MIGORI COUNTY

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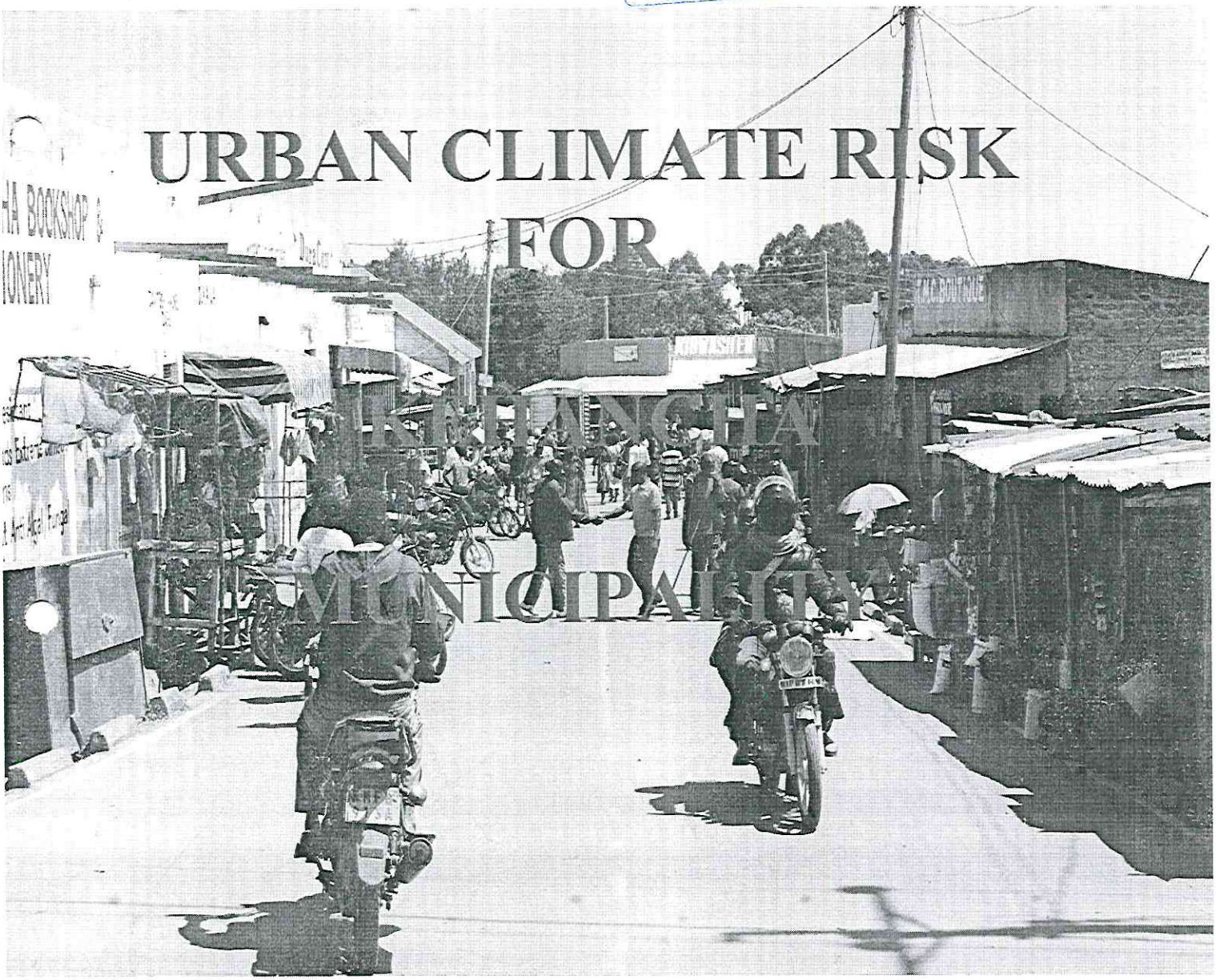
URBAN CLIMATE RISK FOR KEHANCHA MUNICIPALITY



KEHANCHA MUNICIPALITY CLIMATE RISK PROFILE 2025

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Executive Summary

Kenya is urbanizing rapidly, with31% of the population living in urban areas (2019), a figure projected to reach around 50% by 2050. The fastest urban growth is occurring in small and medium-sized towns. Urbanization drives economic growth and improves living standards but also increases exposure to climate-related hazards, particularly flooding, drought, and extreme heat.

After having done some public participation and some stake holder engagements, Kehancha Municipal climate risk profile team identified the following climate risks for profiling:

- Extreme Precipitation patterns
- Pluvial flooding
- Drought
- Heat stress
- Land degradation
- Landslides

The development of this profile has been aided by GCA in partnership with WB to help the municipality to identify key climate risks as it implements KUSP 2.

This profile can be used in the future to come up with interventions to mitigate the effects caused with these climate related risks and thus achieving a resilient climate for lifes to strive in a safe, health and conducive environment.

1.1. Current and Future Climate Risks on Urban Elements

Table1.SummaryofHazard-PluvialfloodingrisksforKehancha 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						
Storm water Drainage	Catastrophic	High	High	High	High	High
Water Wastewater Management	Moderate	High	High	High	High	High
Solid Waste Manageme	Moderate	High	High	High	High	High

nt						
Transport and Mobility	Moderate	High	High	High	High	High
Energy	Insignificant	Low	Low	Low	Low	Low
Economic Infrastructure	Insignificant	Low	Low	Low	Low	Low
Social Infrastructure	Insignificant	Low	Low	Low	Low	Low
Emergency Services	Insignificant	Low	Low	Low	Low	Low
Populations						
Urban Residents	Major	Very high	Very high	Very high	Very high	Very high
Informal Settlement Residents	Catastrophic	Very high	Very high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	Moderate	High	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Insignificant	Low	Low	Low	Low	Low
Urban Blue Infrastructure	Minor	Medium m	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medi um	Medium	Medium	Medium	Medium

Table2.Summary of Hazard- Extreme precipitation risks for Kehancha 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						
Storm water Drainage	Catastrophic	Very High	Very High	Very High	Very High	Very High
Water Wastewater Management	Catastrophic	Very High	Very High	Very High	Very High	Very High
Solid Waste Management	Catastrophic	Very High	Very High	Very High	Very High	Very High
Transport and Mobility	Catastrophic	Very High	Very High	Very High	Very High	Very High
Energy	Moderate	Low	Low	High	High	High

Economic Infrastructure	Catastrophic	Very High	Very High	Very High	Very High	Very High
Social Infrastructure	Moderate	Low	High	High	High	High
Emergency Services	insignificant	low	low	Low	low	low
Populations						
Urban Residents	Moderate	High	High	High	High	High
Informal Settlement Residents	catastrophic	Very high	Very high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	catastrophic	Very high	Very high	Very High	Very high	Very high
Natural Assets						
Urban Green Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Urban Blue Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medium	Medium	Medium	Medium	Medium

Table3.Summary of Hazard-Extreme heat risks for Kehancha 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						
Storm water Drainage	Insignificant	Low	Low	Low	Low	Low
water Waste water Management	Moderate	Medium	High	High	High	High
Solid Waste Management	Insignificant	Low	Low	Low	Low	Low
Transport and Mobility	Insignificant	Low	Low	Low	Low	Low
Energy	Insignificant	Low	Low	Low	Low	Low
Economic Infrastructure	Insignificant	Low	Low	Low	Low	Low
Social Infrastructure	Insignificant	Low	Low	Low	Low	Low
Emergency Services	Insignificant	Low	Low	Low	Low	Low
Populations						
Urban Residents	Moderate	Medium	High	High	High	High
Informal Settlement Residents	Moderate	Medium	High	High	High	High
Vulnerable and Marginalized Groups	Moderate	Medium	High	High	High	High
Natural Assets						

Urban Green Infrastructure	Insignificant	Low	Low	Low	Low	Low
Urban Blue Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medium	Medium	Medium	Medium	Medium

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List of Acronyms

GCA	Global Climate Adaptation
WB	World Bank
KUSP	Kenya Urban Support Program
ICT	Information Communication Technology
CBOs	Community-Based Organizations
CECM	County Executive Committee Member
CSOs	Civil Society Organizations
DRM	Disaster Risk Management
FAO	Food Agricultural Organization
KMD	Kenya Meteorological Department
MSMEs	Micro, Small, and Medium Enterprises
NDMA	National Disaster Management Authority
NEMA	National Environment Management Authority
RCRA	Rapid climate risk assessment
SDHUD	State Department of Housing and Urban development
SSP	Shared socio-economic pathways
MIWASCO	Migori Water and sanitation company

