COUNTY GOVERNMENT OF ELGEYO MARAKWET

URBAN CLIMATE RISK PROFILE
FOR
ITEN TAMBACH MUNICIPALITY

JANUARY 2026

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Executive Summary

Table 1: Summary of Landslide risks for Iten Municipality

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

Table 2: Summary of Heat stress risks for Iten Municipality

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

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

Table 3: Summary of wild fire risks for Iten Municipality

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

Table 4: Summary of drought risks for Iten Municipality

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

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

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List of Acronyms

RCRA	Rapid climate risk assessment
UACA	Urban Areas and Cities Act
NEMA	National Environmental Management Authority
KMD	Kenya Meteorological Department
KNBS	Kenya National Bureau of Statistics

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1. Context

1.1. Objective

The primary objective of the **Iten Tambach Municipality Urban Climate Risk Profile** is to provide a **Rapid Climate Risk Assessment (RCRA)** that provides a strategic framework for safeguarding the Municipality's unique high altitude ecosystem and its global reputation as the "Home of Champions." By identifying specific localized hazards, such as escarpment-related landslides, erratic rainfall patterns, and the physiological impact of rising temperatures on elite athletic training, this profile aims to inform future decision-making across four critical pillars:

a) Policies & Strategies: To develop evidence-based Municipal and County-level policies that prioritize climate resilient livelihoods, protecting both the burgeoning sports tourism sector and the local agricultural economy from climate induced shocks.

b) Urban Planning: To integrate long-term resilience into the **Iten Spatial Plan** and capital expenditure plans, ensuring that urban expansion onto sensitive topographical areas (such as the Kerio escarpment) is managed through robust disaster risk reduction strategies.

c) Building Codes, Standards & Guidelines: To establish specialized construction standards and permit requirements that account for increased thermal stress and intense storm-water runoff, ensuring that athletic facilities, training camps, and residential infrastructure are built to future-proof specifications.

d) Investing in Infrastructure: To guide the delivery of climate resilient public works, specifically water supply systems to combat drought induced scarcity and durable road networks, thereby minimizing operational risks for both the local community and the international athletic elite.

1.2. Urban Context

1.2.1. Geographic area

Iten Municipality is within Keiyo North Sub County in Elgeyo Marakwet County and sits on an elevation of 2,400 m (7,900 ft.) above sea level. The entire area of the municipality is approximately 184 square kilometers and it hosts the County headquarters. The Municipality partly covers three wards namely; Kamariny, Kapchemutwa and Tambach. Also, 10 locations and 15 sub locations are within the boundary of the Municipality. The Sub locations are, Kessup, Anin, Rimoi, Chesitek, Katalel, Kiptabus, Kaplamai, Sergoit, Kapkessum, Chebokokwo, Iten township, Mindililwo, Kapkonga, Sing'ore and Bugar as shown in the map overleaf.

