



# **URBAN CLIMATE RISK PROFILE FOR MUNICIPALITY OF NAIVASHA**

2025

**Prepared by:**

Municipality of Naivasha  
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## Foreword

The Municipality of Naivasha stands at a critical juncture in its urban development towards becoming a sustainable Resort City. As one of Kenya's fastest-growing municipalities, Naivasha continues to attract investments, residents, and visitors due to its unique ecological assets, industrial potential, and strategic location within Nakuru County and the larger Nairobi–Nakuru economic corridor. However, this rapid growth also exposes the municipality to increasing climate-related risks that threaten livelihoods, infrastructure, and the natural ecosystems that sustain its growth trends.

The Urban Climate Risk Profile for the Municipality of Naivasha has been prepared to provide a comprehensive understanding of the municipality's climate vulnerabilities, hazards, and adaptive capacities. It highlights the major risks, including flooding, drought, solid waste, pollution and land degradation. It also analyses how these intersect with urban systems such as housing, transport, energy, water, sanitation, and waste management. The profile further identifies key entry points for climate-resilient planning, investment, and policy interventions.

This document is not only a technical assessment but also a call to action. It provides an evidence base for decision-makers, planners, and development partners to integrate climate resilience into urban planning, infrastructure design, and service delivery. By adopting the recommendations outlined herein, Naivasha can strengthen its capacity to anticipate, absorb, and adapt to climate issues aimed at enhancing sustainable urban growth.

We acknowledge the invaluable contributions of county government institutions, development partners, community representatives, and technical experts who collaborated in the preparation of this profile. Their collective effort underscores a shared commitment to building a resilient and prosperous Naivasha that thrives in harmony with its natural environment.

Together, we can transform Naivasha into a model Blue-Green Resilient Resort City one that safeguards its people, economy, and ecosystems for generations to come.



Municipal Manager  
Municipality of Naivasha  
County Government of Nakuru



## Executive Summary

This Urban Climate Risk Profile (UCRP) provides a rapid assessment of the current and future climate risks facing Naivasha Municipality. Its primary objective is to identify priority risks to people, infrastructure, and the critical natural asset of Lake Naivasha to inform the municipality's Integrated Development Plan and climate adaptation strategy.

### Key Hazards Identified

The assessment focused on the three highest-priority climate hazards for Naivasha:

1. Flooding (Pluvial and Fluvial)
2. Drought and Water Stress
3. Extreme Heat

### Summary of Risk Findings

Naivasha faces a complex challenge of both too much and too little water, compounded by rising temperatures. The tables below summarize the projected risk levels for key urban element categories.

**Table 1. Summary of Flooding Risks for Municipality of Naivasha**

Category	Current Risk	2050 (SSP2-4.5)	2050 (SSP5-8.5)	2100 (SSP2-4.5)	2100 (SSP5-8.5)
<b>Infrastructure &amp; Services</b>					
Storm water Drainage	High	Very High	Very High	Very High	Very High
Transport and Mobility	Medium	High	High	High	Very High
Solid waste	Medium	High	High	High	Very High
Gully erosion	High	Very High	Very High	Very High	Very High
<b>Populations</b>					
Informal Settlement Residents	High	Very High	Very High	Very High	Very High
<b>Natural Assets</b>					
Lake Naivasha & Riparian Zone	Medium	High	High	High	Very High

**Table 2. Summary of Drought Risks for Municipality of Naivasha**

Category	Current Risk	2050 (SSP2-4.5)	2050 (SSP5-8.5)	2100 (SSP2-4.5)	2100 (SSP5-8.5)
<b>Infrastructure &amp; Services</b>					
Wastewater Management	High	High	Very High	Very High	Very High
<b>Populations</b>					

Urban Residents	Medium	High	High	High	Very High
<b>Economic Infrastructure</b>					
Floriculture and Agricultural sector	High	Very High	Very High	Very High	Very High

### Key Takeaways and Next Steps

The assessment reveals that **population** (Informal Settlement Residents e.g., in Kihoto and Kasarani) and the **Wastewater Management** system face the most urgent and interconnected risks from flooding and drought. Solid waste shall equally contribute to pollution on both the informal settlements and water bodies. This leads to environmental degradation. The floriculture industry, a key economic pillar, is highly vulnerable to water stress.

### Immediate actions should include:

1. **Prioritizing** nature-based solutions and upgraded drainage in flood-prone informal settlements.
2. **Investing** in water conservation, wastewater reuse, and repairing non-revenue water losses in the municipal supply system.
3. Developing **an integrated water resource management plan** for the Lake Naivasha basin that balances urban, agricultural, and ecological needs.

### Objective

This Urban Climate Risk Profile aims to conduct a systematic, evidence-based assessment of the current and projected climate risks to the Municipality of Naivasha.

The specific objectives are to:

- Identify the key climate hazards affecting the urban area, with a focus on water-related risks.
- Map exposed and vulnerable populations, infrastructure, and the Lake Naivasha ecosystem.
- Evaluate the magnitude of climate risks under different future scenarios.
- Provide a foundational evidence base for prioritizing adaptation actions in the municipality's planning and budgeting cycles.

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## List of Acronyms

RCRA	Rapid climate risk assessment
CCKP	Climate Change Knowledge Portal
CRA	Climate risk assessment
GCA	Global Center on Adaptation
GIS	Geographic Information System
IDeP	Integrated Development Plan
KUSP -II	Second Kenya Urban Support Program
NbS Nature	Nature-based solutions
NDMA	National Disaster Management Authority
NGO	Non-governmental organization
RCP	Representative concentration pathways
RCRA	Rapid climate risk assessment
SDHUD	State Department of Housing and Urban Development

# 1. Chapter 1: Context

## 1.1.1. Geographic area

Naivasha Municipality is located in Nakuru County, within the Great Rift Valley. It lies on the northern shore of Lake Naivasha, a freshwater lake critical for the economy and ecology. The urban area is transected by major transportation routes (A8 Road, Railway) and is characterized by flat lowlands near the lake and gently sloping terrain to the north.

## 1.1.2. Governance Structure

The municipality is managed by the Naivasha Municipal Board under the devolved system of the County Government of Nakuru. Key departments involved in this assessment include Water, Environment, Natural Resources, Urban Planning, and Public Health.

## 1.1.3. Socio-economic Context

Naivasha has a rapidly growing population, estimated at over 300,000 people, driven by trade, logistics, and the floriculture industry. Wards such as Kihoto and Lake View contain significant informal settlements with high population density and poverty levels.

## 1.1.4. Economic Context

The economy is dominated by the floriculture and horticulture industry (exporting cut flowers), which is a major employer but also a significant water user. Tourism (based on Lake Naivasha and Hell's Gate National Park), geothermal energy production, and logistics are other key sectors.

## 1.1.5. Land-use Context

Land use is a critical issue. There is intense competition between large-scale flower farms, small-scale agriculture, urban expansion, and the protection of the lake's riparian land. Encroachment on the riparian zone has reduced its natural buffer capacity.