Table 4

1. Context

Introduction

Climate change is considered one of the most serious threats to sustainable development globallyandaffectsessentialresourcesthatplayimportantrolesinsupportinghumanlives and ecological systems (FAO 2015). Fossil fuels such as coal, oil and gas are by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions. As greenhouse gas emissions blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. The world is now warming faster than any point in recorded history. Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature. This poses many risks to human beings and all other forms of life on Earth. Kenya's economy is largely dependent on tourism and rain fed agriculture, both susceptible to climate change and extreme weather events. Increasing heat and recurrent droughts contribute to severe crop and livestock losses, leading to famine, displacement, and other threats to human health and wellbeing. Kenya's predominantly low-lying coastline and surrounding islands are at risk from sea level rise, with significant implications for the fisheries sector and storm surge protection. Migori County's climate is classified as tropical and is supposed to experience rainfall throughout the year but with climate change this has drastically reduced in some region. The annual average rainfall in the county ranges from 12801 mm to 22141mm per year. The rainfall pattern used to be evenly distributed all year round with March and July receiving heavy rains while December and February receive light rains. With climate change, the weather patterns have changed. Kehancha Municipality has experienced climate related hazards such as pluvial flooding, extreme precipitation, and prolonged dry spell. Risks that have resulted from these hazards include destruction of infrastructure, disruption of economic activities, drying of water sources among others. To mitigate and adapt effects of climate change, the County Government of Migori has developed Climate change governance structures, climate change frameworks, legislation and policy. This Municipal climate risk profile has been developed in reference to the county climate change governance framework.

Objectives of Kehancha Municipal Climate Risk Profile

The main objective of this Climate Risk Profile is to assess the municipality's exposure, sensitivity and adaptive capacity to climate-related hazards in order to inform evidence-based planning, decision-making and investment towards building municipal climate resilience. The profile aims to generate localized, social and economic dimensions to guide sustainable urban development, reduce vulnerability, enhance the community's preparedness and adaptive capacity to climate change impacts.

The specific objectives are to: -

i. Identify and characterize climate hazards affecting the Municipality.
ii. Analyze the exposure and sensitivity of critical sectors and systems.
iii. Assess the municipality's adaptive capacity at institutional, community, and household levels, highlighting existing coping mechanisms, governance structures, and resource constraints.
iv. Map climate vulnerability hotspots within the municipality.
v. Recommend priority adaptation and mitigation measures to supporting integration of climate resilience into Municipal planning and development initiatives.

Municipal Context

Geographical area

The Municipality of Kehancha is the newest municipality in Migori County created in line with the Urban Areas and Cities Act, 2011 with an intention to provide better services and distribute county resource to the residents. Upon satisfying the criteria needed to be classified as a municipality and in exercising the powers conferred in section 9(1) of the Urban Areas and Cities Act 2011 augmented by section 72 of the Interpretations and General Provisions Act (Chapter 2) and all other enabling provisions of law, the governor for Migori County Government, His Excellency Hon Dr. Ochilo Ayacko granted the Municipality the Municipal charter on 15th February 2023. The municipality has a board duly constituted as per the Act and the Municipal Manager to operationalize its activities. The Board is a corporate body with perpetual succession and a common seal. The board members were gazette on 6th April 2023.

The municipality covers an area of 171.3 km2 and has a population of 100,433 persons according to Kenya National Population and Housing Census 2019. It covers 5 wards: Bukira East, Bukira Central, Gokeharaka/Getambwega and parts of Nyabasi West (Maeta Location, Nyabikongori and Kemakoba Sub-locations) and Masaba (Nyamagagana).

Figure1-Geographic allocation of Kehancha Municipality

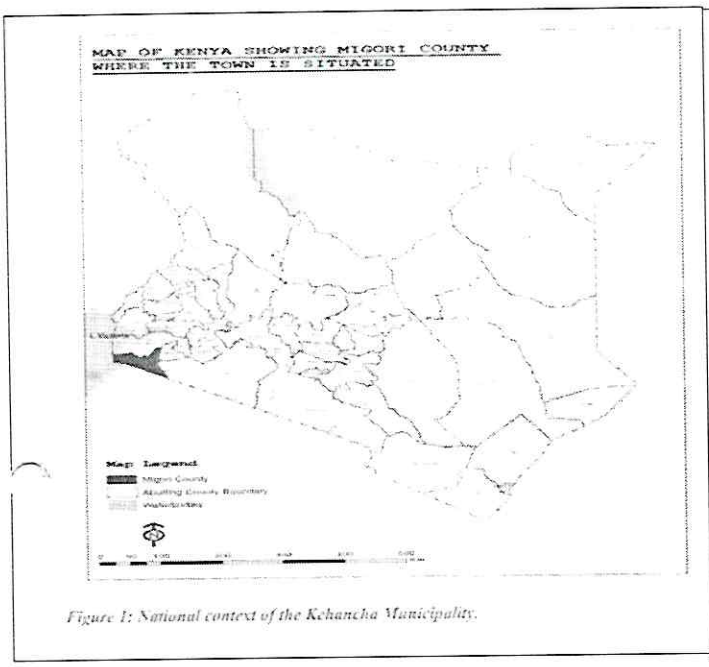


Figure 1: National context of the Kehancha Municipality.

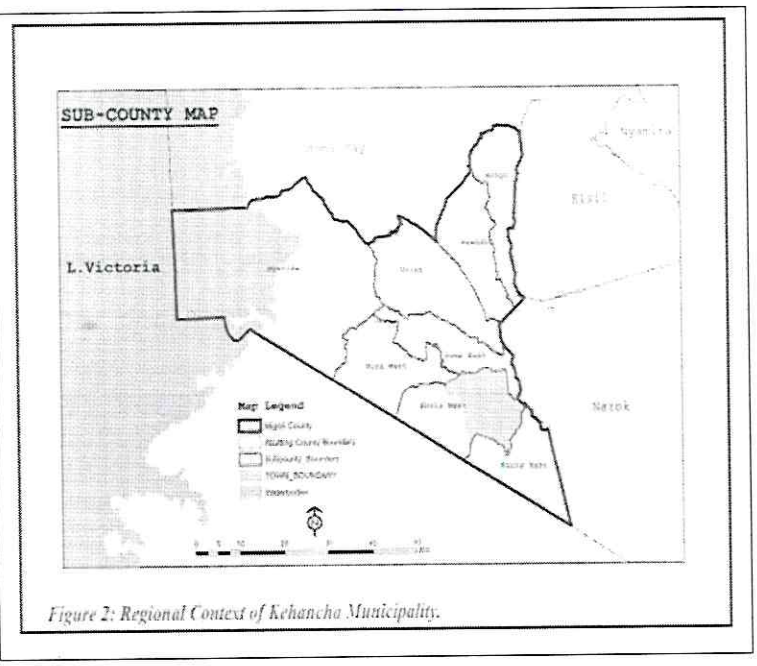


Figure 2: Regional Context of Kehancha Municipality.