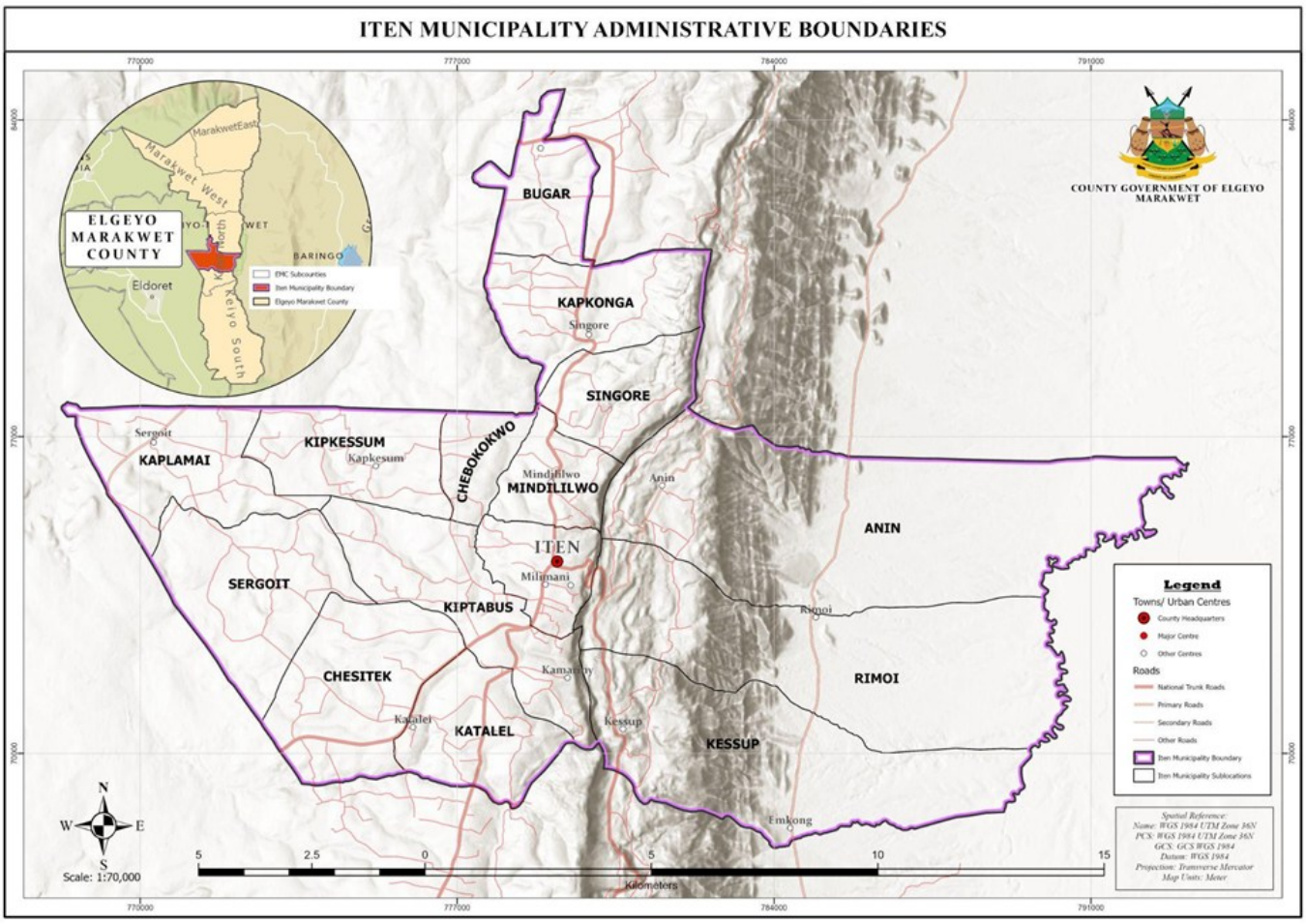

Figure 1: Map of Iten Municipaliy Administrative Boundaries

1.2.2. Governance Structure

Iten Tambach Municipality is the only Municipality within Elgeyo Marakwet County. The Municipality was established in 2018 under the Urban areas and Cities Act of 2011 (amended 2019) by virtue of being the County headquarters. The Governance structure comprises a Municipal Board that provides oversight and policy direction, a Municipal Manager who is in-charge of day to day coordination and delivery of services and departmental heads for corporate and technical service sections. The following County departments are responsible for developing this Urban Climate Risk Profile:

- Department of Lands, Physical Planning, Housing, Urban Development and Energy .
- Department of Environment, Water and Climate Change.
- Department of Roads, Transport and Public Works.
- National Environment Management Authority.
- Kenya Meteorological Department.
- National Government Administrative Office.
- Office of the Governor.
- Department of Health Services.

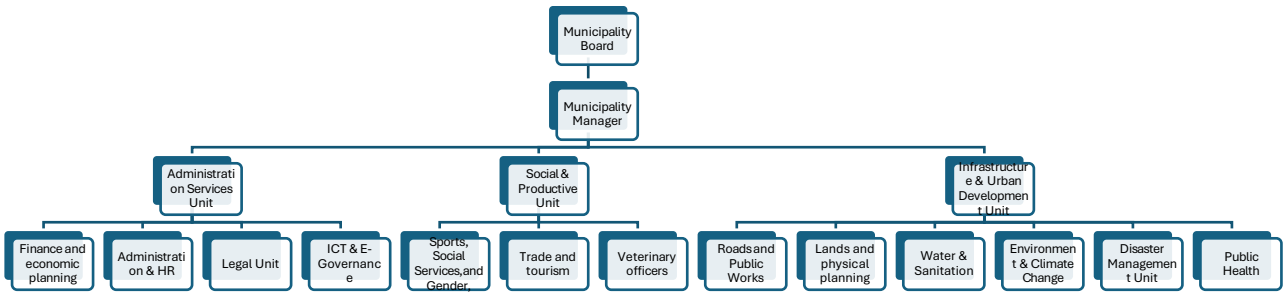

Figure 2: Iten Municipality Organogram

1.2.3. Socio-economic Context

Iten Municipality is globally recognized as the "Athletics Mecca", an accolade rooted in its legacy of producing internationally renowned athletics marathon holders. The Municipality is placed at an altitude of 2,400 meters above sea level which is an ideal training environment for training of athletes. These ideal conditions attract visitors from all over the world who visit to marvel at the sceneries and environment the municipality has to offer. The Municipality's total population was 54,158 according to the Kenya National Bureau of Statistics (KNBS), 2019 Population and Housing Census. The 2029 population projection based on this is 66,108 of which 32,711 are Male 33,397 Female and indicating a balanced ratio of male to female.

Table 5: Population Projections by Sub-Location

	Population *2019			Population *2025			Population *2027			Population *2029		
Sub Location	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Bugar	1,493	1,378	2,871	1,683	1,553	3,236	1,751	1,616	3,368	1,822	1,682	3,505
Singore	572	604	1,176	645	681	1,325	671	708	1,379	698	737	1,435
Kapkonga	1,031	1,064	2,095	1,162	1,199	2,361	1,209	1,248	2,457	1,258	1,299	2,557
Chebokokwa	1,016	1,126	2,142	1,145	1,269	2,414	1,192	1,321	2,512	1,240	1,374	2,615