## 1.2. Key Stakeholders & Inclusiveness

Stakeholders were engaged through a multi-stakeholder workshop and technical meetings. The process included representatives from the NAIVAWAS, flower farm associations, community leaders from informal settlements, and National Government Agencies.

Figure 1. Stakeholder Mapping for Naivasha Municipality

	Keep satisfied	Manage closely
High Influence	<ul style="list-style-type: none"> <li>Water Resources Authority (WRA)</li> <li>Kenya Railways</li> <li>Kenya National Highways Authority</li> </ul>	<ul style="list-style-type: none"> <li>Nakuru County Government</li> <li>Naivasha Municipal Board</li> <li>Lake Naivasha Riparian Authority</li> </ul>
	Monitor	Keep Informed
Low Influence	<ul style="list-style-type: none"> <li>Academic and research Institutions (e.g., KWRTI)</li> <li>Tourism Operators</li> </ul>	<ul style="list-style-type: none"> <li>Community-Based Organizations (CBOs) in Kihoto/Kasarani/Karagita Manera</li> <li>Floriculture Farmers Associations</li> </ul>

		<ul style="list-style-type: none"> <li>Residents Associations</li> </ul>
	Low Interest	High Interest

High	<b>High Influence – Low Interest</b> <ul style="list-style-type: none"> <li></li> </ul>	<b>High Influence – High Interest</b> <ul style="list-style-type: none"> <li></li> </ul>
	<b>Low Influence – Low Interest</b> <ul style="list-style-type: none"> <li></li> </ul>	<b>Low Influence – High Interest</b> <ul style="list-style-type: none"> <li></li> </ul>
Low		High

## 2. Hazard Assessment

This section presents the hazard assessment component of the Urban Climate Risk Profile for the Municipality of Naivasha. It identifies and analyses the key climate-related hazards affecting the municipality, considering their probability, intensity, geographic extent, and timescales under current and future climate conditions. The assessment draws on available climate data, historical trends, and local knowledge to understand how hazards such as flooding, drought, extreme heat, fog level rise, and storms are evolving and how they may intensify over time. By establishing a clear picture of present and projected climate hazards, this section provides the foundation for assessing impacts, vulnerabilities, and risks in subsequent sections, and supports climate risk-informed urban planning, investment, and service delivery

### 2.1. Key Climate Hazards

**Table 6. Hazard Screening for Naivasha Municipality**

Hazard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazard (Y/N)
<b>Heat Stress</b>				
Average surface temperature increase	Y	Y	Y	Y
Average ocean temperature increase	N	N	N	N
Extreme heat	Y	Y	Y	Y
<b>Flooding</b>				
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	N	N	N	N
Lake level rise	Y	Y	Y	Y
Waterlogging	Y	Y	Y	Y
<b>Water Stress</b>				
Drought (meteorological, hydrological)	Y	Y	Y	Y
Groundwater salinization	Y	Y	Y	Y
Saline intrusion	Y	Y	Y	Y
<b>Wildfire</b>				
Wildfires & bushfires	N	N	N	N
<b>Storms</b>				
Extreme wind	Y	Y	N	Y
Tropical cyclones	N	N	N	N
Sand and dust storms	Y	Y	Y	Y
Hailstorms	Y	N	N	N
<b>Mass Movement</b>				

Hazard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazard (Y/N)
Landslides	N	N	N	N
Coastal erosion	N	N	N	N
Gully erosion	N	N	N	N
<b>Marine Conditions</b>				
Ocean acidification	N	N	N	N
<b>Geophysical*</b>				
Subsidence	N	N	N	N
Earthquakes	N	N	N	N
Volcanos	N	N	N	N

## 2.2. Climate Indicators and Hazard Thresholds

**Table 8: Climate indicators and hazard thresholds selected for the assessment**

Key Hazard	Climate indicator	Data source	Threshold		
			Low	Medium	High
Flooding	Max daily precipitation in 24h (mm)	Kenya Meteorological Department	< 40mm	40-80mm	> 80mm
Drought	Standardized Precipitation Index (SPI)	Kenya Meteorological Department	SPI > -1	-1 to -2	SPI < -2
Extreme heat	Number of days with Tmax > 30°C	Kenya Meteorological Department	< 10 days/year	10-25 days	> 25 days

## 2.3. Current Hazard Levels and Climate Projections

**Table 9. Current and future hazards levels for Municipality of Naivasha.**

Hazard	Hazard Level				
	Current (Baseline)	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Flooding	Medium	High	High	High	Very high
Drought	Medium	High	High	High	Very high
Extreme Heat	Medium	High	High	High	Very high

*Interpretation: A "High" hazard level indicates events are likely to occur with high frequency and/or intensity.*

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

**Table 10. 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

#### **2.4. Current and Future Hazard Impact Areas**

Maps generated for this assessment show:

**Flooding:** The low-lying areas adjacent to Lake Naivasha (Kihoto, Karagita) and along the North-Eastern seasonal streams are current flood hotspots. Projections show an expansion of flood risk areas due to more intense rainfall events.

**Drought:** The entire municipality is projected to face increased drought frequency and severity, impacting surface water inflows to the lake and groundwater recharge.

**Heat:** The urban core of Naivasha town shows a pronounced Urban Heat Island effect, which is projected to intensify, increasing heat stress for residents.

### 3. Exposure & Vulnerability Assessment

This section examines how climate hazards interact with people, assets, systems, and ecosystems within the Municipality of Naivasha to create risk. It assesses who and what is exposed to the identified key climate hazards and why certain groups, locations, and systems are more vulnerable than others. The analysis considers demographic characteristics, socio-economic conditions, land use patterns, infrastructure distribution, and environmental sensitivity, with particular attention to vulnerable and marginalized populations, critical urban services, heritage assets, and key livelihood systems. By understanding exposure and vulnerability alongside hazard intensity, this section provides a comprehensive basis for identifying priority risk hotspots and informing targeted, equitable, and climate-resilient urban planning and investment decisions.