PROPOSED KEHANCHA MUNICIPAITY BOUNDARY

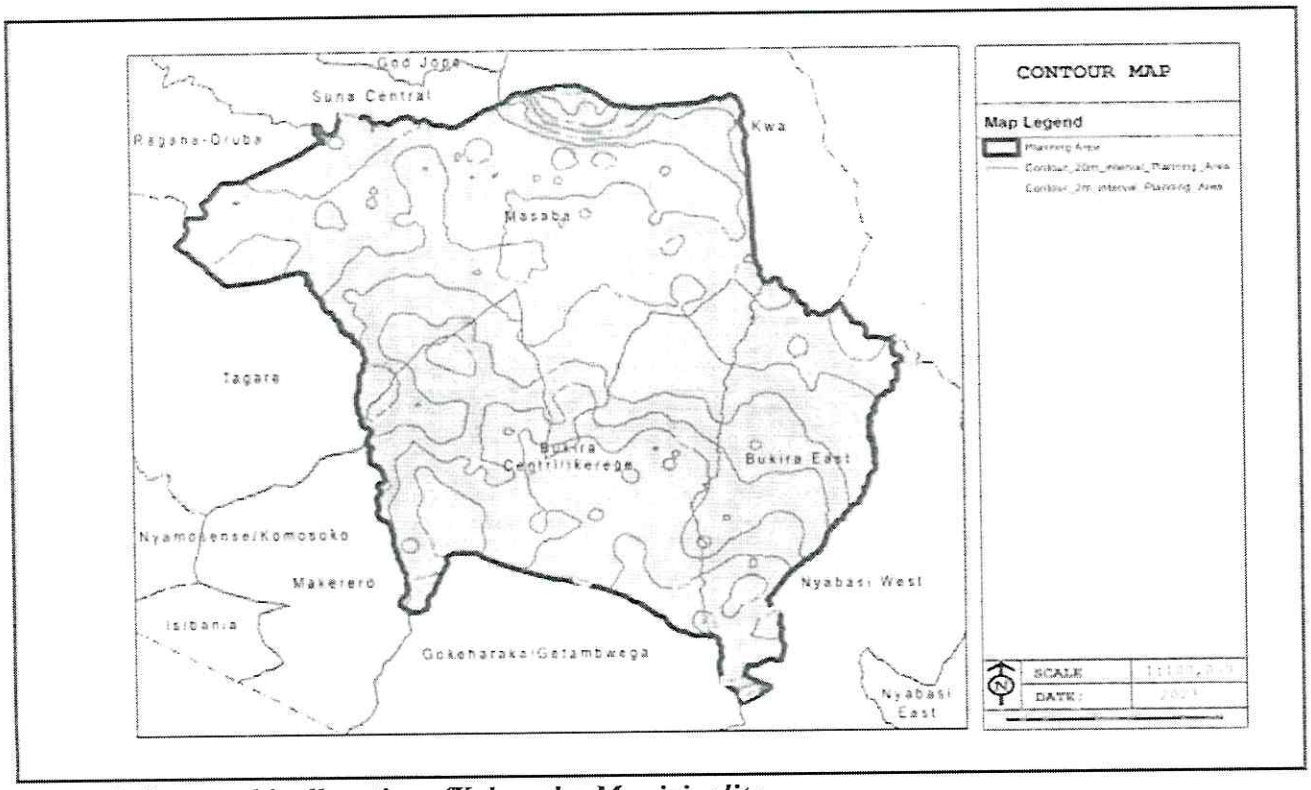


Figure2-GeographicallocationofKehancha Municipality

Governance Structure

Organizational Structure of Kehancha Municipality

Kehancha Municipality was established following the granting of Municipal Charter on 6th February 2019, marking its transition into a legally recognized urban governance entity with defined administrative and service delivery functions. The Municipality operates under a structured governance system comprising the Municipal Board at the helm, the Municipal Manager, and the key technical departments responsible for day-to-day operations.

Kehancha Municipality operates under the Ministry of Lands, Housing, Urban Development and Physical Planning. The Municipal Board is the highest decision-making and policy-formulation body within the municipal governance structure. It provides strategic leadership and oversight to all municipal functions. It approves key policies, plans, budgets, by-laws, development priorities, and performance targets for the Municipality. The Board is responsible

for ensuring compliance with national legislation, promoting sustainable development, and safeguarding the public interest—especially in areas such as solid waste management, climate resilience, environmental conservation, and urban infrastructure development.

The daily administration of the Municipality is entrusted to the Municipal Manager who is the chief administrator and accounting officer of the Municipality. The Municipal Manager reports directly to the Municipal Board and provides leadership to all municipal departments. Kehancha Municipality has 9 key departments or directorates namely, Internal Audit, Finance, Administration, ICT, Environment, Economic Planning, Physical Planning, Public Health, Engineering, and Social Services.

In relation to climate governance, the municipal climate change mandate is entrenched into the county climate change planning framework. The CECM Lands, Housing, Urban Areas and Physical Planning represent the municipality in the county steering committee which is the apex county climate action decision making organ .The Municipal Manager is a member of the county technical working group which gives technical guidance on technical matters.

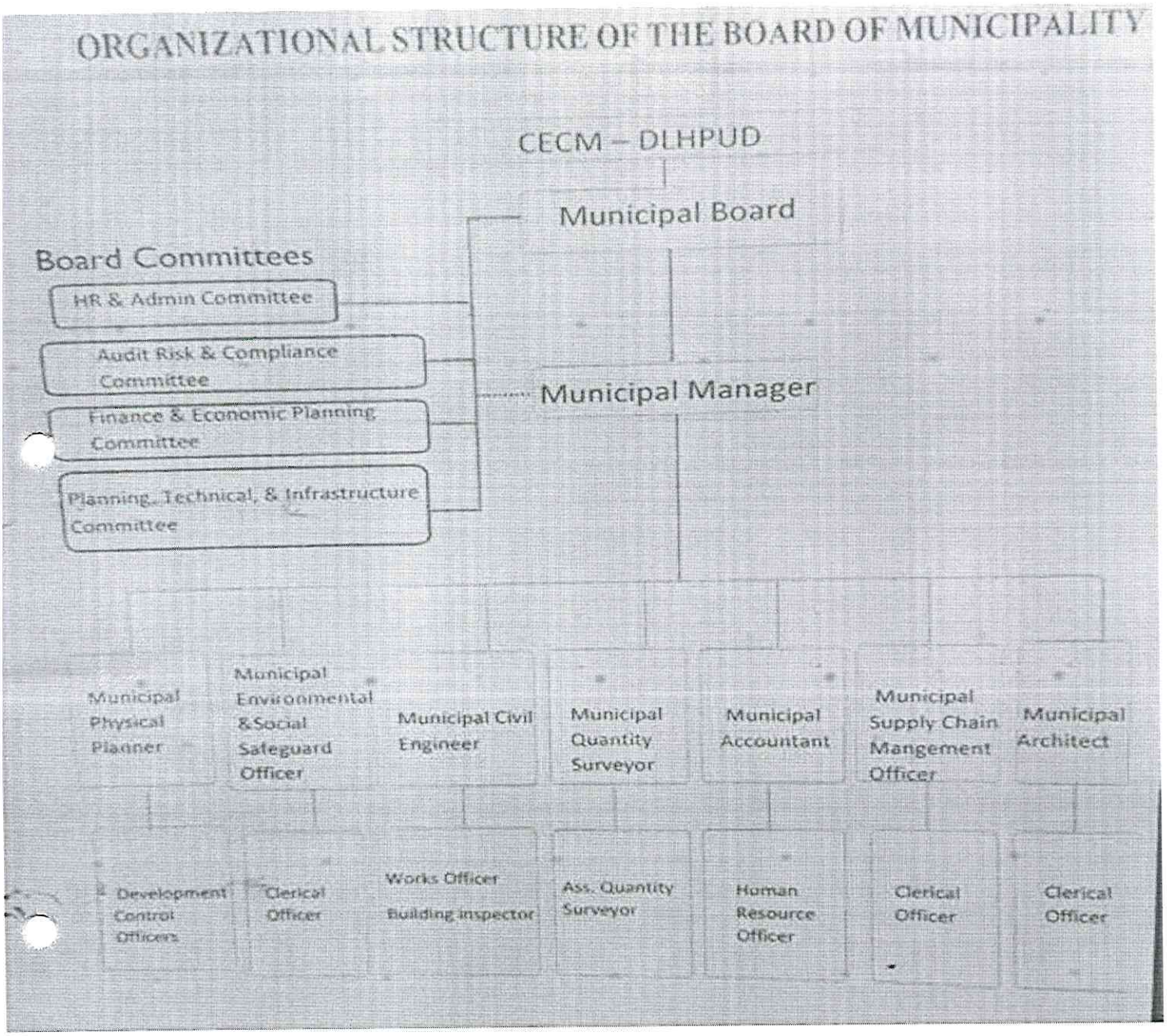
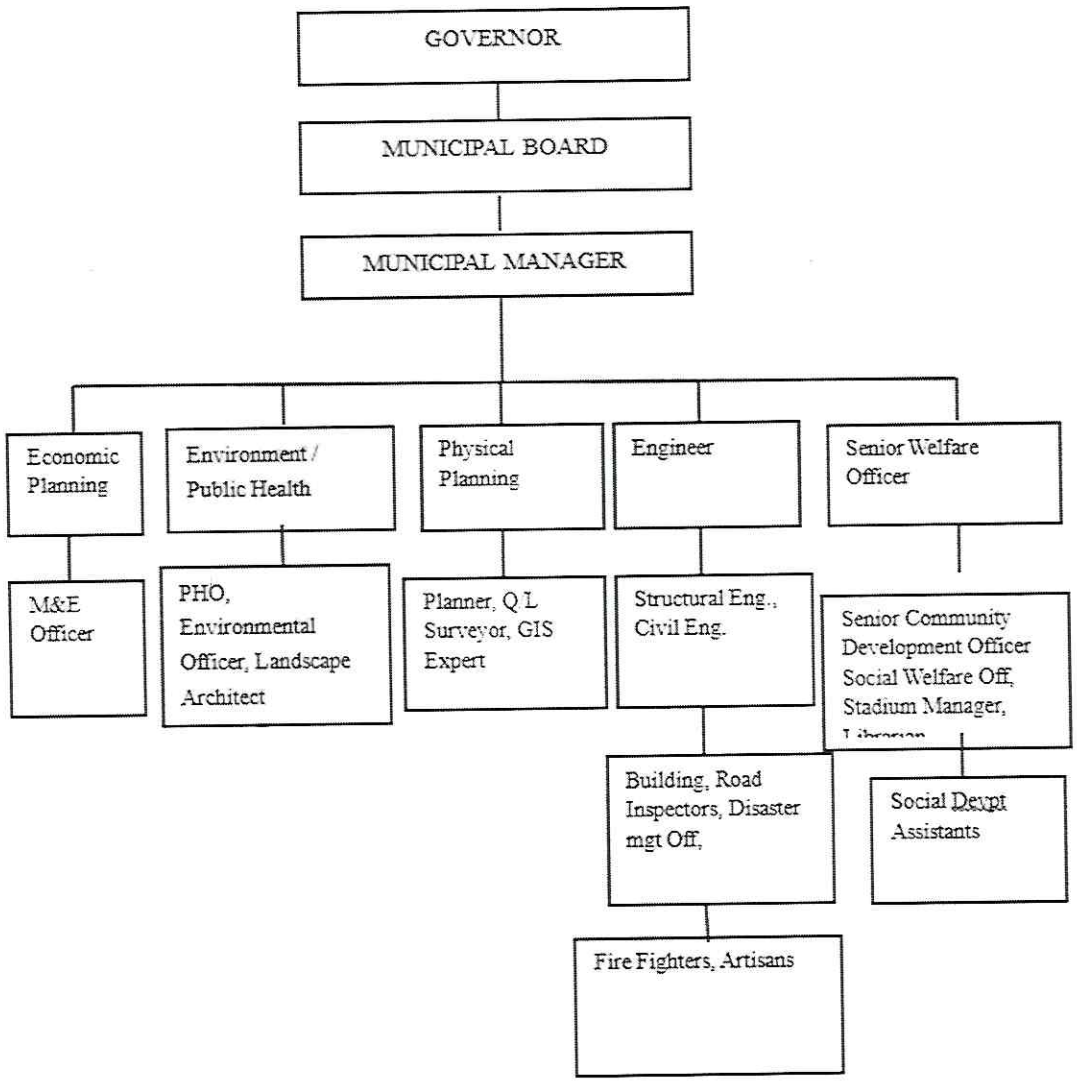