	Population *2019			Population *2025			Population *2027			Population *2029		
Sub Location	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Kapkessum	1,040	981	2,021	1,172	1,106	2,278	1,220	1,151	2,371	1,269	1,197	2,467
Mindililwo	1,967	2,151	4,118	2,217	2,424	4,641	2,307	2,523	4,830	2,401	2,626	5,027
Iten Township	4,453	4,723	9,176	5,019	5,323	10,342	5,223	5,540	10,763	5,436	5,765	11,201
Anin	1,756	1,610	3,366	1,979	1,815	3,794	2,060	1,888	3,948	2,143	1,965	4,109
Kessup	1,870	1,870	3,740	2,108	2,108	4,215	2,193	2,193	4,387	2,283	2,283	4,565
Rimoi	1,274	1,277	2,551	1,436	1,439	2,875	1,494	1,498	2,992	1,555	1,559	3,114
Chesitek	1,669	1,709	3,378	1,881	1,926	3,807	1,958	2,005	3,962	2,037	2,086	4,123
Kaplamai	1,578	1,571	3,149	1,779	1,771	3,549	1,851	1,843	3,694	1,926	1,918	3,844
Sergoit	1,558	1,547	3,105	1,756	1,744	3,500	1,827	1,815	3,642	1,902	1,888	3,790
Katalel	2,529	2,671	5,200	2,850	3,010	5,861	2,966	3,133	6,099	3,087	3,260	6,347
Kiptabus	2,992	3,078	6,070	3,372	3,469	6,841	3,509	3,610	7,120	3,652	3,757	7,409
Total	**26,798**	**27,360**	**54,158**	**30,204**	**30,837**	**61,041**	**31,432**	**32,092**	**63,524**	**32,711**	**33,397**	**66,108**

(Source: KNBS 2019, National Population and Housing Census.)

1.2.4. Economic Context

Most households in Iten Tambach Municipality rely on agriculture for their livelihoods. About 80% of these households practice cultivation for both subsistence and commercial reasons. The Municipality is endowed with the highland area, hanging valley and the lower Kerio Valley. These three portions of land each support different varieties of crops that contribute to the economy of the Municipality. The highlands are suitable for maize, horticulture, potatoes, beans, wheat and pyrethrum. The highlands also support dairy production while the lowlands support green peas and groundnuts. Agriculture is the major driver of the economy in Iten Municipality. Iten's strategic location and reputation as a world-class athletics training destination makes it an attractive opportunity for trade, investment and infrastructure development.

Table 6: Categories of businesses within the Municipality.

No.	Business Category	Number of businesses	%	Type of Enterprises	Category
1	General Trade, Wholesale, Retail, Shops and Services	4,411	37.5%	Retail shops, hardware stores, supermarkets, salons, barbers, and other service providers.	Micro & Small Enterprises
2	Informal Sector	2,328	19.8%	Jua Kali artisans, street vendors, small-scale mechanics, and market traders.	Micro Enterprises
3	Industrial Plants, Factories, Workshops, Contractors	1,453	12.3%	Garages, welding, fabrication, carpentry, and construction firms.	Small & Medium Enterprises
4	Accommodation and Catering	1,044	8.9%	Hotels, lodges, restaurants, cafes, and catering services.	Small & Medium Enterprises
5	Agriculture, Forestry & Natural Resource Extraction	633	5.4%	Agro-processing, dairy, beekeeping, tree nurseries, and quarrying.	Micro & Small Enterprises
6	Transport, Storage & Communications	619	5.3%	Matatus, bodaboda groups, courier services, logistics, and fuel stations.	Small & Medium Enterprises
7	Professional, Technical & Financial Services	498	4.2%	Law firms, consultancies, SACCOs, microfinance, engineering and accounting firms.	Small & Medium Enterprises
8	Amusement & Pool Table Businesses	440	3.7%	Pool tables, gaming spots, and small recreation centers.	Micro Enterprises
9	Education, Health & Entertainment Services	351	3.0%	Private schools, clinics, gyms, and entertainment centers.	Small Enterprises

1.2.5. Land-use Context

Land within Iten Tambach Municipality is utilized for different purposes. These uses have been classified into; Educational, Transportation, Public Utility, Public Purpose, Recreational,

Conservation, Agriculture, Commercial, Residential and Industrial. The largest share of Municipality land is under Agriculture, Residential and Commercial Land Uses. Despite the Municipality being planned, it is rapidly sprawling into the surrounding Agricultural hinterlands. This is largely driven by population growth and desire for more space leading to significant environmental, social, and economic impacts like increased habitat loss and reduced land for cultivation. The Municipality is facing enforcement challenges in land use classification owing to the need for review of existing zoning plans and regulations to ensure enforcement and compliance.

1.3. Key Stakeholders & Inclusiveness

Stakeholders were engaged in consultative meetings with Government officials, Civil Society Organizations, Community Members, Private Sector Actors, Investors,

Table 7: Stakeholder mapping for Iten Tambach Municipality.

High	**High Influence – Low Interest** ● Kenya Meteorological Department (KMD) ● National Environment Management Authority (NEMA) ● World Bank	**High Influence – High Interest** ● Iten Tambach Municipality Officials ● County Government of Elgeyo Marakwet Officials ● County Disaster Risk Management Unit ● State Department of Housing and Urban Development ● County Climate Change Unit (CCU)
	Low Influence – Low Interest ● Business Community ● External investors	**Low Influence – High Interest** ● Kenya World Vision ● Kenya Red Cross Society ● Community Based Organizations
Low		High

2. Hazard Assessment

This section involves screening of potential climate hazards affecting Iten Municipality. It analyzes climate indicators, thresholds and gives a description of current and future trends. This hazard assessment section also concentrates on screening of hazard levels under SSP2-4.5 and SSP5-8.5 scenarios. Iten Municipality lies in a climate sensitive belt that is exposed to landslides, drought and wildfires. These three are selected as the key hazards for the Urban Climate Risk Profile.

2.1. Key Climate Hazards

[Refer to Step-2.1 to screen for key hazards. It is recommended that a maximum of 4-5 key hazards are selected for the urban area.]

