Sensitivity:** • **Medium** — roads degrade faster; heat affects public transport reliability.	**Medium**	**Moderate**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	□ Extreme heat softens asphalt surfaces, causing rutting; dust increases on unpaved roads. □ Pedestrian mobility reduces, especially for elderly and vulnerable groups.		**Adaptive Capacity:** • **Medium** — routine maintenance possible but costly.		
Energy	□ Increased cooling demand (fan use, refrigeration, cold storage) drives up electricity consumption. □ Heat affects transformer efficiency and increases chances of power outages.	**High**	**Sensitivity:** • **High** — increased demand stresses the grid, especially in urban centres. **Adaptive Capacity:** • **Medium** — KPLC system adjustments possible but limited redundancy.	**High**	**Catastrophic**
Economic Infrastructure	□ Heat affects productivity of markets, shops, agro-processors, and informal businesses. □ Post-harvest losses increase due to faster spoilage.	**High**	**Sensitivity:** □ Heat affects productivity of markets, shops, agro-processors, and informal businesses. □ Post-harvest losses increase due to faster spoilage.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	•		**Adaptive Capacity:** • **Medium** — some businesses adopt refrigeration, but high energy costs limit access.		
Social Infrastructure	□ High indoor temperatures reduce learning capacity and increase heat-related illnesses. □ Hospitals face increased caseloads for dehydration, heat exhaustion.	**High**	**Sensitivity:** • **High** — buildings poorly ventilated; few have cooling systems. **Adaptive Capacity:** • **Medium** — can adopt shading, ventilation strategies but limited funding.	**High**	**Catastrophic**
Emergency Services	• Fire risk and heat-related medical emergencies increase; staff performance may drop in extreme heat.	**Medium**	**Sensitivity:** • Medium— emergency operations directly affected by high temperatures. **Adaptive Capacity:** • **Medium** — response capacity exists but is strained during heatwaves.	**High**	**Major**
Populations					
Urban Residents	□ High temperatures increase discomfort, indoor overheating, and energy bills for cooling. □ Heat stress worsens in dense settlements with limited tree cover.	**High**	**Sensitivity:** • **High** — many homes lack ventilation, insulation, or shading. **Adaptive Capacity:** • **Medium** — some can afford fans or cooling, but energy prices limit uptake.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	□ Corrugated iron-sheet houses trap heat, making indoor conditions extremely high. □ Little vegetation or shaded areas; limited access to cooling.	**High**	**Sensitivity:** • **Very High** — poor housing materials, overcrowding, and lack of water worsen heat stress. **Adaptive Capacity:** • **Low** — low incomes and lack of cooling infrastructure.	**High**	**Catastrophic**
Vulnerable and Marginalized Groups	□ Infants and elderly at greatest risk; heat stress worsens chronic illness. □ Limited mobility increases difficulty accessing cool areas.	**High**	**Sensitivity:** • **Very High** — physiological susceptibility to overheating. **Adaptive Capacity:** • **Low** — depend on caretakers and access to cooling or water. …	**High**	**Catastrophic**
Natural Assets					
Urban Green Infrastructure	□ Parks, trees, and green belts dry quickly; canopy cover reduces. □ Increased risk of vegetation die-off.	**High**	**Sensitivity:** • **High** — species sensitive to moisture loss. **Adaptive Capacity:** • **Medium** — county watering programs exist but limited in scale.	**High**	**Catastrophic**
Urban Blue Infrastructure		**High**	**Sensitivity:** • **High** — aquatic ecosystems fragile under heat.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	□ Higher temperatures accelerate water loss and reduce oxygen levels, affecting ecosystems. □ Reduced flow worsens pollution concentration.		**Adaptive Capacity:** • **Medium** — poor protection of riparian areas; limited restoration programs.		
Peri-urban and Agricultural Systems	□ Heat reduces crop yields (vegetables, bananas, coffee seedlings). □ Livestock experience heat stress reducing productivity.	**High**	**Sensitivity:** • **Very High** — many crops are temperature sensitive; heat increases irrigation demand. **Adaptive Capacity:** • **Low** — limited irrigation access; smallholder farmers lack cooling sheds.	**High**	**Catastrophic**

Table 16. Exposure, Vulnerability, and Impacts of Land Degradation on Urban Elements