Figure3-The pictorial representation (organogram) above represents the Municipal Organogram

CLIMATE RISK PROFILE ORGANOGRAM



1.1.1. Socio-economic Context

The Municipal social economic status is dependent on climate sensitive sectors such as agriculture, small scale commercial activities and artisanal mining. Climate change impacts low-income areas greatly due to over reliance on rain-fed agriculture, and frequent disruptions of commercial and mining activities by climate related hazards which threaten livelihoods, food security and infrastructure resilience. Strategic investments in adaptive infrastructure, inclusive planning, and resilient livelihoods are essential to safeguard development gains and reduce vulnerability.

Economic Context

Economic growth of the municipality is anchored on the following commercial activities: transport, telecommunication, open and closed markets, financial institutions, learning institutions, housing, supermarkets, open air markets, Tourism, Hospitality. Mining and extractive activities, Pottery. The municipality is experiencing rapid urban growth, with expanding informal settlements and businesses. Informal trade (e.g street vending, boda-boda transport) dominates the urban economy but lacks climate resilience planning. Poor infrastructure (drainage, roads, and waste systems) exacerbates flood damage and disrupts economic activity. Over half of the population lives below the poverty line.

Land and Environment

Overview

Land is the most important natural resource required in wealth creation. Rights to land are largely the source of social and political power. Further, these rights offer landowner opportunity to establish adequate shelter which provides protection from unfavorable weather, security, privacy and socio-economic advancement for a better quality of life. Land ownership in the municipality is in two settlement patterns; core-urban and peri-urban/rural settlements. This section outlines in detail land use, land cover, land tenure and suitability which affects development in the municipality.

1.6.2 Kehancha Land Use

Kehancha is a town that depicts various land uses. Mixed use developments in the CBD entails commercial, educational, industrial establishments as well as public purpose institutions and public utilities.

1.6.3 Land Tenure, Ownership and Land Values

Land is a scarce economic resource and is characterized by various land uses. The land parcels are registered as private and public land with the last being held in trust by the government. Majority of the residents enjoy freehold land ownership rights while the core urban developers are issued with plot cards and are yet to process leases. Within the urban core, land values are highest due to demand and high return uses.

Key Stakeholders & Inclusiveness

The stakeholder analysis was conducted based on distinct roles and priorities of actors across the Municipality climate governance ecosystem. Further, the actors were analyzed by use of An influence/ Interest Matrix in terms of interest and influence. Four quadrants were derived defining stakeholder's levels as follows; High Influence – Low Interest, High Influence – High Interest, Low Influence–Low Interest and Low Influence–High Interest. Engagement strategies have been tailored to each quadrant to ensure appropriate involvement.

A detailed stakeholder list in the appendix.

High Influence–Low Interest (Engagement approach is inform)	High Influence–High Interest (Engagement approach is consult and collaborate)
• National line ministries• Private utility service providers • Media ➢ Development Partners: World Band, Commercial Banks. ➢ Migori County Water and Sanitation Company Limited ➢ Civil Society Organizations (CSOs) ➢ Residents of the municipality	➢ Kehancha Municipality Board ➢ County climate change steering committee ➢ Members of the county assembly from the wards within the municipality ➢ Municipality Staff (Planning, Infrastructure, Environment; ➢ County Climate Change Unit ➢ County line Departments (Disaster Risk Management (DRM); Water, Environment, Natural Resources Climate Change, Health, and Roads & Public Works, Agriculture. ➢ SDHUD) ➢ National Environment Management Authority ➢ National Disaster Management Authority (NDMA) ➢ KMD

	Low Influence–Low Interest (Engagementapproachis monitor) • Small businesses (traders) ➢ Local Micro, Small, and Medium Enterprises (MSMEs) ➢ insurance providers. ➢ Residents from neighboring areas adjacent to the municipality	Low Influence–High Interest **(Engagement approach is consult and involve)** ➢ Traders within the economic hubs- of Kehancha town ➢ Community-Based Organizations (CBOs) ➢ Vulnerable and marginalized groups ➢ Market committee
Low		High

Figure6.Stakeholder mapping for Kehancha Municipality

Hazard Assessment

This section is critical to understanding the Municipality's vulnerability to climate change by identifying and characterizing the most significant climate-related hazards. Based on historical data and future projections, the initial screening process, reveals that Changes in Precipitation Patterns, specifically leading to both Pluvial (surface level) flooding and Drought (prolonged dry spells), are the most pressing high-priority threats for the municipality, alongside Gully Erosion, which contributes to mass movement risks. These six key hazards pluvial flooding, prolonged dry spell, changes in precipitation, heat stress, land degradation and landslides will be the focus of the subsequent analysis, as their potential for significant impact demands integration into urban planning and resilience strategies informed by this climate risk profile.