#### 3.1. Urban Elements

**Table n. Urban elements inventory for Municipality of Naivasha.**

Category	Subcategory	INCLUDED In The RCRA (Y/N)	Available In GIS FORMAT (Y/N)	Description
<b>Infrastructure &amp; Services</b>				
Stormwater Drainage	Stormwater drainage conveyance network	Y	N	Limited and often clogged network in the town center; non-existent in most informal settlements.
	Stormwater storage			
Water & Wastewater Management	Pumping stations			
	Groundwater abstraction			
	Water treatment facilities			
	Water supply networks	Y	Y	<ul style="list-style-type: none"> <li>Naivasha Water and Sanitation Company (NAIVAWASS) system;</li> <li>High non-revenue water (~45%)</li> <li>Reliant on Lake Naivasha and boreholes.</li> </ul>
	Sewer networks	Y	Y	
	Wastewater treatment facilities			
Solid Waste Management	Transfer facilities	Y	N	
	Landfills and dump sites		N	
	Recycling centers			
	Collection fleet	Y	N	
	Road networks	Y	Y	

Category	Subcategory	INCLUDED In The RCRA (Y/N)	Available In GIS FORMAT (Y/N)	Description
Transport and Mobility	Non-motorized transport networks	Y	Y	
Economic Infrastructure	Markets			
	Businesses and commercial hubs	Y	N	
	Industrial zones/parks and logistics parks	Y	N	
Social Infrastructure	Government buildings and service centers	Y	Y	
	Education facilities			
	Healthcare facilities			
	Public spaces	Y	Y	
	Faith-based buildings			
	Cultural and heritage assets			
Emergency Services	Fire stations	Y	Y	
	Police stations			
	Telecommunications networks			
	Early warning systems			
	Disaster management centers and shelters			
	Evacuation routes			
<b>Populations</b>				
Urban Residents	Population	Y	N	
	Households	Y	N	
Informal Settlement Residents	Population living in informal settlements	Y	N	Estimated 60,000-100,000 people in settlements like Kihoto, Kasarani, and Karagita, located on flood-prone land near the lake.
	Households lacking land tenure	Y	Y	
	Households / residents lacking access to basic services	Y	N	
Vulnerable and Marginalized Groups	Low-income households			
	Women-headed households			
	Children and youth			
	Elderly persons			
	People with disabilities (PWD)			
	Homeless populations			
	Unemployed or precariously employed workers			

Category	Subcategory	INCLUDED In The RCRA (Y/N)	Available In GIS FORMAT (Y/N)	Description
	Seasonal workers / migrant laborers			
<b>Natural Assets</b>				
Urban Green Infrastructure	Urban parks and gardens	Y	Y	
	Green corridors	Y	Y	
	Street landscaping			
	Urban forests and forest reserves			
Urban Blue Infrastructure	Natural wetlands			
	Rivers			
	Riparian zones	Y	N	<ul style="list-style-type: none"> <li>Freshwater lake, riparian zone critically degraded and encroached, reducing its natural buffer capacity.</li> </ul>
	Lakes, ponds and reservoirs			
	Coastal ecosystems			
	Urban agriculture			
Peri-urban and Agricultural Systems	Peri-urban agriculture	N	N	
	Agroforestry systems	N	N	
	Forests and forest reserves	N	N	
	Protected areas and national parks	N	N	
	Savannahs and rangelands	N	N	

### 3.2. 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 n. 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.
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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 1. Impact Matrix**

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

**Table 12. Exposure, Vulnerability, and Impacts of Pluvial Flooding on Urban Elements**

**Hazard: Pluvial Flooding**

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
<b>Infrastructure &amp; Services</b>					
Storm water Drainage	<ul style="list-style-type: none"> <li>Excess water overwhelms existing drainage channels in Naivasha CBD</li> </ul>	MEDIUM	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>The municipality Lacks an intergrared Drainage Master plan</li> <li>Lined drainage coverage is limited to the CBD and is not adequate to handle excess flood water</li> </ul>	High	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>The municipality to provide integrated drainage systems in the CBD</li> <li>Rain water harvesting.</li> </ul>		
Water & Wastewater Management	<ul style="list-style-type: none"> <li>Water infiltrates into the existing pit Latrines and septic discharging waste water</li> </ul>	MEDIUM	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Overspill of faucal matter within residential and commercial zones</li> </ul>	High	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Promotion and use of bio digesters</li> </ul>		
Solid Waste Management	<ul style="list-style-type: none"> <li>The uncollected waste are washed away and clogs existing drainage channels</li> </ul>	MEDIUM	<b>Sensitivity:</b> Municipality lacks sufficient workforce, equipment and waste management infrastructure to collect waste generated The municipality relies on a dumping site located in Naivasha in place of a modern landfill	High	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Municipality has partnered with private garbage collectors in collection and dumping of waste generated within the municipality</li> <li>The municipality can rehabilitate part of the dumpsite land for development of a Material Recovery facility (MRF)</li> </ul>		
Transport and Mobility	Water overflow on the road reserve hamper pedestrian and vehicular movement	MEDIUM	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Unpaved road network</li> <li>Blocked culverts</li> <li>Blocked service lanes</li> </ul>	Medium	moderate
			<b>Adaptive Capacity:</b> Enhance capacity Promote water harvesting		
Energy	<ul style="list-style-type: none"> <li>Flooding leads to fall power lines leading to prolonged power disruption</li> </ul>	MEDIUM	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Frequent power blackouts</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Use of concrete and stabilized Electric poles</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Economic Infrastructure	<ul style="list-style-type: none"> <li>Business activities are affected during flooding leading to loss of revenue</li> </ul>	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Buildings on low-lying areas; inadequate drainage.</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Temporary embankments</li> <li>Drainage construction.</li> </ul>		
Social Infrastructure	<ul style="list-style-type: none"> <li>Flooding disrupts persons seeking services from government offices.</li> </ul>	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Absence of Drainage channels</li> <li>Buildings located on low lying area below the road levels</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Temporary embankments have been created to redirect water away from government facilities</li> <li>Construction of drainage channels is underway to redirect storm water to Mbegi river</li> </ul>		
Emergency Services	<ul style="list-style-type: none"> <li>Flooding affects access to Hospitals, schools and the CBD</li> </ul>	MEDIUM	<b>Sensitivity:</b> Absence of lined Drainage channels	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Paving of access to the district hospital and development of high capacity Drainage channel.</li> </ul>		
<b>Populations</b>					
Urban Residents	<ul style="list-style-type: none"> <li>Flooding disrupt normal human activities</li> </ul>	MEDIUM	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Poor road networks</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Paving of access roads</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	<ul style="list-style-type: none"> <li>Flooding in Kihoto and karagita always leading to destruction of household property</li> </ul>	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Inadequate drainage channels, Temporary building material compromising stability of residential units</li> <li>Congestion compromising storm water flow</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Planning and tenure regularization but limited budgetary allocation hamper infrastructure development</li> <li>Civic education, annual cleanups.</li> </ul>		
Vulnerable and Marginalized Groups	Persons living with disability elderly and young school going children are exposed to risk associated with movements limiting acces to basic services and access to learning institution	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Poor road networks, lack of assistive devises for persons living with disability</li> <li>...</li> </ul>	High	catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Lack of alternative access routes</li> </ul>		
<b>Natural Assets</b>					
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>Municipal facilities experience prolonged flooding</li> </ul>	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>water logging and poor sanitation levels</li> </ul>	high	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Development of alternative water channels redirecting storm water from the CBD</li> <li>Improvement and rehabilitation of storm water drainage channels</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Urban Blue Infrastructure	Lake Naivasha experiences excessive sedimentation and contamination	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Inadequate buffer along the riparian reserves</li> <li>Lack of filtration zones to trap solid material</li> </ul>	high	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Annual tree planting and civic education</li> <li>Annual lake cleanup exercises</li> </ul>		
Peri-urban and Agricultural Systems	<ul style="list-style-type: none"> <li>Destruction of food crops in peri-urban farms.</li> </ul>	HIGH	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Soil erosion</li> <li>lack of irrigation</li> <li>Crop loss.</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Soil conservation.</li> <li>Crop diversification.</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
<b>Infrastructure &amp; Services</b>					
Stormwater Drainage	<ul style="list-style-type: none"> <li>The main drainage channels are located on unpaved sections of the road leading to Increased dust deposits.</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Increased dust, waste and debris levels on drainage channels</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited budget allocation to facilitate regular Maintenance of Drainage channel.</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Water & Wastewater Management	<ul style="list-style-type: none"> <li>Prolonged drought reduces water supply thus limiting access to water for domestic use.</li> </ul>	High	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Over Reliance on water supplied by Naivasha Water &amp; Sanitation Company</li> <li>Excessive obstruction of river water for agricultural use upstream</li> <li>Lake pollution from unmanaged waste</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Drilling of boreholes to supplement existing water sources.</li> </ul>	High	catastrophic
Solid Waste Management	<ul style="list-style-type: none"> <li>Reduced water availability limits cleaning of waste collection points.</li> <li>Increased illegal dumping and open burning.</li> </ul>	Medium	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Limited waste collection equipment and personnel</li> <li>Reliance on a shrinking dumping site</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Partnership with private garbage collectors</li> <li>Proposed Material Recovery Facility (MRF)</li> </ul>	Medium	Moderate
Transport and Mobility	<ul style="list-style-type: none"> <li>Prolonged drought contributes to cracking and degradation of unpaved roads.</li> <li>increased dust levels.</li> </ul>	High	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>increased dust levels affects pedestrian road users</li> <li>increased dust levels compromise visibility contributing to road accidents</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Limited budgetary allocation to finance continuous watering</li> </ul>	Medium	Major
Energy	<ul style="list-style-type: none"> <li>Increased water demand for cooling and refrigeration</li> </ul>	Medium	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Grid strain and limited transformer capacity during peak demand periods ...</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Use renewable energy to supplement power supplied by Kenya power</li> </ul>	Medium	Moderate