Table 8: Hazard screening for Iten Tambach Municipality

Hazard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazard (Y/N)
Heat Stress				
Average surface temperature increase	Yes	Yes	Yes	No
Average ocean temperature increase	No	No	No	No
Extreme heat	No	No	No	No
Marine heat waves	No	No	No	No
Cold Stress				
Average surface temperature during winter	No	No	No	No
Extreme cold (e.g., cold spells, frost)	No	No	No	No
Snowfall and ice storms	No	No	No	No
Flooding				
Changes in precipitation patterns	No	No	No	No
Pluvial (surface level) flooding, including flash flooding and urban flooding	No	No	No	No
Fluvial (river) flooding	No	No	No	No
Sea level rise	No	No	No	No
Coastal flooding, including storm surges	No	No	No	No
Waterlogging	No	No	No	No
Water Stress				
Drought (meteorological, hydrological)	Yes	Yes	Yes	Yes
Groundwater salinization	No	No	No	No
Saline intrusion	No	No	No	No
Wildfire				
Wildfires & bushfires	Yes	Yes	Yes	Yes
Storms				
Extreme wind	No	No	No	No
Tropical cyclones	No	No	No	No
Sand and dust storms	No	No	No	No
Hailstorms	No	No	No	No
Mass Movement				
Landslides	Yes	Yes	Yes	Yes
Coastal erosion	No	No	No	No
Gully erosion	No	No	No	No
Marine Conditions				
Ocean acidification	No	No	No	No

Hazard	Hazard Likely (Y/N)	Significant Impact (Y/N)	High Priority (Y/N)	Key Hazard (Y/N)
Heat Stress				
Average surface temperature increase	Yes	Yes	Yes	No
Average ocean temperature increase	No	No	No	No
Geophysical*				
Subsidence	No	No	No	No
Earthquakes	No	No	No	No
Volcanos	No	No	No	No

** 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.*

2.2. Climate Indicators and Hazard Thresholds

Table 9: Climate indicators and hazard thresholds selected for the assessment

Key Hazard	Climate indicator	Data source	Threshold		
			Low	Medium	High
Landslide	Landslide Susceptibility Index	https://disasters-nasa.hub.arcgis.com/search?collection=dataset&q=land%20susceptibility%20index	Low/Very Low	Moderate	High/Very High
Heat Stress	# days with heat index > 35°C(Mean)	Climate Change Knowledge Portal	<5 days/season	5-15 days/season	>15 days/season
Wildfire	Fire Weather Index (FWI)	https://thinkhazard.org/en/report/133-kenya/WF	Low/Very Low	Medium	High/Very High

Key Hazard	Climate indicator	Data source	Threshold		
			Low	Medium	High
Drought	SPEI Drought Index	https://spei.csic.es/spei_database_2_10/#map_name=spei48#map_position=1475	>-1.0 (average value is -0.7)	-1.0 to -1.5	<-1.5

2.3. Current Hazard Levels and Climate Projections

Trends in climate past, present and future always need to be understood in the context of the naturally occurring variability. *Climate variability* here, refers to the ways how climate conditions (e.g., temperature and precipitation) "flicker" from year to year within their respective typical "range of variability".

Table 10: Current and future hazards levels for Iten Tambach Municipality

	Hazard Level				
Hazard	**Current (Baseline)**	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Landslide	High	High	High	Medium	Low
Heat Stress	Low	High	High	High	High
Wildfire	Medium	Low	Low	Low	Low
Drought	Medium	High	High	Low	Low

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

Table 11: Interpretation of hazard levels

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

3. Exposure & Vulnerability Assessment

Climate risk stems from the interaction of hazards, exposure, and vulnerability, where exposure is the presence of people, assets, or ecosystems in places that could be adversely affected, and vulnerability is the predisposition to suffer harm, including lack of capacity to cope or adapt. High exposure and vulnerability often result from skewed development, such as rapid, unplanned urbanization in hazardous areas.

3.1. Urban Elements

Table 12: Urban elements 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	Storm water drainage network covers most part of the Municipality
	Storm water storage	N	N	N/A
Water & Wastewater Management	Pumping stations	Y	Y	Yokot and Singore Pumping Stations
	Groundwater abstraction	Y		
	Water treatment facilities			
	Water supply networks			
	Sewer networks			
	Wastewater treatment facilities			
Solid Waste Management	Transfer facilities	Y	Y	3 Transfer Stations within the Municipality.
	Landfills and dump sites	N	N	
	Recycling centers	N	N	
	Collection fleet	Y	Y	
Transport and Mobility	Road networks	Y	Y	There are different classes of roads traversing the Municipality including 2 Class B roads.
	Bridges	N	N	
	Public transport networks (rail, bus, mini-bus, etc.)	Y	Y	
	Transportation terminals	N	N	
	Vehicle depots	N	N	
	Non-motorized transport networks	Y	Y	
	Freight and logistics hubs	N	N	

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
Energy	Energy power plants	N	N	
	Poles and power lines	Y	N	
	Transformers and substations	Y	Y	
	Streetlighting	Y	N	
Economic Infrastructure	Markets	Y	Y	
	Businesses and commercial hubs	Y	Y	
	Industrial zones/parks and logistics parks	Y	Y	
Social Infrastructure	Government buildings and service centers	Y	Y	
	Education facilities	Y	Y	
	Healthcare facilities	Y	Y	
	Public spaces	Y	Y	
	Faith-based buildings	Y	N	
	Cultural and heritage assets	Y	Y	
Emergency Services	Fire stations	Y	Y	
	Police stations	Y	Y	
	Telecommunications networks	Y	Y	
	Early warning systems	Y	Y	
	Disaster management centers and shelters	Y	Y	
	Evacuation routes	N	N	
Populations				
Urban Residents	Population	Y	Y	
	Households	Y	Y	
Informal Settlement Residents	Population living in informal settlements	Y	Y	
	Households lacking land tenure	Y	N	
	Households / residents lacking access to basic services	Y	N	
Vulnerable and Marginalized Groups	Low-income households	Y	N	
	Women-headed households	Y	N	
	Children and youth	Y	N	
	Elderly persons	Y	N	
	People with disabilities (PWD)	Y	N	
	Homeless populations	Y	N	
	Unemployed or precariously employed workers	Y	N	