Key Climate Hazards

Table5.Hazards screening for Kehancha Municipality

azard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazar (Y/N)
eat Stress				
verage surface temperature increase	Y	Y	N	Y
verage ocean temperature increase	N	N	N	N
xtreme heat	Y	Y	Y	Y
larine heat waves	N	N	N	N
old Stress				
verage surface temperature during winter	N	N	N	N
xtreme cold (e.g., cold spells, frost)	N	N	N	N
nowfall and ice storms	N	N	N	N
looding				
ha ges in precipitation patterns	Y	Y	Y	Y
luvial (surface level) flooding, including flash ooding and urban flooding	Y	Y	Y	Y
luvial (river) flooding	Y	N	N	N
ea level rise	N	N	N	N
oastal flooding, including storm surges	N	N	N	N
Vaterlogging	Y	N	N	N
Water Stress				
rought (meteorological, hydrological)	Y	Y	Y	Y
roundwater salinization	Y	Y	Y	Y
aline 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
Sa.. and dust storms	N	N	N	N
Hailstorms	N	N	N	N
Mass Movement				
Landslides	Y	Y	Y	Y
Coastal erosion	N	N	N	N
Gully erosion	Y	Y	Y	Y
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.*

1.2. Climate Indicators and Hazard Thresholds

Table6.Climate indicators and hazard thresholds selected for the assessment

Key Hazard	Climate indicator	Data source	Threshold		
			Low	Medium	High
Pluvial flooding	#of days with precipitation >50mm	https://climateknowledgeportal.worldbank.org/country/Kenya/era5-historical	<3days /Year	3-6 days/year	>6days/year
Extreme precipitation pattern	Number of days per year with precipitation >100mm. 3 consecutive rainfall events with a total precipitation of 150mm	https://climateknowledgeportal.worldbank.org/country/Kenya/era5-historical			
Drought	10 days without rainfall, with<10mm	Metrological dept. website			
Land degradation	Topographical threshold, soil, anthropogenic	Raw data		Medium	
Heat stress	5 to 10 heat days temperatures >35	https://climateknowledgeportal.worldbank.org/country/Kenya/era5-historical			
Landslides	Landslides occur at the mining sites	Raw data			

Current Hazard Levels and Climate Projections

The Municipality experiences a dual climate hazard challenge, driven by extremes in precipitation patterns. One need the municipality experiences pluvial flooding and excessive precipitation, a major hazard that leads to massive land degradation and formation of deep gulley. On the other end, the municipality frequently encounters prolonged dry spells causing the drying of water sources and crop failure, representing the other major climate risk. These severe climatic hazards inflict widespread havoc, resulting in significant loss and damage to property and livelihoods, and the destruction of critical physical urban infrastructure. Notably, the frequency of these events has changed over time: historically, hazards like pluvial floods and prolonged dry spell occurred rarely, but they are now experienced frequently within

Municipality.

Table7.Current and future hazards levels for Kehancha Municipality

Hazard	Hazard Level				
	Current (Baseline)	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
Pluvial flooding	High	High	High	High	High
Extreme precipitation pattern	High	High	High	High	High
Prolonged dry spell	Moderate	Moderate	High	High	High
Land degradation	Moderate	Moderate	Moderate	Moderate	Moderate
Heat stress	Medium	High	High	High	High
Landslides	Moderate	Moderate	Moderate	High	High

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

Table8.Interpretationofhazardlevels

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

1.3. Current and Future Hazard Impact Area

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 (Nyangoto).	**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 become 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	**Very High** – Multi-year droughts and water crises likely; ecosysten and livelihood

				agriculture.	stress.
eat Stress / xtreme rban 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 amplification in urban cores.	**Very High** – +3°C to +4°C; extreme heat becomes a majo urban hazard affecting health and productivity
and egradation	**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.
Extreme pitation	**Medium**	**High**	**Very high**	**High**	**Very high**
Landslides	**Medium**	**High**	**Very high**	**High**	**Very high**

Exposure & Vulnerability Assessment

Exposure and vulnerability within Kehancha Municipality are strongly linked to its urban infrastructure systems. **Storm water drainage** is inadequate, leaving low-lying neighbor hoods highly exposed to flooding during intense rainfall, which disrupts livelihoods and damages property. **Water and wastewater management** faces challenges from aging networks and limited treatment capacity, making communities vulnerable to contamination risks during floods and droughts. Solid **waste management** is constrained by poor collection coverage and informal dumping, increasing exposure to health hazards and blocking drainage channels that worsen flood impacts. Finally, **transport and mobility** are vulnerable due to unpaved roads and weak drainage, where heavy rains frequently cause erosion, traffic disruption, and economic losses. Together, these elements highlight the municipality's high sensitivity to climate risks and the urgent need for resilient infrastructure planning.

Urban Elements

Table9.Urbanelements inventory

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
Infrastructure & Services				
Storm water Drainage	Storm water drainage conveyance network	**Y**	**Y**	Open drainage channels exist in Kehancha town but are undersized and poorly maintained, resulting in frequent flooding during heavy rainfall.
	Stormwater storage	**N**	**N**	No major stormwater retention ponds; water stagnates in low-lying areas such as Komasincha and Nyangoto.
Water & Wastewater Management	Pumping stations	**N**	**N**	No centralized pumping stations within the municipality.
	Groundwater abstraction	**Y**	**Y**	Boreholes and shallow wells supply institutions and residential areas, especially during dry seasons.

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
	Water treatment facilities	Y	N	Limited treatment facilities under Migori Water and Sanitation Company (MIWASCO).
	Water supply networks	Y	Y	Piped water covers main urban cores; peri-urban areas rely on boreholes and vendors.
	Sewer networks	Y	Y	Partial sewer coverage in Kehancha Municipality; informal settlements rely on septic tanks and pit latrines.
	Wastewater treatment facilities	N	N	Not available .
Solid Waste Management	Transfer facilities	Y	N	One transfer facility available and a few skips where solid waste is collected and transported to the dumpsite.
	Landfills and dump sites	Y	Y	Kurutyange dumpsite serves as the main waste disposal site; lacks proper lining and leachate control.
	Recycling centers	N	N	Recycling conducted informally by waste pickers.
	Collection fleet	Y	N	Municipal uses County fleet and is limited; waste collection irregular, particularly in peripheral wards.
Transport and Mobility	Road networks	Y	Y	Well-developed network connects Kehancha Municipality; some rural access roads become impassable during rains.
	Bridges	Y	Y	Small bridge exist over Nyangoto river; and is at risk of erosion and scouring.

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
	Public transport networks (rail, bus, mini-bus, etc.)	Y	N	Matatus and boda-boda services dominate; no formal bus terminal.
	Transportation terminals	Y	N	Main terminal located in Kehancha CBD.
	Vehicle depots	N	N	N/A
	Non-motorized transport networks	Y	N	Pedestrian walkways Available in Kehancha town.
	Freight and logistics hubs	N	N	N/A
Energy	Energy power plants	N	N	N/A
	Poles and power lines	Y	Y	Kenya Power lines cover main centers; some exposed to falling
	Transformers and substations	Y	Y	One substation serving Kehancha town; stable supply.
	Streetlighting	Y	N	Installed at the market only, public facilities and streets not covered.
Economic Infrastructure	Markets	Y	Y	Kehancha open-air markets critical for livelihoods.
	Businesses and commercial hubs	Y	Y	High concentration in Kehancha town; exposed to heat stress and poor drainage.
	Industrial zones/parks and logistics parks	Y	N	Mining activities take place within Kehancha Municipality.
Social Infrastructure	Government buildings and service centers	N	N	N/A
	Education facilities	Y	Y	Some schools affected by floods due to their slope e.g.Nyangoto.
	Healthcare facilities	Y	Y	Kehancha Level 4 Hospital serves the region;
	Public spaces	N	N	N/A

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
	Faith-based buildings	Y	N	Numerous across wards; act as emergency shelters during floods.
	Cultural and heritage assets	N	N	None formally documented.
Emergency Services	Fire stations	N	N	Municipality depends on the county fire extinguishers
	Police stations	Y	Y	Main station in Kehancha town; accessible but limited emergency response capacity.
	Telecommunications networks	Y	Y	Mobile coverage is good; supports early warnings.
	Early warning systems	N	N	No dedicated local system; reliant on county and national alerts.
	Disaster management centers and shelters	N	N	None established; Public schools and churches serve as temporary shelters.
	Evacuation routes	N	N	Not formally designated or mapped.
Populations				
Urban Residents	Population	Y	Y	Estimated population ~100443 persons (2019 census).
	Households	N	N	Municipal Households have not been documented unless it is done in the next Census for the County.
Informal Settlement Residents	Population living in informal settlements	Y	N	Residents in low-lying areas like Komasincha lack land tenure and basic services.
	Households lacking land tenure	N	N	Not documented

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
	Households / residents lacking access to basic services	N	N	Not documented
Vulnerable and Marginalized Groups	Low-income households	Y	N	Women-headed households, PWDs, elderly, and unemployed youth concentrated in peri-urban zones.
	Women-headed households	N	N	Not Documented
	Children and youth	N	N	Not Documented
	Elderly persons	N	N	Not Documented
	People with disabilities (PWD)	N	N	Not Documented
	Homeless populations	N	N	Not Documented
	Unemployed or precariously employed workers	N	N	Not Documented
	Seasonal workers / migrant laborers	N	N	Not Documented
	Nomadic groups in peri-urban areas	N	N	Not Documented
	Urban refugees and migrants	N	N	Not Documented
	Minority ethnic groups in urban areas	N	N	Not Documented
Natural Assets				
Urban Green Infrastructure	Urban parks and gardens	Y	Y	Tree-lined streets, urban gardens, and riparian vegetation; limited protection.
	Green corridors	Y	Y	Tree-lined streets, urban gardens, and riparian vegetation; limited protection.
	Street landscaping	Y	Y	Tree-lined streets, urban gardens, and riparian vegetation; limited protection.
	Urban forests and forest reserves			Tree-lined streets, urban gardens, and riparian vegetation; limited protection.