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Economic Infrastructure	<ul style="list-style-type: none"> <li>Small and Medium enterprises operating car washes, eateries rely on cheap water supplied by Naivasha Water and Sanitation Company</li> <li>Water shortage results increased overhead cost as a result purchase of expensive water from private</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Over reliance on limited water sources</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Recycling of water and use of water efficient mechanisms for cleaning</li> </ul>	Medium	Major
Social Infrastructure	<ul style="list-style-type: none"> <li>Prolonged droughts result to lose of greenery within school compounds contributing to increased dust levels and subsequent increase prevalence of air borne diseases</li> <li>Reduced water supply results to poor hygiene</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Lack of sufficient water storage facilities</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Progressive installation an acquisition of water storage tanks</li> </ul>	Medium	Moderate
Emergency Services	<ul style="list-style-type: none"> <li>Increased incidences of fire</li> <li>Prolonged droughts contribute indirectly to conflict and increased crime as a result of competitions for limited resources overwhelming the police station.</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited firefighting water reserves and equipment...</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Continuous drilling of boreholes but the coverage is limited budget allocation from the exchequer</li> </ul>	High	Major
<b>Populations</b>					
Urban Residents	<ul style="list-style-type: none"> <li>Water rationing</li> <li>Increased household expenditure on water</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Heavy dependence on piped water supply</li> <li>• Limited alternative livelihood options</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Household water storage tanks</li> <li>Purchase of water from vendors</li> </ul>	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	<ul style="list-style-type: none"> <li>Severe water shortages</li> <li>Reliance on expensive water vendors</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Inadequate water storage facilities</li> <li>Low household income</li> <li>Poor sanitation infrastructure</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Community boreholes (limited coverage)</li> </ul>		
Vulnerable and Marginalized Groups	<ul style="list-style-type: none"> <li>Increased health risks</li> <li>Increased food insecurity</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Low-income levels</li> <li>Limited access to healthcare</li> <li>High dependency ratios</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Government relief food programs (limited reach)</li> </ul>		
<b>Natural Assets</b>					
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>Drying of parks and public open spaces</li> <li>Reduced tree cover</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Lack of irrigation systems</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Tree planting initiatives (rain-fed dependent)</li> <li>Purchase of water bowsers to supplement rain water</li> </ul>		
Urban Blue Infrastructure	<ul style="list-style-type: none"> <li>Reduced river flows</li> <li>Declining groundwater recharge levels</li> <li>Degraded lakebasin</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Over-abstraction of water resources</li> <li>Limited recharge areas</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Riparian restoration initiatives</li> </ul>		
Peri-urban and Agricultural Systems	<ul style="list-style-type: none"> <li>Crop failure</li> <li>Livestock losses</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Over reliance on rain-fed agriculture</li> <li>Limited irrigation infrastructure</li> </ul>	High	Catastrophic

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	<ul style="list-style-type: none"> <li>Soil degradation</li> </ul>		<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Adoption of drought-resistant crops</li> <li>Agroforestry practices</li> </ul>		

**Table 14. Exposure, Vulnerability, and Impacts of Sand and dust storms on Urban Elements**

**Hazard:** Sand and dust storms

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
<b>Infrastructure &amp; Services</b>					
Stormwater Drainage	<ul style="list-style-type: none"> <li>Dust deposits clog open drainage channels along in the CBD</li> <li>Wind-blown sediments from unpaved roads accumulate in culverts</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Open and unlined drainage channels</li> <li>High sediment load from nearby bare lands</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Periodic manual desilting by municipality</li> </ul>	Medium	Moderate
Water & Wastewater Management	<ul style="list-style-type: none"> <li>Dust contamination of rooftop rainwater harvesting systems</li> <li>Sedimentation in shallow wells peri-urban areas</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Reliance on shallow wells and rooftop tanks</li> <li>Limited filtration systems</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Basic water treatment and tank cleaning practices</li> </ul>	Medium	Moderate
Solid Waste Management	<ul style="list-style-type: none"> <li>Wind scatters waste from open collection points</li> <li>Increased litter accumulation along Naivasha Nairobi highway</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Open waste storage points</li> <li>Limited waste containment facilities</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Increased waste collection fleet and equipment.</li> </ul>	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Transport and Mobility	<ul style="list-style-type: none"> <li>Reduced visibility along Nairobi–Nakuru Highway</li> <li>Dust-covered unpaved roads in reduce road safety</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Large proportion of unpaved roads</li> <li>Increased pedestrian movement without protective walkways</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited road watering and partial paving in CBD</li> </ul>		
Energy	<ul style="list-style-type: none"> <li>Dust accumulation on transformers and power lines</li> <li>Reduced efficiency of solar panels</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Overhead power distribution system</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Routine maintenance by Kenya Power</li> </ul>		
Economic Infrastructure	<ul style="list-style-type: none"> <li>Reduced business activity in open-air markets due to dust</li> <li>Increased cleaning and maintenance costs for shops in CBD</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Open market structures</li> <li>Small businesses lack protective infrastructure</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Temporary coverings and enclosed shopfronts</li> </ul>		
Social Infrastructure	<ul style="list-style-type: none"> <li>Schools experience high dust exposure</li> <li>Health facilities report increased respiratory complaints</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited tree cover within school compounds</li> <li>Poor ventilation systems</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Tree planting initiatives in schools</li> </ul>		
Emergency Services	<ul style="list-style-type: none"> <li>Reduced visibility affecting emergency response time</li> <li>Increased respiratory-related emergencies</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited specialized respiratory response equipment</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Availability of Naivasha District Hospital services</li> </ul>		
<b>Populations</b>					