Category	Subcategory	Included in the RCRA (Y/N)	Available in GIS format (Y/N)	Description
	Seasonal workers / migrant laborers	Y	N	
	Nomadic groups in peri-urban areas	N	N	
	Urban refugees and migrants	N	N	
	Minority ethnic groups in urban areas	Y	N	
Natural Assets				
Urban Green Infrastructure	Urban parks and gardens	Y	Y	
	Green corridors	Y	Y	
	Street landscaping	Y	Y	
	Urban forests and forest reserves	N	N	
Urban Blue Infrastructure	Natural wetlands	Y	Y	
	Rivers	Y	Y	
	Riparian zones	Y	Y	
	Lakes, ponds and reservoirs	Y	Y	
	Coastal ecosystems	N	N	
	Urban agriculture	Y	N	
Peri-urban and Agricultural Systems	Peri-urban agriculture	Y	N	
	Agroforestry systems	Y	N	
	Forests and forest reserves	Y	Y	
	Protected areas and national parks	Y	Y	
	Savannahs and rangelands	Y	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 13: Interpretation of exposure and vulnerability levels

Level	Exposure Level Interpretation	Vulnerability Level Interpretation
High	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 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	Few or no critical urban elements lie within the hazard footprint or area of impact.	The urban element is minimally vulnerable to the climate hazard due to limited sensitivity and/or a high degree of adaptive capacity.

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

Table 14: Impact Matrix

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

Table 15: Exposure, Vulnerability, and Impacts of Landslide on Urban Elements

Hazard: Landslide

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	● Storm water infrastructure is minimally affected by landslide since the escarpment is the only side affected by landslides.	Medium	**Sensitivity:** ● Alternative routes during landslides **Adaptive Capacity:** ● Regular maintenance of drainage facilities. ● Stone pitching the drainages to minimize impact.	Medium	Moderate
Water & Wastewater Management	● Most Water Infrastructure is mostly concentrated in the populated areas away from the escarpment which is prone to landslides.	Low	**Sensitivity:** ● Use of strong water pipes that could withstand the impact. **Adaptive Capacity:** · Regular maintenance of pipes that burst during landslide.	Low	Insignificant
Solid Waste Management	· All Solid waste infrastructure is within major urban centres away from landslide prone areas.	Low	**Sensitivity:** · There is no solid waste infrastructure that is sensitive to landslides in the Municipality. **Adaptive Capacity:** · No adaptive capacity needed.	Low	Insignificant
Transport and Mobility	· Roads and footpaths located on steep escarpment slopes.	Medium	**Sensitivity:** Earthen and gravel roads are sensitive to slope failure. **Adaptive Capacity:**	Low	Minor

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			· Regular maintenance of affected roads.		
Energy	Poles exposed to ground movement in unstable areas.	Low	**Sensitivity:** · Poles and transformers vulnerable to slope movement. **Adaptive Capacity:** · Rapid response by utility providers.	Low	Insignificant
Economic Infrastructure	· Limited high-rise or heavy structures.	Low	**Sensitivity:** · Informal structures vulnerable to ground instability. **Adaptive Capacity:** · Community awareness of high-risk zones.	Low	Insignificant
Social Infrastructure	· Schools and health facilities generally sited on stable ground.	Low	**Sensitivity:** · Minor risk from nearby landslides. **Adaptive Capacity:** · Institutional planning and safe siting standards.	Low	Insignificant
Emergency Services	· Emergency access roads may be temporarily blocked by landslides.	Low	**Sensitivity:** · Response time affected by road obstruction. **Adaptive Capacity:** · Local disaster committees and community response mechanisms.	Low	Insignificant
Populations					
Urban Residents	· Some households located near steep slopes.		**Sensitivity:** · Risk of injury or displacement during slope failure.		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
		Medium	**Adaptive Capacity:** · Ability to relocate temporarily.	Medium	Moderate
Informal Settlement Residents	· Informal housing on marginal or steep land.	Low	**Sensitivity:** · Poor construction materials. **Adaptive Capacity:** · Community-based risk awareness.	Low	Insignificant
Vulnerable and Marginalized Groups	· Households located along escarpment slopes and steep valleys	Low	**Sensitivity:** · Limited savings for relocation or rebuilding **Adaptive Capacity:** · Limited early warning systems	Low	Insignificant
Natural Assets					
Urban Green Infrastructure	· Degraded riparian buffers	High	**Sensitivity:** · Limited slope stabilization measures **Adaptive Capacity:** · Ongoing tree planting initiatives	Moderate	Major
Urban Blue Infrastructure	· Drainage channels prone to blockage by debris	Low	**Sensitivity:** · High runoff during intense rainfall **Adaptive Capacity:** Community clearing of drainage channels before rainy seasons.	Low	Insignificant
Peri-urban and Agricultural Systems	· Farms located on steep escarpment terrain		**Sensitivity:** Soil erosion and crop loss during heavy rains		