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
Urban Blue Infrastructure	Natural wetlands	Y	Y	Kehancha dam requires protection against urban sprawl
	Rivers	Y	Y	Rivers Hibwa, Nyangoto and Migori are prone to pollution and flooding
	Riparian zones	Y	Y	Rivers hibwa,Nyangoto, and Migori prone to pollution and flooding.
	Lakes, ponds and reservoirs	Y	N	Not Documented
	Coastal ecosystems	N	N	N/A
	Urban agriculture	Y	Y	Rivers Nyangoto, and Migori prone to pollution and flooding.
Peri-urban and Agricultural Systems	Peri-urban agriculture	Y	Y	Agroforestry and smallholder farms dominate outskirts; highly climate-sensitive.
	Agroforestry systems	Y	Y	Agroforestry and smallholder farms dominate outskirts; highly climate-sensitive
	Forests and forest reserves	Y	Y	Need to be Documented
	Protected areas and national parks	Y	Y	Need to be Documented
	Savannahs and rangelands	N	N	N/A

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.

Table10.Interpretationofexposureandvulnerabilitylevels

.evel	Exposure Level Interpretation	Vulnerability Level Interpretation
ligh	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 t the climate hazard due to moderate sensitivit 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 t the climate hazard due to limited sensitivit 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.

Table11.ImpactMatrix

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

Cordant data sources used to complete the table in Annex-N2.]

Table12. Exposure, Vulnerability, and Impacts of Hazard-1 on Urban Elements
Hazard: Pluvial flooding

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• Storm Water Drainage System Is Overwhelmed by Surface Runoff from Precipitation… • Majority Of Drainages Are Not Lined	HIGH	**Sensitivity:** • Earth Drains Are Highly Sensitive… • Lined Drainages Are Highly Sensitive Due To Poor Routine Maintenance **Adaptive Capacity:** • Low	HIGH	Catastrophic
Water &Wastewater Management	• Water distribution network frequently damaged due to gully erosion • Surface runoff contaminates waste water treatment ponds overflowing into water bodies affecting functionality of treatment facilities. • Disruption of water supply for both piped and portable water sources	Medium	**Sensitivity:** Lows in most of the water infrastructure is not within the pluvial flood prone areas **Adaptive Capacity:** • Low due to aged infrastructure and overstretched capacity	medium	Moderate
Solid Waste Management	• Minimal flooding at the collection points, aggregation centers and disposal points	Low	**Sensitivity:** Low **Adaptive Capacity:** • High	low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Transport and Mobility	• Minimal flooding due to clogged storm drains as a result of siltation • Earth roads experience gully erosion…	moderate	**Sensitivity:** • Moderate • **Adaptive Capacity:** • Moderate due to routine maintenance by both county and national government agencies	Medium	Moderate
Energy	• The exposure is not significant • …	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Insignificant
Economic Infrastructure	• Majority of infrastructure not located in the pluvial flood prone areas	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Insignificant
Social Infrastructure	• Majority of social infrastructure in the pluvial flood prone areas	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Insignificant
Emergency Services	• Does not limit emergency response	Low	**Sensitivity:** • Low	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability(Description)	Vulnerability Level	Impact Level
			Adaptive Capacity: • High		
Populations					
urban Residents	• Flooding is common in the CBD where the majority of residents go to seek goods and services. Movement is disrupted and service provision affected • Estates on downstream e.g. Ntunyigi encounter destruction of household properties and kitchen gardens	Moderate	**Sensitivity:** • Medium **Adaptive Capacity:** Lows in the affected communities lack alternatives	High	Major
Informal Settlement Residents	• Residents of Nyangoto affected by floods	High	**Sensitivity:** High **Adaptive Capacity:** • Low since the area's high density, with poor housing, sanitation and service coverage.	High	Catastrophic
Vulnerable and Marginalized Groups	• Majority of school going children are disrupted because roads are flooded	• Medium	**Sensitivity:** • Medium **Adaptive Capacity:** • Low especially for day scholars who must use the roads on daily basis	Medium	Moderate
Natural Assets					
Urban Green Infrastructure	• Does not exist	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability(Description)	Vulnerability Level	Impact Level
Urban Blue Infrastructure	• Investment in blue infrastructure is low though fish ponds situated in low-lying areas are commonly destroyed by floods. • Households that depend on shallow wells and protected springs are denied access to water due to contamination	Medium	**Sensitivity:** medium **Adaptive Capacity:** • medium	Low	Minor
Peri-urban and Agricultural Systems	• Farms on the low-lying areas are normally washed away by flood and erosion leading to destruction of crops	Low	**Sensitivity:** • Medium **Adaptive Capacity:** • Medium since only the farms on the downstream are affected	Medium	Minor

Table14.Exposure, Vulnerability, and Impacts of Hazard-2on Urban Elements

Hazard: Extreme precipitation

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	• The entire municipal storm water drainage systems overwhelmed by surface runoff volumes	High	**Sensitivity:** • The earth drains are highly sensitive due to ground topography which leads to high velocity of surface runoff causing gully erosion which destroys municipal road network • Lined storm drains capacity is overstretched Leading to overflow and damage to the	High	Catastrophic

			infrastructure		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			Adaptive Capacity: • Low due to inadequate maintenance		
Water &Wastewater Management	• Water distribution network frequently damaged due to gully erosion • Surface runoff contaminates surface water bodies • Surface runoff contaminates waste water treatment ponds overflowing into water bodies affecting functionality of treatment facilities. • Disruption of water supply for both piped and portable water sources	High	**Sensitivity:** • Moderate: siltation and contamination of surface water sources • Reduced efficiency of waste water treatment plants due to infiltration of rain water. **Adaptive Capacity: Low** Due to: • Aging water distribution networks and sewerage infrastructure • Limited capacity of the existing wastewater treatment plants	High	Catastrophic
Solid Waste Management	• Delayed solid waste collection services • Increase potential of water contamination due to leachate as a result of infiltration of rainwater through decomposing garbage at the disposal site. • Surface runoff sweeps away solid waste into drainage system leading to clogging and blockage	High	**Sensitivity:** • High since waste collection services is a continuous exercise disrupted by the increased ion precipitation • **Adaptive Capacity:** • Low	High	Catastrophic

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Transport and Mobility	• Majority four municipal roads are earth roads which are rendered impassable during heavy rains • Traffic flow is disrupted on all major roads • Gulley erosions cut roads leading to disruption of movement and damage of road infrastructure • Due to design limitation that did not provide adequate drainage system, most Roads are flood during heavy rains hence impassable	High	**Sensitivity:** • High **Adaptive Capacity:** • low	High	Catastrophic
Energy	• Power outage caused by shot-circuits and system faults caused by rain water intrusion into poorly insulated equipment's such as transformers		**Sensitivity:** • Medium **Adaptive Capacity:** • High. Even with heavy rainfall, outage is short or barely noticeable and the system recovers quickly, almost effortlessly	Medium	Moderate
Economic Infrastructure	• Traders operating within open spaces and markets are forced to close their businesses leading low income • Reduced customers due to restricted movements during heavy rains. • Reduced working hours of traders	High	**Sensitivity:** • High **Adaptive Capacity:** • low. Most traders depend on sales/proceeds as their major source of livelihood	High	Catastrophic