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Urban Residents	<ul style="list-style-type: none"> <li>Increased respiratory illnesses (e.g., asthma, allergies)</li> <li>Reduced outdoor economic activities</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>High exposure due to outdoor informal sector activities</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Use of masks and indoor sheltering</li> </ul>		
Informal Settlement Residents	<ul style="list-style-type: none"> <li>Severe dust exposure in urban and peri urban areas due to unpaved surfaces</li> <li>Dust intrusion into temporary housing structures</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Houses constructed with temporary materials</li> <li>Congested settlements</li> </ul>		
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited mitigation measures</li> </ul>		
Vulnerable and Marginalized Groups	<ul style="list-style-type: none"> <li>Children and elderly highly affected by respiratory infections</li> <li>Persons with disabilities face mobility challenges during low visibility</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Pre-existing health conditions</li> <li>Limited access to protective gear</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited targeted support programs</li> </ul>		
<b>Natural Assets</b>					
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>Drying of vegetation in the municipal park and public open spaces</li> <li>Soil erosion in open grounds near the CBD</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Sparse vegetation cover</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Tree planting and greening initiatives</li> </ul>		
Urban Blue Infrastructure	<ul style="list-style-type: none"> <li>Increased sediment load in Lake Naivasha</li> <li>Reduced water quality due to dust runoff</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited riparian buffer protection</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Annual clean-up exercises</li> </ul>		
Peri-urban and Agricultural Systems	<ul style="list-style-type: none"> <li>Topsoil erosion in peri-urban farms</li> <li>Reduced crop productivity due to moisture loss</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Reliance on rain-fed agriculture</li> <li>Limited windbreak structures</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Adoption of agroforestry and windbreak trees</li> </ul>		

**Table 15. Exposure, Vulnerability, and Impacts of Fluvial Flooding on Urban Elements**

**Hazard:** Fluvial Flooding

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
<b>Infrastructure &amp; Services</b>					
Stormwater Drainage	<ul style="list-style-type: none"> <li>Natural surface runoff accumulates in poorly drained sections of Kihoto and Karagita</li> <li>Rising lake levels during intense rainfall increases flooding</li> <li>Open roadside drains become overwhelmed</li> </ul>	Medium	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Absence of integrated drainage system</li> <li>Mostly unlined roadside drains</li> <li>Poor maintenance</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Periodic manual desilting</li> <li>Small-scale drainage improvements in CBD only</li> </ul>	Medium	Moderate
Water & Wastewater Management	<ul style="list-style-type: none"> <li>Floodwaters infiltrate shallow wells in low-lying zones</li> <li>Septic tanks may overflow during prolonged lake flooding</li> </ul>	High	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Reliance on shallow groundwater</li> <li>Limited sewer coverage</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Borehole drilling initiatives</li> <li>Basic chlorination programs</li> </ul>	High	Catastrophic
Solid Waste Management	<ul style="list-style-type: none"> <li>Floodwaters transport waste from informal dumping areas into natural flow paths leading to land and water contamination</li> </ul>	Medium	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Open dumping practices</li> <li>Limited waste containment</li> </ul> <p><b>Adaptive Capacity:</b></p> <ul style="list-style-type: none"> <li>Private garbage collection partnerships</li> <li>Improved solid waste management infrastructure</li> </ul>	Medium	Moderate
Transport and Mobility	<ul style="list-style-type: none"> <li>Low-lying access roads near seasonal flow paths become impassable</li> </ul>	Medium	<p><b>Sensitivity:</b></p> <ul style="list-style-type: none"> <li>Undersized culverts</li> <li>Significant proportion of unpaved roads</li> </ul>	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	<ul style="list-style-type: none"> <li>Culverts blocked by debris during heavy rainfall</li> </ul>		<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Ongoing culvert upgrades</li> <li>Road rehabilitation efforts</li> </ul>		
Energy	<ul style="list-style-type: none"> <li>Flooding in low-lying areas threatens ground-mounted transformers</li> <li>Temporary power outages during heavy rainfall events</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Overhead power infrastructure</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Elevated transformer installations in select areas</li> </ul>	Medium	Moderate
Economic Infrastructure	<ul style="list-style-type: none"> <li>Businesses in low-lying areas experience temporary closures</li> <li>Reduced access during flood events</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Informal business structures</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Temporary relocation during heavy rains</li> </ul>		
Social Infrastructure	<ul style="list-style-type: none"> <li>Schools and public offices in low-elevation areas experience temporary access disruption</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Buildings located below road level</li> <li>Limited flood barriers</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Localized embankments and drainage diversion</li> </ul>	Medium	Moderate
Emergency Services	<ul style="list-style-type: none"> <li>Flooded access roads delay emergency response</li> <li>Increase in waterborne diseases post-flooding</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited specialized flood response equipment</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Availability of Fire engine and personnel.</li> </ul>	Medium	Major
<b>Populations</b>					
Urban Residents	<ul style="list-style-type: none"> <li>Surface water accumulation in residential compounds</li> <li>Temporary displacement in extreme rainfall seasons</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Settlement expansion in low-lying areas within catchment</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Informal sandbagging and temporary channels</li> </ul>	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	<ul style="list-style-type: none"> <li>Frequent flooding in Kihoto and Karagita due to natural flow accumulation</li> <li>Loss of property and sanitation disruption</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Temporary housing materials</li> <li>High-density settlement in low-elevation zones</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited relocation options</li> </ul>		
Vulnerable and Marginalized Groups	<ul style="list-style-type: none"> <li>Increased exposure to contaminated standing water</li> <li>Elevated disease burden among children and elderly</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Pre-existing health vulnerabilities</li> <li>Limited mobility</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Limited targeted flood protection programs</li> </ul>		
<b>Natural Assets</b>					
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>Excessive erosion during overtopping events</li> <li>Loss of vegetation along natural floodplain</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Weak riparian buffer enforcement</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Riparian tree planting initiatives</li> </ul>		
Urban Blue Infrastructure	<ul style="list-style-type: none"> <li>Channel widening and sediment deposition in Lake Naivasha</li> <li>Natural floodplain expansion during heavy rainfall</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Deforestation upstream and in riparian areas</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Community lake basin restoration activities</li> </ul>		
Peri-urban and Agricultural Systems	<ul style="list-style-type: none"> <li>Flooding of farms located within natural floodplain</li> <li>Soil erosion and crop destruction</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Farming within flood-prone zones</li> <li>Limited protective infrastructure</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Seasonal crop adjustments.</li> </ul>		