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
		Low	**Adaptive Capacity:** ● Limited access to modern soil stabilization technologies	Low	Insignificant

Table 16: Exposure, Vulnerability, and Impacts of Heatstress on Urban Elements

Hazard: Heatstress

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	● Vegetation loss due to heat reduces natural cooling and runoff moderation.	Low	**Sensitivity:** ● Concrete and masonry drainage structures are moderately sensitive to thermal expansion and surface degradation **Adaptive Capacity:** ● Use of durable construction materials with moderate heat resistance.	Low	Insignificant
Water & Wastewater Management	● Elevated temperatures affect water storage tanks and exposed pipelines.	Low	**Sensitivity:** ● Higher temperatures may reduce water quality due to microbial growth. **Adaptive Capacity:** ● Availability of groundwater sources and gravity-fed systems.	Low	Insignificant
		Low	**Sensitivity:**	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Solid Waste Management	· Organic waste decomposes faster under heat, increasing odor and health risks.		· Heat exposure affects worker health and operational efficiency. **Adaptive Capacity:** · Use of protective gear and adjusted working hours for workers.		
Transport and Mobility	· Roads and pedestrian areas exposed to high surface temperatures.	Low	**Sensitivity:** · Asphalt softening and pedestrian discomfort. **Adaptive Capacity:** · Moderate climate and shaded streets.	Low	Insignificant
Energy	· Increased electricity demand during hot periods.	Low	**Sensitivity:** · Transformers may overheat during peak demand. **Adaptive Capacity:** · Stable grid and low cooling demand overall.	Low	Insignificant
Economic Infrastructure	· Outdoor businesses exposed to heat.	Low	**Sensitivity:** · Reduced productivity during extreme heat. **Adaptive Capacity:** · Flexible working hours.	Low	Insignificant
Social Infrastructure	· Schools and clinics experience indoor heat discomfort.	Low	**Sensitivity:** · Children and elderly affected by high temperatures. **Adaptive Capacity:**	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			· Natural ventilation and short heat duration.		
Emergency Services	· Staff exposed during outdoor response activities.	Low	**Sensitivity:** · Heat fatigue risk **Adaptive Capacity:** · Shift systems and hydration practices.	Low	Insignificant
Populations					
Urban Residents	· Prolonged exposure during heat waves.	Medium	**Sensitivity:** · Elderly, children, and outdoor workers vulnerable. **Adaptive Capacity:** · Behavioral adaptation and access to water.	Medium	Moderate
Informal Settlement Residents	· Densely built housing with poor ventilation.	Low	**Sensitivity:** · Heat buildup indoors. **Adaptive Capacity:** · Community coping mechanisms.	Low	Insignificant
Vulnerable and Marginalized Groups	· Outdoor workers (farmers, boda boda riders, construction workers)	Low	**Sensitivity:** Limited access to cooling systems **Adaptive Capacity:** · Basic healthcare facilities available	Low	Insignificant
Natural Assets					
		High	**Sensitivity:**	Medium	Major

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Urban Green Infrastructure	· Limited urban tree canopy in town center		· Heat island effect in built-up areas **Adaptive Capacity:** · Tree planting programs underway		
Urban Blue Infrastructure	· Seasonal water shortages	High	**Sensitivity:** · Water scarcity reduces cooling and hydration options **Adaptive Capacity:** · Community water supply systems exist	Medium	Major
Peri-urban and Agricultural Systems	· Crops exposed to rising temperatures	Medium	**Sensitivity:** · Heat stress reduces crop yields **Adaptive Capacity:** · Some drought-resistant crop varieties	Medium	Major

Table 17: Exposure, Vulnerability, and Impacts of Wildfire on Urban Elements

Hazard: Wildfire

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	· Risk of ash and debris entering drainage channels.	Low	**Sensitivity:** · Reduced drainage efficiency. **Adaptive Capacity:** · Natural open drainage systems.	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Water & Wastewater Management	· Infrastructure near vegetation at risk.	Low	**Sensitivity:** · Minor damage to exposed components. **Adaptive Capacity:** · Rapid response **Adaptive Capacity:** ·	Low	Insignificant
Transport and Mobility	· Roads near grassland and forest edges.	Low	**Sensitivity:** · Smoke reduces visibility. **Adaptive Capacity:** · Firebreaks and rapid clearing.	Low	Insignificant
Energy	· Power lines passing through vegetated areas.	Low	**Sensitivity:** · Risk of line damage by fire. **Adaptive Capacity:** · Vegetation control programs.	Low	Insignificant
Economic Infrastructure	· Farms and storage facilities near grasslands.	Low	**Sensitivity:** · Loss of crops or structures. **Adaptive Capacity:** · Traditional fire management practices.	Low	Insignificant
Social Infrastructure	· Schools near open vegetation.	Low	**Sensitivity:** · Smoke inhalation risk. **Adaptive Capacity:** · Emergency evacuation plans.	Low	Insignificant
Emergency Services	· Fire response teams exposed during suppression.	Low	**Sensitivity:** · Equipment and manpower limitations.	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			Adaptive Capacity: · Community firefighting support.		
Populations					
Urban Residents	· Smoke exposure during dry seasons.	Low	**Sensitivity:** · Respiratory discomfort. **Adaptive Capacity:** · Ability to limit outdoor activities.	Low	Insignificant
Informal Settlement Residents	· Proximity to unmanaged vegetation.	Low	**Sensitivity:** · Fire spread risk due to housing materials. **Adaptive Capacity:** · Community vigilance.	Low	Insignificant
Vulnerable and Marginalized Groups	· Communities near forested escarpments	Low	**Sensitivity:** · Limited fire response equipment **Adaptive Capacity:** · Community-based fire response groups	Low	Insignificant
Natural Assets					
Urban Green Infrastructure	· Dry grasslands during dry seasons	Low	**Sensitivity:** · Accumulated dry biomass increases fire risk **Adaptive Capacity:** · Periodic fire awareness campaigns **Adaptive Capacity:** ·	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Peri-urban and Agricultural Systems	· Farms adjacent to forests and grasslands	Medium	**Sensitivity:** · Livestock at risk during uncontrolled fires **Adaptive Capacity:** · Traditional firebreaks in farms	Medium	Moderate