Hazard: Land Degradation

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• Land degradation increases soil erosion and siltation, blocking drains, culverts and outlets; upstream catchment degradation increases sediment load into urban drainage.	**Medium**	**Sensitivity:** • **Medium** — system dependent on stable soils. **Adaptive Capacity:** • Low — limited desilting equipment and irregular maintenance.	**Medium**	**Moderate**
Water & Wastewater Management	• Catchment degradation reduces surface water reliability and increases turbidity, raising treatment costs; siltation of intakes and spring sources.	**High**	**Sensitivity:** • **High** — treatment stressed by sediment-heavy water. **Adaptive Capacity:** • Medium — some treatment adjustment possible but limited redundancy.	**High**	**Catastrophic**
Solid Waste Management	• Land degradation creates informal dumping zones and erosion exposes buried waste, though overall exposure remains low.	**Medium**	**Sensitivity:** • **Low**— exposed waste increases environmental risks. **Adaptive Capacity:** • Low — poor site management and limited equipment.	**Low**	**Minor**
Transport and Mobility	• Road shoulders erode; unpaved roads degrade faster under runoff; gullies affect access routes.	**Medium**	**Sensitivity:** • **Medium** — transport corridors sensitive to soil instability. **Adaptive Capacity:** • **Medium** — maintenance possible but expensive.	**Medium**	**Moderate**
Energy		**Low**	**Sensitivity:** • Low — overall network resilient.	**Low**	**Insignificant**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	• Soil instability undermines electricity poles, small substations and distribution lines.		**Adaptive Capacity:** • Medium — routine repairs possible.		
Economic Infrastructure	• Agricultural processing, local markets, and agri-business depend on productive land—declining soil fertility disrupts value chains.	**High**	**Sensitivity:** • **High** — strong dependence on land productivity. **Adaptive Capacity:** • **Medium** — larger enterprises can invest in conservation; smallholders cannot.	**High**	**Catastrophic**
Social Infrastructure	• Schools/health facilities in peri-urban areas affected by erosion of compounds and access roads.	**Medium**	**Sensitivity:** • Medium — disruptions to sanitation and accessibility. **Adaptive Capacity:** • Medium — local repairs possible but funding limited.	**Medium**	**Moderate**
Emergency Services	• Land degradation limits access routes for fire engines and ambulances, especially in steep or rural areas.	**Medium**	**Sensitivity:** • **Medium** — response times affected by degraded roads. **Adaptive Capacity:** • **Medium** — rerouting possible but delays increase.	**Medium**	**Moderate**
Populations					
Urban Residents	• Households on steep slopes, riverbanks and informal settlements exposed to erosion, unstable soils and gully formation.	**High**	**Sensitivity:** • **High** — informal settlements lack stabilization and drainage. **Adaptive Capacity:** • **Low** — limited resources for soil conservation.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	• More likely to settle on degraded marginal lands with poor infrastructure.	**Medium**	**Sensitivity:** • **High** — limited relocation options. **Adaptive Capacity:** • **High** —financial constraints restrict adaptation.	**High**	**Major**
Vulnerable and Marginalized Groups	• Direct exposure to soil fertility decline, gully formation and reduced yields.	**Medium**	**Sensitivity:** • **High**— financial constraints restrict adaptation. **Adaptive Capacity:** • High — degradation increases workload and reduces resource availability.	**High**	**Major**
Natural Assets					
Urban Green Infrastructure	• High exposure to deforestation, soil erosion and surface runoff.	**High**	**Sensitivity:** • High — vegetation loss accelerates degradation loops. **Adaptive Capacity:** • Medium — reforestation possible but slow.	**High**	**Catastrophic**
Urban Blue Infrastructure	• Exposed to siltation, reduced water quality and unstable banks from erosion.	**High**	**Sensitivity:** • **High** — aquatic ecosystems rapidly degrade. **Adaptive Capacity:** • **Medium** — restoration achievable with strong management.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Peri-urban and Agricultural Systems	• Directly exposed to erosion, nutrient depletion and gully formation.	**High**	**Sensitivity:** • **Very High** — primary asset affected. **Adaptive Capacity:** • **Low** — natural recovery slow without intervention.	**High**	**Catastrophic**

Table 17. Exposure, Vulnerability, and Impacts of Change in Precipitation Patterns on Urban Elements