**Table 16. Exposure, Vulnerability, and Impacts of Extreme Heat on Urban Elements**

**Hazard:** Extreme Heat

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
<b>Infrastructure &amp; Services</b>					
Stormwater Drainage	<ul style="list-style-type: none"> <li>• Prolonged dry periods cause cracking of unlined drainage channels</li> <li>• Increased sediment and debris accumulation due to dry winds</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Mostly unlined and exposed drainage channels</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Periodic maintenance and desilting</li> </ul>	Medium	Moderate
Water & Wastewater Management	<ul style="list-style-type: none"> <li>• Increased water demand during hot periods</li> <li>• Reduced groundwater recharge levels</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Heavy reliance on boreholes and Naivasha Water and Sanitation Company</li> <li>• Limited water storage infrastructure</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Borehole drilling and water rationing measures</li> </ul>	High	Catastrophic
Solid Waste Management	<ul style="list-style-type: none"> <li>• Accelerated decomposition of waste in open collection points</li> <li>• Increased odor and vector attraction</li> <li>• Dumpsite fires due to Methane and excessive heat</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Open waste dumpsites</li> <li>• Limited waste containment facilities</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Private garbage collectors operating in CBD</li> <li>• Construction of a Modern landfill</li> </ul>	Medium	moderate
Transport and Mobility	<ul style="list-style-type: none"> <li>• Heat stress affects pedestrians and boda boda operators</li> <li>• Surface degradation of unpaved roads</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Limited shaded walkways</li> <li>• High pedestrian dependency</li> </ul> <b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Limited tree cover initiatives</li> </ul>	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Energy	<ul style="list-style-type: none"> <li>Increased electricity demand for cooling and refrigeration</li> <li>Transformer overheating during peak heat periods</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited transformer capacity</li> <li>Overhead power infrastructure exposed to direct heat</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Adoption of solar energy systems in institutions and household</li> </ul>		
Economic Infrastructure	<ul style="list-style-type: none"> <li>Reduced productivity in open-air markets (e.g., Modern Market)</li> <li>Increased operating costs for water</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Informal traders operate in open spaces without shade</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Temporary shading structures and adjusted business hours</li> </ul>		
Social Infrastructure	<ul style="list-style-type: none"> <li>Schools experience high indoor temperatures</li> <li>Health facilities report increased dehydration and heat-related illness</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited ventilation in classrooms</li> <li>Limited green cover within compounds</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Installation of water storage tanks and tree planting in schools</li> </ul>		
Emergency Services	<ul style="list-style-type: none"> <li>Increased heat-related medical cases at the District Hospital</li> <li>Injuries due to fire outbreaks during prolonged dry heat</li> </ul>	Medium	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Financial medical burdens</li> </ul>	Medium	Moderate
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Boreholes and hospital services available</li> <li>Availability of a fire engine</li> </ul>		
<b>Populations</b>					
Urban Residents	<ul style="list-style-type: none"> <li>Increased dehydration and heat exhaustion</li> <li>Higher household expenditure on water and electricity</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>Limited access to cooling systems</li> <li>High outdoor economic activity</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>Water storage and schedule adjustment</li> </ul>		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Informal Settlement Residents	<ul style="list-style-type: none"> <li>• Extreme indoor heat in iron-sheet structures in low income residential areas</li> <li>• Limited access to clean water during peak heat</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Housing made of heat-absorbing materials</li> <li>• High density settlements</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Minimal mitigation options</li> </ul>		
Vulnerable and Marginalized Groups	<ul style="list-style-type: none"> <li>• Children, elderly, and persons with disabilities at high risk of heat stress</li> <li>• Increased health complications</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Pre-existing medical conditions</li> <li>• Limited mobility</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Limited targeted cooling or relief programs</li> </ul>		
<b>Natural Assets</b>					
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>• Drying of vegetation in Municipal park and public open spaces</li> <li>• Increased tree mortality during prolonged heat periods.</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Limited irrigation systems</li> </ul>	Medium	Major
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Tree planting initiatives (rain-dependent)</li> </ul>		
Urban Blue Infrastructure	<ul style="list-style-type: none"> <li>• Reduced river flow levels</li> <li>• Increased evaporation rates</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Limited protection of riparian zones</li> <li>• Reduced recharge during dry periods</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Community lake conservation initiatives</li> </ul>		
Peri-urban and Agricultural Systems	<ul style="list-style-type: none"> <li>• Crop wilting and reduced yields</li> <li>• Livestock heat stress</li> <li>• Soil moisture loss</li> </ul>	High	<b>Sensitivity:</b> <ul style="list-style-type: none"> <li>• Heavy reliance on rain-fed agriculture</li> <li>• Limited irrigation coverage</li> </ul>	High	Catastrophic
			<b>Adaptive Capacity:</b> <ul style="list-style-type: none"> <li>• Adoption of drought-resistant crops and agroforestry</li> </ul>		

## 4. Climate Risk Assessment

This section integrates the findings from the hazard assessment and the exposure and vulnerability analysis to determine the overall climate risks facing the Municipality of Naivasha. It evaluates the likelihood and potential consequences of climate-related hazards by examining how hazard intensity and frequency intersect with exposed populations, assets, services, and ecosystems, as well as their capacity to cope and adapt. The assessment highlights priority climate risks across sectors and locations, including impacts on livelihoods, public health, infrastructure, natural systems, and cultural heritage. By identifying high-risk areas and systems, this section provides a clear evidence base to guide risk prioritization, resilience-building actions, and the mainstreaming of climate considerations into the Integrated Development Plan and other municipal planning instruments.

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 n. 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 n. 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.