Table 18: Exposure, Vulnerability, and Impacts of Drought on Urban Elements

Hazard: Drought

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Infrastructure & Services					
Stormwater Drainage	· Prolonged dry conditions reduce runoff.	Low	**Sensitivity:** · Accumulation of debris and sediments. **Adaptive Capacity:** · Periodic manual cleaning.	Low	Insignificant
Water & Wastewater Management	· Reduced surface and groundwater availability.	Low	**Sensitivity:** · Water shortages affect service reliability. **Adaptive Capacity:** · Alternative water sources.	Low	Insignificant
Solid Waste Management	· Reduced water availability for cleaning operations.	Low	**Sensitivity:** · Dust-related health and operational challenges. **Adaptive Capacity:** · Community monitoring and enforcement.	Low	Insignificant
		Low	**Sensitivity:**	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
Transport and Mobility	· Dusty roads during prolonged dry periods.		· Reduced visibility and comfort. **Adaptive Capacity:** · All-weather road sections		
Economic Infrastructure	· Agriculture-dependent businesses affected.	Low	**Sensitivity:** · Reduced agricultural output. **Adaptive Capacity:** · Income diversification.	Low	Insignificant
Social Infrastructure	· Water shortages affect schools and clinics.	Medium	**Sensitivity:** · Hygiene and sanitation challenges. **Adaptive Capacity:** · Water storage facilities.	Low	Minor
Emergency Services	· Increased demand for relief services.	Low	**Sensitivity:** · Resource constraints. **Adaptive Capacity:** · County and national support mechanisms.	Low	Insignificant
Populations					
Urban Residents	· Reduced water availability.	Medium	**Sensitivity:** · Health and livelihood stress. **Adaptive Capacity:** · Water rationing and alternative sources.	Medium	Moderate
Informal Settlement Residents	· Dependence on communal water points.	Low	**Sensitivity:** · High cost and limited access to water. **Adaptive Capacity:**	Low	Insignificant

Category	Exposure (Description)	Exposure Level	Vulnerability (Description)	Vulnerability Level	Impact Level
			· Community sharing mechanisms		
Vulnerable and Marginalized Groups	· Low-income households reliant on rain-fed agriculture	Low	**Sensitivity:** · Limited income diversification **Adaptive Capacity:** · County drought response programs	Low	Insignificant
Natural Assets					
Urban Green Infrastructure	· Urban trees and vegetation affected by prolonged dry spells	Medium	**Sensitivity:** · Reduced soil moisture **Adaptive Capacity:** · Reduced soil moisture	Medium	Moderate
Urban Blue Infrastructure	· Boreholes and community water systems	Medium	**Sensitivity:** · Declining water tables **Adaptive Capacity:** ● Water rationing measures during drought	High	Major
Peri-urban and Agricultural Systems	● Rain-fed crop farming	Medium	**Sensitivity:** ● Crop failure during prolonged drought **Adaptive Capacity:** ● Agricultural extension services	Medium	Moderate

4. Climate Risk Assessment

Climate Risk Assessment in the Municipality is a structured process used by Municipalities to identify, analyze and prioritize risks caused by climate change that could affect people, infrastructure, the economy and the environment. The purpose of this section is to integrate hazards, exposure and vulnerability to express present and future climate risks across the city.

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 19: 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.

Table 20: 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 21: Summary of Landslide risks for Iten Tambach Municipality

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

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

Table 22: Summary of Heat stress risks for Iten Tambach Municipality

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level	Low	High	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	Insignificant	Very Low	Low	Low	Low	Low
Water & Wastewater Management	Insignificant	Very Low	Low	Low	Low	Low
Solid Waste Management	Insignificant	Very Low	Low	Low	Low	Low

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

Table 23: Summary of Wild fire risks for Iten Tambach 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	Low	Low	Low	Low
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	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Water & Wastewater Management	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Solid Waste Management	Insignificant	Low	Very Low	Very Low	Very Low	Very low

	Time Horizon & Climate Scenario	Current	2050 SSP2-4.5	2050 SSP5-8.5	2100 SSP2-4.5	2100 SSP5-8.5
	Hazard Level	Medium	Low	Low	Low	Low
Categories	**Impact**	**Risk Levels**				
		Current	**2050 SSP2-4.5**	**2050 SSP5-8.5**	**2100 SSP2-4.5**	**2100 SSP5-8.5**
Transport and Mobility	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Energy	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Economic Infrastructure	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Social Infrastructure	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Emergency Services	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Populations						
Urban Residents	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Informal Settlement Residents	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Vulnerable and Marginalized Groups	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Natural Assets						
Urban Green Infrastructure	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Urban Blue Infrastructure	Insignificant	Low	Very Low	Very Low	Very Low	Very low
Peri-urban and Agricultural Systems	Moderate	Medium	Low	Low	Low	Low

Table 24: Summary of Drought risks for Iten Tambach 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	High	High	Low	Low
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	Insignificant	Low	Low	Low	Very Low	Very Low
Water & Wastewater Management	Insignificant	Low	Low	Low	Very Low	Very Low
Solid Waste Management	Insignificant	Low	Low	Low	Very Low	Very Low

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

4.2. Climate Risk Hotspots

Climate risks in Iten Municipality are unevenly distributed across three main topographical zones; Highlands, Escarpment, and Valley—driven by elevation, economic activity, and geography. Key hazards include severe frost in the highlands, high soil erosion/landslide risk on the escarpments, and water stress in the valley.