Hazard: Change in Precipitation Patterns

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• Drainage systems exposed to intense rainfall events leading to overflow, siltation, and blockages; prolonged dry spells reduce system functionality due to sediment accumulation.	**High**	**Sensitivity:** • High — infrastructure not designed for current rainfall extremes. **Adaptive Capacity:** • Medium — limited upgrades, desilting irregular.	**Medium**	**Major**
Water & Wastewater Management	• Water supply and wastewater systems exposed to fluctuating rainfall affecting groundwater recharge, surface water quality, and wastewater overflow during storms.	**High**	**Sensitivity:** • High — turbidity spikes overwhelm treatment; wastewater plants affected by stormwater infiltration. **Adaptive Capacity:** • Medium — some operational flexibility but infrastructure constraints remain.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Solid Waste Management	• Dumpsites exposed to leachate increases during heavy rainfall; waste washed into waterways; disruption of collection during extreme weather.	**Medium**	**Sensitivity:** • Medium — poor containment increases environmental risks. **Adaptive Capacity:** • Low — few engineered disposal sites and limited drainage controls.	**Medium**	**Moderate**
Transport and Mobility	• Roads and bridges exposed to flooding, erosion, and pavement weakening during heavy rains; dry spells lead to dust and surface cracking.	**High**	**Sensitivity:** • High — erosion and washouts common during storms. **Adaptive Capacity:** • Medium — maintenance possible but reactive and underfunded.	**Medium**	**Major**
Energy	• Energy distribution infrastructure exposed to storm-related disruptions (lightning, wind, erosion); rainfall variability affects systems reliant on steady water supply.	**Medium**	**Sensitivity:** • Medium — outages increase with storm intensity. **Adaptive Capacity:** • Medium — restoration capacity exists but challenges persist.	**Medium**	**Moderate**
Economic Infrastructure	• Markets, agro-processing and SMEs exposed to disruptions in supply chains, reduced access, and water-related operational challenges.	**High**	**Sensitivity:** • High — dependent on consistent water availability and functional access roads. **Adaptive Capacity:** • Medium — some private actors adapt, but small enterprises vulnerable.	**High**	**Catastrophic**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Social Infrastructure	• Schools, hospitals and social facilities exposed to flooding, roof leaks, and sanitation challenges during irregular rains.	**Medium**	**Sensitivity:** • High — essential services require stable water and infrastructure conditions. **Adaptive Capacity:** • Medium — some facilities have basic storage but structural resilience is limited.	**High**	**Major**
Emergency Services	• Emergency operations exposed to access difficulties during storms; communication and mobility disrupted by road flooding or washouts.	**High**	**Sensitivity:** • Medium — response heavily dependent on road network and weather. **Adaptive Capacity:** • Medium — alternative routing possible but limited.	**Medium**	**Major**
Populations					
Urban Residents	• Exposed to flash floods, drainage overflows, water shortages during dry spells, and health risks from water contamination.	**Medium**	**Sensitivity:** • Medium — reliant on municipal systems with limited redundancy. **Adaptive Capacity:** • Medium — can adopt household coping measures depending on income.	**High**	**Major**
Informal Settlement Residents	• Highly exposed to flooding, runoff, contamination of drinking water, and storm-related hazards due to marginal settlement locations.	**High**	**Sensitivity:** • High — poor housing, inadequate drainage, and overcrowding. **Adaptive Capacity:** • Low — limited financial and institutional support.	**High**	**Catastrophic**
Vulnerable and	• Children, elderly, PWDs, and low-income households exposed to health hazards,	**High**	**Sensitivity:** • High — disproportionate impact from water shortages and extreme rainfall.	**Medium**	**Major**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Marginalized Groups	mobility constraints, and service disruptions.		**Adaptive Capacity:** • Low- limited ability to relocate or reinforce homes.		
Natural Assets					
Urban Green Infrastructure	• Trees, parks, and landscaped areas exposed to drought stress, soil erosion, and storm damage from intense rains.	**Medium**	**Sensitivity:** • Medium — vegetation quickly affected by rainfall extremes. **Adaptive Capacity:** • Low — limited irrigation and management resources.	**High**	**Major**
Urban Blue Infrastructure	• Rivers, streams, and wetlands exposed to fluctuating water levels, sedimentation, and pollution during erratic rainfall events.	**High**	**Sensitivity:** • High — ecosystems easily destabilized by runoff and pollutant loads. **Adaptive Capacity:** • Medium — restoration possible but requires sustained effort.	**Medium**	**Major**
Peri-urban and Agricultural Systems	• Farms and peri-urban land exposed to irregular rains affecting planting seasons, crop yields, and increasing erosion.	**High**	**Sensitivity:** • High — rainfall-dependent cropping systems highly impacted. **Adaptive Capacity:** • Medium — irrigation limited; smallholder farmers vulnerable.	**High**	**Catastrophic**