### 4.1. Current and Future Climate Risks on Urban Elements

**Table 19. Summary of Pluvial Flooding risks for Naivasha Municipality**

Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5

	<b>Hazard Level</b>	Medium	Medium	High	High	High
<b>Categories</b>	<b>Impact</b>	<b>Risk Levels</b>				
		<b>Current</b>	<b>2050 SSP2-4.5</b>	<b>2050 SSP5-8.5</b>	<b>2100 SSP2-4.5</b>	<b>2100 SSP5-8.5</b>
<b>Infrastructure &amp; Services</b>						
Stormwater Drainage	major	high	high	Very high	Very high	Very high
Water & Wastewater Management	Major	High	High	Very high	Very high	Very high
Solid Waste Management	Moderate	Medium	Medium	High	High	High
Transport and Mobility	Major	High	High	Very high	Very high	Very high
Energy	Moderate	Medium	Medium	Medium	High	High
Economic Infrastructure	Major	High	High	Very high	Very high	Very high
Social Infrastructure	Moderate	Medium	Medium	High	High	High
Emergency Services	Major	High	High	Very high	Very high	Very high
<b>Populations</b>						
Urban Residents	Moderate	Medium	Medium	High	High	High
Informal Settlement Residents	Major	Very high	Very high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	Moderate	Medium	Medium	High	High	High
<b>Natural Assets</b>						
Urban Green Infrastructure	Minor	Low	Low	Medium	Medium	Medium
Urban Blue Infrastructure	Major	High	High	Very high	Very high	Very high
Peri-urban and Agricultural Systems	Major	High	High	Very high	Very high	Very high

**Table 20. Summary of Drought risks for Naivasha Municipality**

	<b>Time Horizon &amp; Climate Scenario</b>	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	<b>Hazard Level</b>	high	high	high	high	high
<b>Categories</b>	<b>Impact</b>	<b>Risk Levels</b>				
		<b>Current</b>	<b>2050 SSP2-4.5</b>	<b>2050 SSP5-8.5</b>	<b>2100 SSP2-4.5</b>	<b>2100 SSP5-8.5</b>

Infrastructure & Services						
Stormwater Drainage	minor	medium	medium	medium	medium	medium
Water & Wastewater Management	major	Very high				
Solid Waste Management	minor	medium	medium	medium	medium	Medium
Transport and Mobility	moderate	high	high	high	high	high
Energy	moderate	high	high	high	high	high
Economic Infrastructure	major	Very high				
Social Infrastructure	Moderate	high	high	high	high	High
Emergency Services	major	Very high				
Populations						
Urban Residents	Moderate	high	High	high	high	High
Informal Settlement Residents	Major	Very high				
Vulnerable and Marginalized Groups	Major	Very high				
Natural Assets						
Urban Green Infrastructure	Minor	medium	medium	medium	medium	medium
Urban Blue Infrastructure	moderate	high	high	high	high	High
Peri-urban and Agricultural Systems	Major	Very high				

**Summary of Sand and Dust Storms risks for Naivasha Municipality**

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level	medium	medium	high	high	high
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	low	medium	Medium	Medium
Water & Wastewater Management	Moderate	Medium	Medium	High	High	High

Solid Waste Management	Minor	Low	Low	Medium	Medium	Medium
Transport and Mobility	Moderate	Medium	Medium	High	High	High
Energy	Moderate	Medium	Medium	High	High	High
Economic Infrastructure	Moderate	Medium	Medium	High	High	High
Social Infrastructure	Moderate	Medium	Medium	High	High	High
Emergency Services	Major	High	high	high	Very high	Very high
<b>Populations</b>						
Urban Residents	Moderate	medium	medium	High	high	high
Informal Settlement Residents	major	high	high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	major	high	high	Very high	Very high	Very high
<b>Natural Assets</b>						
Urban Green Infrastructure	minor	low	low	medium	medium	Medium
Urban Blue Infrastructure	moderate	medium	medium	high	high	High
Peri-urban and Agricultural Systems	major	high	high	Very high	Very high	Very high

**Table 22. Summary of fluvial flooding risks for Gilgil Municipality**

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
		Hazard Level	Medium	Medium	High	High
Categories	Impact	Risk Levels				
		Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
<b>Infrastructure &amp; Services</b>						
Stormwater Drainage	Major	High	High	Very high	Very high	Very high
Water & Wastewater Management	Major	High	High	Very high	Very high	Very high
Solid Waste Management	Moderate	Medium	Medium	high	High	High
Transport and Mobility	Major	High	High	Very high	Very high	Very high
Energy	Moderate	Medium	medium	high	High	high
Economic Infrastructure	Major	high	high	Very high	Very high	Very high

Social Infrastructure	Moderate	medium	medium	high	high	High
Emergency Services	Major	High	High	Very high	Very high	Very high
<b>Populations</b>						
Urban Residents	Moderate	medium	medium	high	high	high
Informal Settlement Residents	Major	high	high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	major	high	high	Very high	Very high	Very high
<b>Natural Assets</b>						
Urban Green Infrastructure	minor	low	low	Medium	medium	medium
Urban Blue Infrastructure	major	high	high	Very high	Very high	Very high
Peri-urban and Agricultural Systems	major	high	high	Very high	Very high	Very high

**Table 23. Summary of Extreme heat risks for Naivasha Municipality**

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level	Medium	Medium	high	high	high
Categories	Impact	Risk Levels				
		Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
<b>Infrastructure &amp; Services</b>						
Stormwater Drainage	minor	Medium	medium	high	high	high
Water & Wastewater Management	moderate	medium	medium	high	high	high
Solid Waste Management	minor	medium	medium	high	high	high
Transport and Mobility	moderate	medium	medium	high	high	high
Energy	major	high	high	Very high	Very high	Very high
Economic Infrastructure	major	high	high	Very high	Very high	Very high
Social Infrastructure	moderate	medium	medium	high	high	high
Emergency Services	major	high	high	Very high	Very high	Very high
<b>Populations</b>						
Urban Residents	Moderate	medium	medium	high	high	high

Informal Settlement Residents	major	high	High	Very high	Very high	Very high
Vulnerable and Marginalized Groups	major	high	high	Very high	Very high	Very high
<b>Natural Assets</b>						
Urban Green Infrastructure	Minor	medium	medium	high	high	high
Urban Blue Infrastructure	minor	medium	medium	high	high	high
Peri-urban and Agricultural Systems	major	high	high	Very high	Very high	Very high

## 4.2. Climate Risk Hotspots

The composite risk analysis identifies **Kihoto, Kamere, Karagita and Kasarani** as the highest-priority climate risk hotspots. These areas face a double burden: catastrophic flood risk due to their location and high vulnerability of the population, coupled with high risk from floods, drought and heat due to poor housing conditions and water insecurity.

## 5. What's Next?

### 5.1. Key Findings

- **Highest Priority Hazards: Flooding and Drought** present the most severe and interconnected challenges, creating a cycle of disaster and scarcity.
- **Most At-Risk Groups: Residents of informal settlements** (Kihoto, Kasarani, Karagita) face catastrophic risks from flooding and major risks from water stress and heat.
- **Most Critical Systems:** The **municipal water supply system** is highly vulnerable to drought and lacks the capacity to cope with demand spikes or supply shocks. The **degraded riparian zone** of Lake Naivasha is a critical natural asset at risk, which exacerbates flooding and water quality issues.
- **Economic Vulnerability:** The **floriculture industry**, while a major water user, is itself highly vulnerable to water stress, posing a significant risk to the local economy and employment.