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Emergency Services	• Extreme precipitation has low interference to the emergency services	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High.	Low	Insignificant
Populations					
urban Residents	• Urban residents that live downstream are likely to be affected since the extreme precipitation leads to high run off which in turn affects the water sources	Medium	**Sensitivity:** • Low **Adaptive Capacity:** • High.	Medium	Moderate
Informal Settlement Residents	• Populations living in informal settlements experience e poor drainage and water stagnates around door steps and pathways. • The households are often temporary and easily damaged by extreme precipitation.	High	**Sensitivity:** • High **Adaptive Capacity:** • Low.	High	Catastrophic
Vulnerable and Marginalized Groups	• Most pupils walk to school, which leads to most of them, school day during high precipitation days •	High	**Sensitivity:** • High **Adaptive Capacity:** • Low	High	Catastrophic

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Natural Assets					
Urban Green Infrastructure	• Rains accompanied by strong winds lead to destruction of crops and trees •	High	**Sensitivity:** • High **Adaptive Capacity:** • Low	'Low	Moderate
Urban Blue Infrastructure	• Households that depend on shallow wells and protected springs are denied access to water due to rise of water table due resulting to aquifer root collection from undrained surface ponds	Medium	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Minor
Peri-urban and Agricultural Systems	• Loss of soil fertility through soil erosion and nutrient t leaching • Destruction of support infrastructure such as roads hindering access to markets and consumers	High	**Sensitivity:** • high **Adaptive Capacity:** • low	High	Catastrophic

Table15.Exposure, Vulnerability, and Impacts of Hazard-3 on Urban Elements

Hazard: Prolonged dry spell

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure Services					

Stormwater Drainage		Low	**Sensitivity:** • Not sensitive	Low	insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
	• The entire municipal storm water drainage system is not affected by prolonged dry spell		**Adaptive Capacity:** High		
Water &Wastewater Management	• Drying of wells and boreholes for the municipal residents depended on shallow wells and boreholes	Medium	**Sensitivity:** • Moderate: • Reduced efficiency **Adaptive Capacity: Low** Due to: • Aging water distribution networks and sewerage infrastructure • Limited capacity of the existing water supply networks	medium	Moderate
Solid Waste Management	• The entire municipal solid waste management system is not affected by prolonged dry spell	Low	**Sensitivity:** • Not sensitive **Adaptive Capacity:** • High	Low	insignificant
Transport and Mobility	• Majority of our municipal roads are earth roads which are dusty during dry season	Medium	**Sensitivity:** • low **Adaptive Capacity:** • High	High	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Energy	• This is not affected by prolonged dry Spell since we do not have energy generating plants within the region •	low	**Sensitivity:** • low **Adaptive Capacity:** • High	low	Insignificant
Economic Infrastructure	• Traders operating within open spaces and markets are affected due to heat stress and dust exposure	Medium	**Sensitivity:** • Medium **Adaptive Capacity:** • low. Most traders depend on sales/proceeds as their major source of livelihood •	High	Major
Social Infrastructure (Health facilities, schools)	• Prolonged dry spell causes a non-conducive work environment due to effects of heat stress, dust and drying of wells where some schools depend.	medium	**Sensitivity:** • Low **Adaptive Capacity:** • High	low	Minor
Emergency Services	• Prolonged dry spell has no interference to the emergency services	Low	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Insignificant
Populations					

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
urban Residents	• Urban residents' area affected by heat stress and dust during the prolonged dry spell period	Medium	**Sensitivity:** • Low **Adaptive Capacity:** • High.	Medium	Moderate
Informal Settlement Residents	• Populations living in informal settlement experience water supply shortage since most depend on rain water harvesting and shallow wells • …	High	**Sensitivity:** • High **Adaptive Capacity:** • Low.	High	Catastrophic
Vulnerable and Marginalized Groups	• Prolonged dry spell is accompanied by heat stress which affects marginalized groups such as pupils	Medium	**Sensitivity:** • High • **Adaptive Capacity:** • medium	low	Minor
Natural Assets					
Urban Green Infrastructure	• Urban green infrastructure is affected by prolonged dry spell as a result the plants dry up due to lack of water to replenish. The urban green is majorly depended on the surface water •	High	**Sensitivity:** • high **Adaptive Capacity:** • low	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Urban Blue Infrastructure	• Households that depend on shallow wells and protected springs are denied access to water due to low water table due resulting to aquifer root collection from undrained surface ponds • …	Medium	**Sensitivity:** • Low **Adaptive Capacity:** • High	Low	Minor
Peri-urban and Agricultural Systems	• Loss of soil fertility through soil erosion and nutrient leaching • Lack of surface water to replenish crops	medium	**Sensitivity:** • High **Adaptive Capacity:** • Medium	Medium	Moderate

Climate Risk Assessment

This evaluates the intersection of projected climate hazards, specifically pluvial flooding, extreme precipitation and extreme heat, with the Municipality' elements such as infrastructure, population and natural assets to determine overall vulnerability. Utilizing a standardized risk matrix that correlates hazard levels with impact severity, this profile tracks risks across multiple time horizons and climate scenarios (SSP2-4.5 and SSP5-8.5). The assessment reveals that informal settlement residents and stormwater drainage systems currently face "Very High" and "High" risk levels, particularly from flooding and extreme rainfall, necessitating immediate planning and resource allocation. By categorizing risks from "Very Low" to "Very High," this framework provides a strategic roadmap for the municipality to prioritize urgent mitigation actions and long-term adaptation measures to safeguard its most vulnerable urban elements.

Table 16. Risk matrix

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

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

Table17.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. Allocateresourcesandcoordinateinterventionstopreventorminimizeimpact.
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.

Current and Future Climate Risks on Urban Elements

Table18.Summary of Hazard-Pluvial flooding risks for Kehancha 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						
Storm water Drainage	Catastrophic	High	High	High	High	High
water Waste water Management	Moderate	High	High	High	High	High
Solid Waste Management	Insignificant	Low	Low	Low	Low	Low
Transport and Mobility	Moderate	High	High	High	High	High
Energy	Insignificant	Low	Low	Low	Low	Low
Economic Infrastructure	Insignificant	Low	Low	Low	Low	Low
Social Infrastructure	Insignificant	Low	Low	Low	Low	Low
Emergency Services	Insignificant	Low	Low	Low	Low	Low
Populations						
urban Residents	Major	Very high	Very high	Very high	Very high	Very high
Informal Settlement Residents	Catastrophic	Very high	Very high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	Moderate	High	High	High	High	High
Natural Assets						
Urban Green Infrastructure	Insignificant	Low	Low	Low	Low	Low
Urban Blue Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medium	Medium	Medium	Medium	Medium

Table19.Summary of Hazard-Extreme precipitation risks for Kehancha 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						
Storm water Drainage	Catastrophic	Very High	Very High	Very High	Very High	Very High
water Wastewater Management	Catastrophic	Very High	Very High	Very High	Very High	Very High
Solid Waste Management	Catastrophic	Very High	Very High	Very High	Very High	Very High
Transport and Mobility	Catastrophic	Very High	Very High	Very High	Very High	Very High
Energy	Moderate	Low	Low	High	High	High
Economic Infrastructure	Catastrophic	Very High	Very High	Very High	Very High	Very High
Social Infrastructure	Moderate	Low	High	High	High	High
Emergency Services	insignificant	low	low	low	low	low
Populations						
Urban Residents	Moderate	High	High	High	High	High
Informal Settlement Residents	catastrophic	Very high	Very high	Very high	Very high	Very high
Vulnerable and Marginalized Groups	catastrophic	Very high	Very high	Very high	Very high	Very high
NaturalAssets						
Urban Green Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Urban Blue Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medium	Medium	Medium	Medium	Medium

Table20.SummaryofHazard-ExtreamheatrisksforKehancha Municipality

	Time Horizon Climate Scenario	Current	2050 SSP2 - 4.5	2050 SSP5-8.5	2100 SSP2 - 4.5	2100 SSP5 - 8.5
	Hazard Level					
		Risk Levels				

Categories	Impact	Current	2050 SSP2 - 4.5	2050 SSP5 - 8.5	2100 SSP2 - 4.5	2100 SSP5 - 8.5
Infrastructure& Services						
Storm water Drainage	Insignificant	Low	Low	Low	Low	Low
water Wastewater Management	Moderate	Medium	High	High	High	High
Solid Waste Management	Insignificant	Low	Low	Low	Low	Low
Transport and Mobility	Insignificant	Low	Low	Low	Low	Low
Energy	Insignificant	Low	Low	Low	Low	Low
Economic Infrastructure	Insignificant	Low	Low	Low	Low	Low
Social Infrastructure	Insignificant	Low	Low	Low	Low	Low
Emergency Services	Insignificant	Low	Low	Low	Low	Low
Populations						
urban Residents	Moderate	Medium	High	High	High	High
Informal Settlement Residents	Moderate	Medium	High	High	High	High
Vulnerable and Marginalized Groups	Moderate	Medium	High	High	High	High
NaturalAssets						
Urban Green Infrastructure	Insignificant	Low	Low	Low	Low	Low
Urban Blue Infrastructure	Minor	Medium	Medium	Medium	Medium	Medium
Peri-urban and Agricultural Systems	Minor	Medium	Medium	Medium	Medium	Medium

Climate Risk Hotspots

Alongside extreme precipitation that causes pluvial floods in Kehancha town due to poor drainage systems, kurutyange dumping site also poses a major risk to the environment and surrounding communities due to poor waste treatment methods. The waste transfer site located adjacent to the market in Kehancha town also poses risks due to delays in collection and may lead to outbreak of diseases like cholera.