5. Climate Risk Assessment

The Climate Risk Assessment evaluates the combined effects of hazard exposure, vulnerability, and adaptive capacity to determine the overall level of climate risk facing Migori Municipality. It integrates scientific data, stakeholder insights, and spatial analysis to identify which sectors, populations, and assets are most at risk from climate-induced events such as flooding, drought, heat stress, land degradation etc. This assessment provides a critical foundation for prioritizing resilience actions, informing planning decisions, and guiding sustainable investments that safeguard the municipality's people, economy, and environment against the growing impacts of climate change.

For this Urban Climate Risk Profile, the following matrix summarizes overall risk for each urban element by combining the assessed hazard level and the estimated impact level.

Table 18. Risk matrix

		Hazard Level		
		Low	**Medium**	**High**
Impact Level	**Catastrophic**	High	Very High	Very High
	Major	Medium	High	Very High
	Moderate	Low	Medium	High
	Minor	Low	Low	Medium
	Insignificant	Very Low	Low	Low

For this Urban Climate Risk Profile, risk levels should be interpreted based on the table below.

Table 19. Interpretation of risk levels

Level	Interpretation
Very High	Very high risks are unacceptable. Risk should be avoided, reduced or transferred. Immediate planning and implementation of risk reduction measures is required. Allocate resources and coordinate interventions to prevent or minimize impact.
High	High risks should be actively addressed. Develop and implement mitigation actions promptly. Monitor environmental indicators and ensure readiness of emergency or adaptation measures.
Medium	Medium risks should be managed. Plan and implement mitigation activities to reduce them to acceptable levels. Regularly review climate data and risk levels.
Low	Low risks are acceptable under current conditions. Minimal control or monitoring is needed, provided they remain stable and do not escalate.
Very Low	Very low risks are negligible in terms of likelihood and consequences. No immediate action is required beyond routine monitoring and periodic review.

5.1. Current and Future Climate Risks on Urban Elements

[Complete the table below by following the steps under Section-3 for each key hazard.

- Use outputs from Step-2.3. to fill the "Hazard Levels" row.
- Use outputs from Step-3.3. to fill the "Impact" column.
- Refer to Step-4.1. to fill the "Risk Level" columns, using the Risk Matrix.

The rows for urban elements not included in the assessment, if any, can be removed.]

Table 1. Summary of Pluvial Flooding risks for Migori Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level					
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Infrastructure & Services						
Stormwater Drainage	Moderate	Medium	Medium	High	Medium	High
Water & Wastewater Management	Moderate	Medium	High	High	High	High
Solid Waste Management	Moderate	Medium	Medium	High	Medium	High
Transport and Mobility	Major	High	High	High	High	High
Energy	Moderate	Medium	Medium	High	Medium	High
Economic Infrastructure	Major	High	High	High	High	High
Social Infrastructure	Major	High	High	High	High	High
Emergency Services	Moderate	Medium	High	High	High	High
Populations						
Urban Residents	Major	Medium	High	High	High	High
Informal Settlement Residents	Catastrophic	High	High	High	High	High
Vulnerable and Marginalized Groups	Major	Medium	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Major	Medium	High	High	High	High
Urban Blue Infrastructure	Major	High	High	High	High	High
Peri-urban and Agricultural Systems	Major	High	High	High	High	High