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

Category	List of Key Hazards		
	Current	Mid-term (2050)	Long-term (2100)
<b>Infrastructure &amp; Services</b>			
Stormwater Drainage	Floods	Floods	Floods
Water & Wastewater Management	Drought	Flooding, Drought	Flooding, Drought
Solid Waste Management	Floods, Pollution	Floods, pollution	Floods, Pollution
Transport and Mobility	Floods	Floods	floods

Category	List of Key Hazards		
	Current	Mid-term (2050)	Long-term (2100)
Emergency Services	Floods, Droughts	Flooding Drought, Heat	Flooding Drought, Heat
<b>Populations</b>			
Urban Residents	Flooding, Drought	Flooding, Drought, Heat	Flooding, Drought, Heat
Informal Settlement Residents	Flooding, Drought	Flooding Drought, Heat	Flooding Drought, Heat
Vulnerable and Marginalized Groups			
<b>Natural Assets</b>			
Urban Green Infrastructure	Drought	Flooding, drought	Flooding and drought
Urban Blue Infrastructure	Flooding, Drought	Flooding, Drought	Flooding, Drought
Peri-urban and Agricultural Systems			

## 5.2. Climate Adaptation and Resilience Solutions

**Table n.** Climate adaptation and resilience solutions recommended for Municipality of Naivasha

Category	Recommended Solutions		
	Immediate	Mid-term	Long-term
<b>Infrastructure &amp; Services</b>			
Stormwater Drainage	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Water & Wastewater Management	<ul style="list-style-type: none"> <li>• Aggressive campaign to repair water pipe leaks and reduce non-revenue water.</li> <li>• Promote rainwater harvesting in public buildings.</li> </ul>	<ul style="list-style-type: none"> <li>• Invest in wastewater treatment and reuse for non-potable uses (e.g., flower farms).</li> <li>• Construct managed aquifer recharge schemes.</li> </ul>	<ul style="list-style-type: none"> <li>• Diversify water sources (e.g., advanced treatment, new sustainable boreholes).</li> <li>• Implement a smart water grid.</li> </ul>
Solid Waste Management	<ul style="list-style-type: none"> <li>• Reliable campaign of door to door collections system for households</li> <li>• Organizing clean up activities.</li> <li>• Eliminate illegal dumping</li> <li>• Implement community scale composting plants for organic waste</li> </ul>	<ul style="list-style-type: none"> <li>• Establish material recovery facility (MRF)</li> <li>• Promote reduce and reuse culture</li> <li>• Increase waste collection infrastructure through purchase of skip bins, skip loaders and litterbins</li> <li>• Establish a modern landfill</li> </ul>	<ul style="list-style-type: none"> <li>• Zone for develop a circular economy park to host recycling, composting and up cycling industries to reduce land fill pressure.</li> <li>• Waste to energy interventions</li> </ul>
Transport and Mobility	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Energy	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Economic Infrastructure	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Social Infrastructure	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Emergency Services	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
<b>Populations</b>			

Category	Recommended Solutions		
	Immediate	Mid-term	Long-term
Urban Residents	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Informal Settlement Residents	<ul style="list-style-type: none"> <li>• Community-led clearing of drainage channels.</li> <li>• Install raised community handwashing stations to reduce flood contamination.</li> </ul>	<ul style="list-style-type: none"> <li>• In-situ upgrading of housing and pathways using flood-resilient materials.</li> <li>• Develop a participatory managed retreat plan for the most vulnerable households.</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate highest-risk communities to safe, serviced land.</li> <li>• Integrate resilient water and sanitation services.</li> </ul>
Vulnerable and Marginalized Groups	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
<b>Natural Assets</b>			
Urban Green Infrastructure	<ul style="list-style-type: none"> <li>• Community engagement in tree planting activity</li> <li>• Opening protecting the planted strip through community ownership.</li> </ul>	<ul style="list-style-type: none"> <li>• Mapping and partnership engagement.</li> <li>• Public awareness workshops.</li> </ul>	<ul style="list-style-type: none"> <li>• Expanding the infrastructure through policy on development approval process. Introducing incentives to any urban green infrastructure development</li> </ul>
Urban Blue Infrastructure	<ul style="list-style-type: none"> <li>• Enforce the protection and restoration of the 100m riparian zone.</li> <li>• Promote agroforestry in upper catchment to reduce runoff.</li> </ul>	<ul style="list-style-type: none"> <li>• Mapping and zoning more sensitive regions for protection.</li> <li>• Increase payments for ecosystem services programs to encourage conservation.</li> </ul>	<ul style="list-style-type: none"> <li>• Fully restore the ecological function of the riparian zone as a natural buffer.</li> </ul>

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## ANNEX N1: HISTORICAL HAZARD EVENTS

### Hazard: Kihoto Flooding – Naivasha Municipality

Category	Details
<b>Hazard Event/Type</b>	Riverine and lacustrine flooding (lake-level rise and backflow flooding affecting riparian settlements).
<b>Date Period</b> or	Major flood events recorded during the 2018 long rains and the 2020–2021 exceptional lake level rise period. Seasonal flooding continues to occur during long rains (March–May) and short rains (October–December).
<b>Location</b>	Kihoto Ward, particularly low-lying riparian settlements adjacent to Lake Naivasha shoreline, east of Naivasha CBD. Floodwaters extended into residential areas, informal settlements, access roads, and public spaces within Kihoto.
<b>Intensity</b>	Flood depths ranged approximately between 0.5–2 metres in severely affected zones. Flooding resulted from prolonged heavy rainfall combined with significant lake level rise. In 2020–2021, inundation persisted for weeks to several months due to sustained high water levels and inadequate drainage infrastructure.
<b>Social Impacts</b>	Thousands of households displaced, especially in informal settlements. Vulnerable groups most affected included women-headed households, children, elderly persons, persons with disabilities, and low-income migrant workers in the horticulture sector. Temporary learning disruptions occurred. Increased cases of waterborne and vector-borne diseases were reported.
<b>Physical Impacts</b>	Submergence and destruction of semi-permanent and temporary housing structures. Damage to feeder roads and access roads connecting Kihoto to Naivasha CBD. Collapse of pit latrines and contamination of water sources. Disruption of electricity distribution lines and local infrastructure.
<b>Economic Impacts</b>	Livelihood disruption, particularly for casual labourers in horticulture and small informal businesses. Loss of household assets and merchandise. Increased municipal expenditure on emergency response, relocation, and infrastructure repair. Indirect losses included reduced productivity and increased healthcare costs. Tourism and lakeside enterprises experienced operational disruptions.
<b>Ecological Impacts</b>	Degradation of riparian buffer zones and wetlands. Increased sedimentation and nutrient inflow into the lake. Contamination from flooded sanitation facilities and solid waste. Alteration of shoreline ecosystems and stress on freshwater biodiversity.

## Annex N2. Data Sources

Page	Data	Data Source
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