Further, the entire municipality is exposed to prolonged dry spell resulting in crop failure and water scarcity. This led to water rationing pushing the marginalized population to seek water from unsafe sources such as contaminated water bodies. Crop failure results in reduced crop production leading to skyrocketing prices of agricultural commodities.

5 What Next?

5.1. Key Findings

The key findings of the urban climate profile highlight a range of persistent and evolving climate hazards that pose significant risks within the Municipality. The assessment identifies pluvial flooding and extreme precipitation as the most pervasive threats, affecting critical services such as stormwater drainage, water management, and transport systems from the present day through to 2100.Notably, the municipality's residents, particularly those in informal settlements and marginalized groups are consistently vulnerable toa combination of flooding, extreme rainfall, and prolonged dry spells across all evaluated periods. By mapping these hazards across mid-term (2050) and long-term (2100) projections, thetableprovidesanunderstandingoftheshiftingenvironmentalpressuresthatnecessitate targetedresiliencebuildingandadaptiveplanningforthemunicipality'snaturalandbuiltenvironments.

5.2. Climate Adaptation and Resilience Solutions

This table presents measures proposed for implementation across diverse sectors. Recommendations are strategically categorized into immediate, mid-term, and long-term actions to provide a phased roadmap for enhancing Municipality resilience. Immediate solutions focus on urgent interventions such aside-silting clogged storm drains and repairing flood-damaged utilities, while mid-term strategies involve policy-oriented steps such as developing comprehensive stormwater management plans and promoting water-use efficiency. Looking towards long-term sustainability, proposed measures advocates for transformative measures, including the integration of nature-based solutions like bios Wales and permeable pavements in tone public works, alongside the conservation of critical riparian and wet land areas to serve as natural water retention zones. This multi-tiered approach ensures that the Municipality can simultaneously mitigate current risks while building the systemic capacity needed to withstand future climate uncertainties.

Table22.Climate adaptation and resilience solutions recommended for Kehancha Municipality

Category	Recommended Solutions		
	Immediate	Mid-term	Long-term

Infrastructure & Services			
Stormwater Drainage	- Conduct clogged storm drains de-silting. - Prepare a comprehensives stormwater management plan for Kehancha Municipality. - Demarcation of flood-prone/riparian areas - Sensitization of residents on risk exposure and resilience strategies. - Establishes impermeable footpaths	• Establish infiltration trenches in a highly- flooded public area. • Establishment of bios Wales along roadways and streets, residential development edges, and new housing schemes. • Roof catchment/rainwater harvesting • Compulsory acquisition riparian land • Declaring major hotspot areas as special planning areas (SPA) to allow for Specialized planning.	• Lining unlined earth drains to prevent gully erosion and increase capacity. • Integrate Permeable Pavements and Green Roofs into all new public works and urban development standards.

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Water &Wastewater Management	• Inspect and repair flood-damaged pipes and treatment facilities. • Promoting water use efficiency. • Design for rainwater collection and conduct awareness to residents. • Promote waste-water recycling for urban agriculture use. • Install smart meters to monitor water usage in industrial and residential areas.	• Develop an early warning system for waste water overflow during heavy rainfall. • Promote or of catchment and water harvesting	• Invest in elevating or relocating critical waste water infrastructure in high-risk zones. • Installation of rainwater bulk water harvesting and storage systems. • Increasing climate proof pipe water supply
Solid Waste Management	• Conduct baseline survey of solid waste dumping on water ways. • Clear solid waste from drainage lines immediately after a flood event. • Install waste bins in strategic spots • Capacity building and tax incentives for private waste collectors.	• Conduct public awareness campaigns on responsible solid waste disposal to reduce drain blockages • Installation of Waste Receptacles and elevated separation at source litterbins on areas that are accessible during rainy seasons with roof and lids respectively • Promote circular economy model to divert collected waste away from disposal sites. • Regular collection of waste	• Decentralize waste collection point away from water bodies and flood-prone areas. • Construction of a proper drainage system at the disposal sites and material recovery facilities. • Maintenance of waste facilities access roads to all weather roads. • Prepare laws/policies that give incentives to recycling companies. • Construction of a landfill at kurutyange for proper disposal of waste.

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Transport and Mobility	• Install temporary barriers for flooded roads. • Prepare green mobility strategy for Kehancha Municipality. • Prepare climate resilient road designs	• Upgrade critical road sections and bridges to withstand higher flood levels • Construct elevated walkways along flood Prone areas; bridges on flood plains	• Integrate flood-resilient materials and designs into all new transport infrastructure projects. cobble stone, concrete roads.
Energy	• Conduct baseline survey on renewable energy needs for Kehancha Municipality • Prepare renewable energy policy for municipality • Identify and mobilize partners/stakeholders to implement renewable energy policy.	- Run renewable energy campaign across the municipality • Partner with mobility manufacturers to install EV charging stations in the Municipality • Provide customized local tax policies to attract investment in renewable energy products/ projects. • Install metered, piped gain settlements/estates • Provide motorbike operators with EV powered motorbikes	- Constructs Olar panel assembly point - Mainstream energy policy into key development documents.

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Economic Infrastructure		• Support affected traders to embrace nature-based solutions as alternative sources of livelihoods. • Sensitize traders to utilize climate information to minimize disruption	• Upgrading existing markets facilities by climate-proofing measures to be all weather markets • Relocate markets that are prone to flooding to safer ground.
Social Infrastructure		• provide key social facilities (hospitals, schools) with flood-proofing and resilient designs.	• Develop long-term disaster management plans with clear evacuation and recovery protocols.
Populations			
Urban Residents	• Disseminate real-time flood warning via multiple channels. • Demarcation of flood-prone/riparian areas	• Provide rain harvesting system storm reduce stormwater runoff and promote self- sufficiency.	• Review and revise zoning regulations to restrict or manage development in flood risk areas.
Informal Settlement Residents	• Develop people-centered early warning systems.	• Install communal, elevated water points and sanitation facilities.	• Develop a long-term plan for safer, dignified resettlement • Upgrading of essential services in less hazardous areas.

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Vulnerable and Marginalized Groups	• Prioritize aid assistance for the elderly, disabled, and households head by women.	• Establish community-based disaster risk reduction committee with representation from these groups.	• Integrate climate change considerations into social protection and poverty reduction programs.
Natural Assets			
Urban Green Infrastructure	• Removed debris and sediment from urban parks and green spaces post-flood.	• Rehabilitate and expand existing green spaces (parks, urban forests) to absorb runoff. • Establishment of high value assorted tree nurseries	• Integrate nature-based solutions in urban landscaping and beautification. • Promotion of Apiculture value chain
Urban Blue Infrastructure	• Promote waste-water recycling for urban agriculture use. • Incorporate rainwater harvesting during planning and design stage and enforced during the plan approval stage	• Restore natural meanders and riparian vegetation along degrade driver banks (river restoration).	• Conserve riparian and wetland to act as critical water retention areas. • Establish climate resilient fishponds. • Establish are circulating aquaculture system.
Peri-urban and Agricultural Systems	• Conduct Participatory Scenario planning	• Implement watershed management plans that reduce runoff from upper catchment areas. • Farmers training on conservation agriculture	• Promote climate-resilient farming techniques (e.g., conservation agriculture, drought-resistant crops).

Bibliography

[Alphabeticallylistalltheresources/literatureutilizedtodeveloptheUrban Climate Risk Profile. One example is provided below as reference.]

GCA, Urban Climate Risk Profile: Preparation Guidelines, 2025.

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