Table 2. Summary of Drought risks for Migori Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level					
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Infrastructure & Services						
Stormwater Drainage	Minor	Low	Medium	Medium	Medium	Medium
Water & Wastewater Management	Major	High	High	High	High	High
Solid Waste Management	Minor	Medium	Medium	High	Medium	High
Transport and Mobility	Moderate	Medium	High	High	High	High
Energy	Moderate	Medium	High	High	High	High
Economic Infrastructure	Major	High	High	High	High	High
Social Infrastructure	Major	High	High	High	High	High
Emergency Services	Moderate	Medium	High	High	High	High
Populations						
Urban Residents	Major	High	High	High	High	High
Informal Settlement Residents	Major	High	High	High	High	High
Vulnerable and Marginalized Groups	Major	High	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Major	High	High	High	High	High
Urban Blue Infrastructure	Major	High	High	High	High	High
Peri-urban and Agricultural Systems	Major	High	High	High	High	High

Table 3. Summary of Heat Stress/Extreme Heat risks for Migori Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level					
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Infrastructure & Services						
Stormwater Drainage	Moderate	Medium	Medium	High	Medium	High
Water & Wastewater Management	Moderate	Medium	High	High	High	High
Solid Waste Management	Moderate	Medium	High	High	High	High
Transport and Mobility	Moderate	Medium	High	High	High	High
Energy	Minor	Medium	Medium	High	Medium	High
Economic Infrastructure	Major	High	High	High	High	High
Social Infrastructure	Major	High	High	High	High	High
Emergency Services	Moderate	Medium	High	High	High	High
Populations						
Urban Residents	Major	High	High	High	High	High
Informal Settlement Residents	Major	High	High	High	High	High
Vulnerable and Marginalized Groups	Major	High	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Major	High	High	High	High	High
Urban Blue Infrastructure	Moderate	Medium	Medium	High	Medium	High

Peri-urban and Agricultural Systems	Major	High	High	High	High	High

Table 4. Summary of Land Degradation risks for Migori Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level					
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Infrastructure & Services						
Stormwater Drainage	Moderate	Medium	High	High	High	High
Water & Wastewater Management	Major	High	High	High	High	High
Solid Waste Management	Moderate	Medium	Medium	High	Medium	High
Transport and Mobility	Moderate	Medium	Medium	High	Medium	High
Energy	Moderate	Medium	Medium	High	Medium	High
Economic Infrastructure	Major	High	High	High	High	High
Social Infrastructure	Moderate	Medium	Medium	High	Medium	High
Emergency Services	Moderate	Medium	Medium	High	Medium	High
Populations						
Urban Residents	Moderate	Medium	Medium	High	Medium	High
Informal Settlement Residents	Major	High	High	High	High	High
Vulnerable and Marginalized Groups	Major	High	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Major	High	High	High	High	High

Urban Blue Infrastructure	Major	High	High	High	High	High
Peri-urban and Agricultural Systems	Major	High	High	High	High	High

Table 5. Summary of Changes in Precipitation risks for Migori Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level					
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Infrastructure & Services						
Stormwater Drainage	Major	Medium	Medium	High	Medium	High
Water & Wastewater Management	Major	Medium	Medium	High	Medium	High
Solid Waste Management	Moderate	Medium	Medium	High	Medium	High
Transport and Mobility	Major	Medium	Medium	High	Medium	High
Energy	Moderate	Medium	Medium	High	Medium	High
Economic Infrastructure	Major	High	High	High	High	High
Social Infrastructure	Major	High	High	High	High	High
Emergency Services	Moderate	Medium	Medium	High	Medium	High
Populations						
Urban Residents	Moderate	Medium	Medium	High	Medium	High
Informal Settlement Residents	Major	High	High	High	High	High
Vulnerable and Marginalized Groups	Major	High	High	High	High	High

Natural Assets						
Urban Green Infrastructure	Moderate	Medium	Medium	High	Medium	High
Urban Blue Infrastructure	Major	High	High	High	High	High
Peri-urban and Agricultural Systems	Major	High	High	High	High	High

5.2. Climate Risk Hotspots

Migori Municipality sits in the center of Migori County, ranging from municipal lowlands through rolling peri-urban agricultural lands up toward the southern end of Nyanza. Climate risks are not evenly distributed: urban cores, low-lying drainage corridors and riparian strips, peri-urban farms and steep slopes each face different dominant hazards. The Migori PCRA and County Climate Action Plan highlight flooding (pluvial & fluvial) and drought/ water scarcity as primary threats, with heat stress, land degradation (erosion/siltation) and rising wildfire risk as important cross-cutting concerns.