5. What's Next?

5.1. Key Findings

Table 25: Summary of climate risks affecting urban elements for Iten Tambach Municipality

Category	List of Key Hazards		
	Current	**Mid-term (2050)**	**Long-term (2100)**
Infrastructure & Services			
Stormwater Drainage	Landslide	Landslide	
Water & Wastewater Management			
Solid Waste Management			
Transport and Mobility			
Energy			
Economic Infrastructure			
Social Infrastructure			
Emergency Services			
Populations			
Urban Residents	Landslide	-Landslide -Heatstress -Drought	Heatstress
Informal Settlement Residents			
Vulnerable and Marginalized Groups			
Natural Assets			
Urban Green Infrastructure	Landslide	-Landslide -Heatstress -Drought	-Landslide -Heatstress
Urban Blue Infrastructure	Drought	-Heatstress -Drought	Heatstress
Peri-urban and Agricultural Systems		-Heatstress -Drought	Heatstress

5.2. Climate Adaptation and Resilience Solutions

Table 26: Climate adaptation and resilience solutions recommended for Iten Tambach Municipality

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Infrastructure & Services			
Stormwater Drainage	● Unblocking of existing drainages and culverts to open the way for stormwater. ● Improvement of drainage paths ● Use of sand bags ● Desilt drains ● Emergency pumping to reduce water clogging in blocked sections. ● Land Use planning and Zoning through landslide hazard mapping to zone areas prone to landslides to ensure early preparedness. ● Reforestation of unstable slopes with deep-rooted indigenous species to minimize soil erosion.	● Upgrade drainage infrastructures by replacing pipes, culverts ● Improved solid-waste management by reducing waste entering the drainage through regular collection of waste. ● Scheduled regular main ● Storm-water diversion structure and culvert improvement and maintenance to minimize the effects of landslides. ● Monitoring and Early-Warning Systems by installing ground Movement sensors. ● Drainage system protection through reinforced concrete culverts in high-risk slopes.	
Water & Wastewater Management	● … ● …	● … ● …	● … ● …
Solid Waste Management	● … ● …	● … ● …	● … ● …
Transport and Mobility	● … ● …	● … ● …	● … ● …
Energy	● … ● …	● … ● …	● … ● …
Economic Infrastructure	● … ● …	● … ● …	● … ● …

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Social Infrastructure	● … ● …	● … ● …	● … ● …
Emergency Services	● … ● …	● … ● …	● … ● …
Populations			
Urban Residents	● Drainage control through surface drainage channels to divert surface runoff. ●	● Safe housing measures through deep pile foundations in moderate risk areas. ● Creating green spaces through planting trees and developing shaded areas. ●	Establish air conditioned public cooling centers in community halls, libraries and halls Establsih power-backup
Informal Settlement Residents	● … ● …	● … ● …	● … ● …
Vulnerable and Marginalized Groups	● … ● …	● … ● …	● … ● …
Natural Assets			
Urban Green Infrastructure	● Terracing of steep slopes through construction of stair-step platforms to reduce steep slopeness and minimize landslides. ● ● …	● Ecosystem protection Policies such as Implementation of the Spencer Line that discourages cultivation on slopes of more than 30%. ● Vegetation and Bio-Engineering through Bio-Engineering techniques such as brush Layering and Live Staking. ● ● …	● Development of comprehensive drainage plans ● Upgrading infrastructure by replacing outdated systems with modern systems such as tunnels ● …

Category	Recommended Solutions		
	Immediate	**Mid-term**	**Long-term**
Urban Blue Infrastructure	● Implement water controlled reticulation systems ● Emergency water supplies through use of tanks ● Planting drought-resistant plants ● Encourage minimal water wastage ● …	● Implement systems to capture and store water ● Encourage 3Rs(Reduce, Reuse, Recycle in order to enhance sustainability of water resources. ● Introduce drought-resistant crops. ● …	●
Peri-urban and Agricultural Systems	●	● Improved irrigation efficiency	●

Bibliography

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

Annex N1. Historical Hazard Events

Hazard Event/Type	Landslide
Date or Period	3rd November, 2025
Location	Kibendo Village
Intensity	There was heavy downpour prior to the incident which precipitated a landslide causing a huge rock roll down the hillside fattening a house and killing
Social Impacts	The Landslide claimed the lives of two people, a 67 year old mother and a 2 year old child.
Physical Impacts	A house was crushed by a huge boulder decimating it alongside other surrounding property.
Economic Impacts	Displacement of livelihoods. The affected families depended on the land for their daily subsistence.
Ecological Impacts	Flora and Fauna within the affected area were destroyed during the landslide. There were food crops within the affected land. Also, animals living inside the property were displaced during the incident.