1) **Central urban wards (Oruba-Ragana, Suna- Central, kakrao, wasweta II and God Jope) — flooding, heat, service stress**

- **Pluvial / flash flooding and drainage failure**: the densest urban blocks - municipal center, market areas and low sections adjacent to roadside drains and natural drainage lines - have the highest exposure to short, intense rainfall events and blocked drains. The municipal spatial plan and PCRA show that poor/undersized stormwater systems and clogging by solid waste are common causes of urban inundation. These problems are concentrated where older development and informal infill have reduced natural drainage corridors.
- **Heat stress** is strongest in dense built areas with low tree canopy and high imperviousness (market centres, densely built residential blocks). The county-level heat trends in the CCAP and national guidance indicate rising frequency of extreme heat days, which concentrates health and productivity impacts in the urban core.
- **Service vulnerability** (water, wastewater, energy) is highest where on-site storage is limited (many rental flats and smaller commercial premises) and the municipal network has limited redundancy — meaning shortfalls during droughts or when sources are contaminated after storms.

Policy note: these wards should be prioritized for drain upgrading, solid waste control at markets, and urban greening / shading interventions.

2) Edges and peri-urban fringe (urban expansion zones / peri-urban farms surrounding the core) — drought impact on water supply, agricultural losses, land degradation

- **Water scarcity & drought exposure:** peri-urban producers and smallholder plots that supply vegetables, coffee/tea seedlings and dairy to the municipality are highly sensitive to declining rainfall or longer dry spells — reductions in groundwater recharge reduce yields and raise competition for borehole water. The PCRA and CCAP identify peri-urban agriculture as a hotspot for drought impacts and economic losses.
- **Land degradation and erosion** are evident on steeper slopes and in areas undergoing unchecked construction or informal cultivation; erosion increases sediment loads into drainage, reducing stormwater conveyance capacity and raising treatment costs for water utilities. The municipal spatial plan maps peri-urban open spaces and the hills where erosion risk is concentrated.

Policy note: prioritize water-harvesting, small-scale irrigation (drip), soil conservation and riparian restoration in peri-urban wards and planned expansion zones.

3) Riparian corridors, wetlands and small rivers that cross the municipality (urban blue infrastructure) — flooding, pollution, and ecosystem loss

- River and stream corridors that bisect the urban area (the municipal plan highlights local streams/drainage channels) are focal points for both **pluvial / fluvial flooding** and water quality deterioration after intense storms (wash-off and leachate from dumpsites). Siltation from upstream erosion reduces channel capacity and shifts flood footprints.

Policy note: protect riparian buffers, restrain development on floodplains, and upgrade culverts/bridges where maps show repeated overtopping.

4) Informal settlements and low-income neighborhood's — highest vulnerability to multiple hazards

- These settlements (many located along marginal land, drainage lines or low plots near markets) face **compound risks**: flooding, sanitation failure during floods, contaminated water supplies, heat exposure in metal-roof dwellings, and low adaptive capacity (limited storage and finance). The PCRA explicitly highlights informal settlements as disproportionately affected.

Policy note: prioritize targeted early-warning, localized stormwater clearance, emergency water provision and social protection measures for these wards.

5) Higher elevation / steep slopes— erosion, landslides (localized), and hydrological change

- On steeper slopes leading up from the municipality, intense rainfall can trigger slope instability and gully formation; deforestation/land-use change increase this risk. While

landslides are more spatially limited, their impacts are severe where access roads and scattered settlements sit on unstable slopes. The county plans identify hillside restoration and forest conservation as climate priorities.

6. What's Next?

6.1. Key Findings

Table n. Summary of climate risks affecting urban elements for Migori Municipality

Category	List of Key Hazards		
	Current	Mid-term (2050)	Long-term (2100)
Infrastructure & Services			
Stormwater Drainage	Urban flooding blocked drainage	Flush floods, public health risk	Permanent loss of natural drainage pathways
Water & Wastewater Management	Discharge of untreated sewage, seasonal water shortages	Higher river pollution, infrastructure stress from extreme weather.	Long term ground water contamination, chronic water scarcity
Solid Waste Management	Increased contamination of water sources, blocked storm due to plastic waste	Disease risk and extreme weather intensity.	Methane emissions, chronic flooding and landfill relocation
Transport and Mobility	Traffic disruptions during storms, potholes from intense rainfall	Damage to culverts and bridges leading to high cost of maintenance	chronic flooding and costly infrastructure
Energy	Heatwaves/ high temperatures, flooding	Increased rainfall variability, soil erosion	Population growth and urban expansion, chronic water scarcity
Economic Infrastructure	Drought, erosion, heat	Water stress, erosion	Systematic failures, cyclic extremes.

Category	List of Key Hazards		
	Current	Mid-term (2050)	Long-term (2100)
Social Infrastructure	Water scarcity, flooding	Health hazards, droughts	Structural degradation, chronic water shortage
Emergency Services	Power outages, heavy rains, flooding and disease outbreaks	Population displacement, water scarcity	Infrastructural collapse, extreme heat and chronic water shortage
Populations			
Urban Residents	Flooding, water scarcity and air pollution	Food insecurity, infectious disease expansion and vector	Persistent air quality degradation, infrastructure failure impacts, chronic water shortages.
Informal Settlement Residents	Storm damage, flooding poor water quality	Erosion, waste accumulation, water scarcity	Health crisis, chronic water stress and environmental degradation.
Vulnerable and Marginalized Groups	Heat waves and extreme temperatures, flooding and water logging and food insecurity	Education disruptions, health vulnerabilities, chronic water scarcity	Social instability, chronic poverty, collapse in food system and mental health impacts.
Natural Assets			
Urban Green Infrastructure	Strong winds, flooding, heat waves and extreme temperatures	Loss of biodiversity and prolonged droughts	Ecosystem collapse, permanent loss of green cover, altered hydrology.
Urban Blue Infrastructure	Water contamination, flush floods and heavy rainfall	Prolonged droughts	Chronic water scarcity

Category	List of Key Hazards		
	Current	Mid-term (2050)	Long-term (2100)
Peri-urban and Agricultural Systems	Prolonged droughts, loss of topsoil fertility.	Reduced agricultural productivity, increased livestock vector-bone diseases.	Chronic food insecurity and severe land degradation.

6.2. Climate Adaptation and Resilience Solutions.

Table n. Climate adaptation and resilience solutions recommended for Migori Municipality

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Infrastructure & Services			
Stormwater Drainage	• Desilt and unblock all existing storm water drains, culverts and manhole. • Remove solid waste, silt and illegal obstructions	• Drainage system upgrading. • Construct water retention and detention points	• Implement upstream soil and water conservation measures to reduce run-off entering the town. • Develop an integrated urban storm water management system.
Water & Wastewater Management	• Promote household and institutional rainwater harvesting using surface and underground tanks. • Identification and stoppage of illegal wastewater discharge into open drains, rivers and	• Upgrade treatment plants to handle viable water quality during adversaries like floods • Drill and equip climate resilient boreholes	• Construct or upgrade centralized wastewater treatment plants for climate resilient standards • Protect and restore water catchment areas and riparian zones upstream of Migori area.
Solid Waste Management	• Operational and service measures-clear waste from drainage channels, road reserves and flood prone areas. • Restrict waste disposal during extreme rainfall events where necessary. • Dumpsite and disposal risk control-improve drainage around existing dumpsites to prevent flooding.	• Infrastructure improvement: upgrade waste collection equipment i.e covered waste trucks and skip bins. • Waste reduction and segregation; introduce waste segregation at the source. • Support recycling initiatives for plastics, paper and metal	• Integrated and circular waste systems-develop a sanitary landfill or controlled disposal facility designed for extreme rainfall. • Climate smart waste treatment. Scale up composting facilities to reduce organic waste and methane emissions. • Introducing waste to energy where feasible.

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Transport and Mobility	• Road and drainage maintenance; desilt and clear roadside drains, culverts and bridges during and after rainy seasons. • Non –Motorized Transport protection (NMT)- Clear foot paths and pedestrian crossings. Improve street lighting for safety during extreme weather events.	• Climate resilient road designs; upgrade roads using climate resilient standards. Replace undersized culverts and bridges with larger climate resilient structures. • Mobility and traffic management; design safer bus stops and loading zones that are flood resilient.	• Green and low mobility; expand non-motorized transport networks • Smart and digital solutions; implement smart traffic and asset management system.
Energy	• Protection of critical energy infrastructure; protect transformers and power meters from flooding through elevation and fencing. • Emergency power and preparedness; provide backup generators or solar power systems for critical facilities.	• Climate resilient energy infrastructure; expand solar powered systems for street lighting, water pumping and public buildings • Diversity of energy sources; promote decentralized renewable energy sources (solar, mini-grids, rooftops pvc.	• Integrated and smart energy systems; introduce smart grids and digital monitoring systems for efficient energy management. • Renewable energy transition; promote public private partnership for large scale renewable projects.
Economic Infrastructure	• Enforce land use regulations to prevent construction on riparian reserves • Routine maintenance of infrastructure to prevent climate related deterioration.	• Expand and modernize storm water management systems • Integrate climate risk considerations into municipal planning, budgeting and infrastructure designs	• Develop and implement a climate resilient infrastructure masterplan. • Promote low-carbon and climate smart infrastructure (green buildings, renewable energy hub).
Social Infrastructure	• Conduct rapid climate risk assessments on social facilities • Raise community awareness on climate related health and safety risks	• Upgrade schools and health facilities using climate resilient designs • Train teachers, health workers and facility managers on climate risk management	• Develop and implement a climate resilient social infrastructure strategy aligned with municipal policies • Relocate or redesign social facilities located on high-risk zones

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Emergency Services	• Conduct rapid climate risk and capacity assessments for emergency service facilities and equipment • Identify and map climate hazard hotspots and high-risk communities	• Upgrade fire stations, ambulance centers and emergency operation centers • Develop incident command systems and standard operation procedures for climate emergencies	• Develop and implement a climate resilient service master plan • Establish permanent well equipped Emergency Operation Centers (EOP)
Populations			
Urban Residents	• Provide early warning systems for floods and storms through radio and SMS • Promote solid waste management and drainage maintenance	• Enhance access to clean water and sanitation for all urban residents • Establish community-based disaster response teams trained in first aid and emergency evacuation	• Integrate urban planning with social resilience strategies (safe roads, access to health services, schools) • Ensure inclusive governance and decision making
Informal Settlement Residents	• Conduct rapid vulnerability and risk assessment in informal settlements • Clear blocked drains and debris to reduce flooding risk.	• Improve water sanitation and drainage system • Upgrade housing structure with climate-resilient materials	• Relocate or upgrade informal settlements in high-risk areas • Inclusive planning and social protection
Vulnerable and Marginalized Groups	• Conduct rapid vulnerability assessments to identify marginalized households and high-risk communities • Promote access to clean water, sanitation and health care services.	• Strengthen access to climate resilient housing for low income and marginalized groups • Promote inclusive health and social services with outreach programs for women, children, elderly and persons with disability.	• Establish long-term and livelihood programs and social protection mechanisms for marginalized groups • Relocate or upgrade settlements in high-risk zones with social safeguards for vulnerable residents.
Natural Assets			
Urban Green Infrastructure	• Maintain and protect existing urban trees, parks and vegetated areas • Establish temporary green interventions such as posted plants, green barriers and rooftop gardens	• Expand urban parks, green corridors and street trees to enhance urban cooling and flood mitigation • Integrate green infrastructure into drainage systems	• Establish permanent green corridors and protect urban forests • Promote nature-based solutions to compliment grey infrastructure like wetlands

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Urban Blue Infrastructure	• Clear illegal encroachments and dumping along water course • Conduct rapid assessment of water bodies and drainage systems to identify vulnerabilities	• Upgrade and expand storm water management systems • Improve urban water storage and distribution systems for drought resilience	• Promote nature based solutions for urban water management, including urban wetlands • Integrate innovative water management technologies (smart drainage, sensors, real time monitoring)
Peri-urban and Agricultural Systems	• Water and soil protection, promote mulching, minimum tillage and cover cropping to retain soil moisture. • Livestock resilience, promote strategic destocking during prolonged drought periods	• Water management and irrigation, develop small-scale climate resilient irrigation system • Market and value chain resilience, improve rural-urban feeder roads to ensure market access during extreme weather.	• Integrated landscape and food systems; implement integrated landscape management linking urban, peri-urban and rural systems • Climate resilient food systems; encourage re-use of treated waste-water for irrigation.


MIGORI MUNICIPALITY
MAKING LIVELIHOODS BETTER