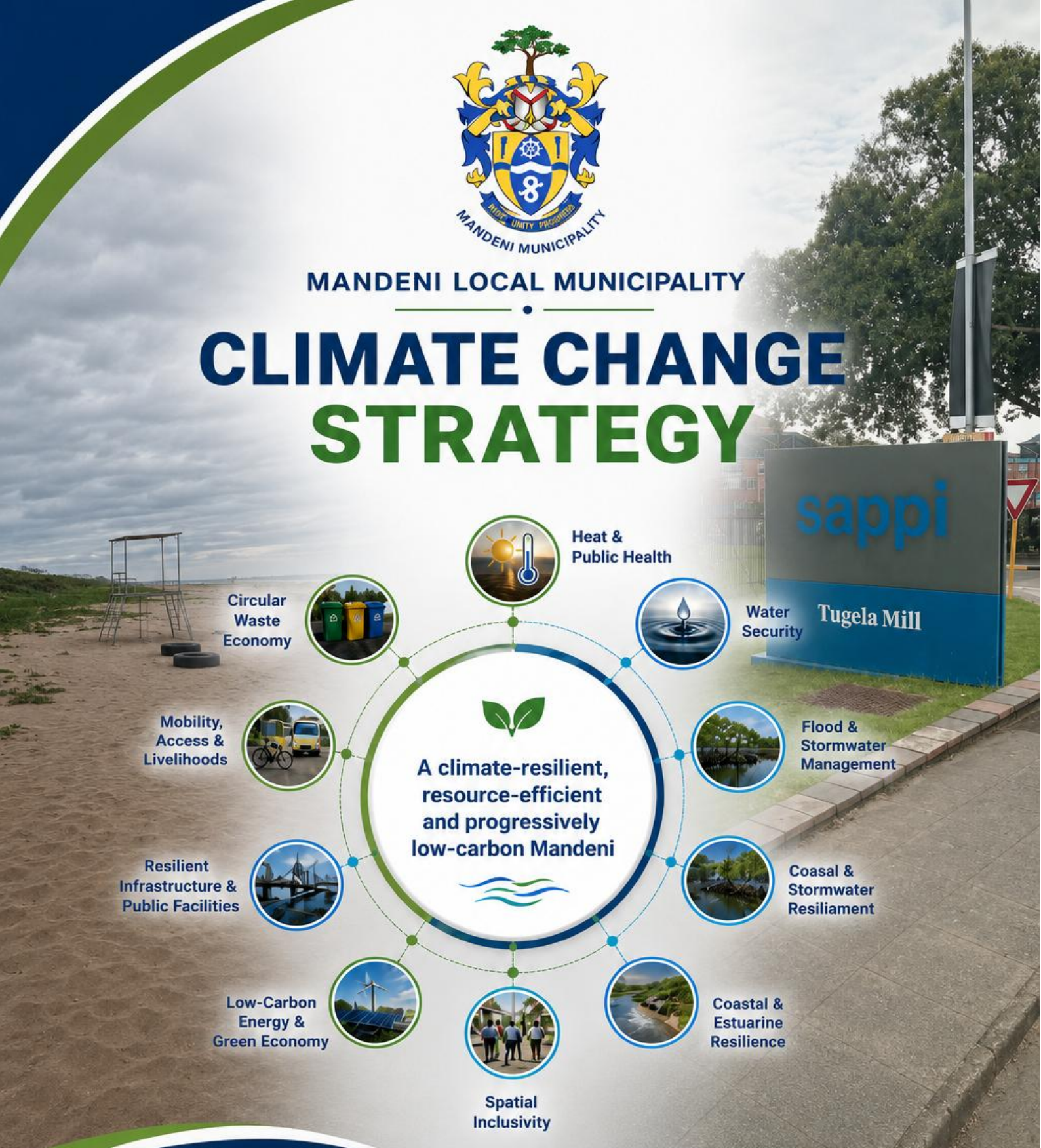
MANDENI MUNICIPALITY

MANDENI LOCAL MUNICIPALITY

CLIMATE CHANGE STRATEGY



Heat & Public Health

Water Security

Flood & Stormwater Management

Coasal & Stormwater Resiliament

Coastal & Estuarine Resilience

Spatial Inclusivity

Low-Carbon Energy & Green Economy

Resilient Infrastructure & Public Facilities

Mobility, Access & Livelihoods

Circular Waste Economy

A climate-resilient, resource-efficient and progressively low-carbon Mandeni

CROSS-CUTTING SUPPORT THEMES

- Governance & Mainstreaming
- Research & Knowledge
- Climate Finance
- Participation & Skills
- Environmental Justice

CLIMATE CHANGE STRATEGY

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Executive Summary

Climate change is already affecting Mandeni Local Municipality and must be treated as a service-delivery, disaster-risk, infrastructure, economic, public-health and environmental governance priority. Mandeni's climate-risk profile is complex because the municipality is simultaneously coastal, industrial, agricultural, rural and urbanising. This means that climate hazards do not occur in isolation; they interact with poverty, unemployment, service backlogs, land governance, informal and traditional housing, floodplain and wetland occupation, ecosystem degradation, industrial activity, agricultural production, coastal exposure and uneven institutional capacity.

Mandeni's priority climate hazards including extreme rainfall, flooding, drought stress, extreme heat, veld and structural fires, lightning, hail, strong winds, storm surge, coastal erosion and sea-level rise. These hazards can damage homes and infrastructure, disrupt water, sanitation, transport and production, and affect ecosystems and coastal settlements. Flooding, poor drainage, illegal dumping, polluted watercourses, sewage risks and exposed coastal assets are among the most immediate identified risks.

The purpose of this Climate Change Strategy is to provide Mandeni Local Municipality with a practical and coordinated framework for responding to climate change through adaptation, mitigation, resilience-building and climate-responsive development. The strategy supports Mandeni's existing municipal priorities by embedding climate action into the Integrated Development Plan, Spatial Development Framework, Land Use Management Scheme, Service Delivery and Budget Implementation Plan, Disaster Risk Management planning, Integrated Waste Management Plan, Human Settlements planning, Local Economic Development planning, Coastal Management Programme, Estuary Management Plan and municipal budgeting processes.

The strategy is adaptation-led because Mandeni's most urgent climate risks relate to flooding, stormwater failure, drought, heat, coastal hazards, fire, lightning, hail, strong winds, vulnerable settlements, weak services, waste pressures and ecosystem degradation. It is mitigation-aware because the municipality must begin to reduce emissions and improve resource efficiency, even though a full municipal greenhouse-gas inventory is not yet available. For this reason, the strategy does not set a quantified carbon-neutrality target at this stage. Instead, it adopts a phased emissions-screening approach focused on municipal electricity use, fuel use, fleet operations, generators, waste, wastewater, transport, industry, agriculture, biomass burning and land-use change.

The long-term vision is for Mandeni to become a climate-resilient, resource-efficient and progressively low-carbon coastal-industrial-rural municipality that protects vulnerable communities, strengthens ecological infrastructure, supports inclusive livelihoods and enables safe, sustainable development across all wards. This vision is supported by principles of resilience, climate justice, economic inclusiveness, ecological infrastructure protection, resource efficiency, health and well-being, spatial risk avoidance, collaboration, evidence-based action, accountability and transparency.

The Strategy recognises that climate impacts are not experienced equally. Rural and traditional-authority areas face particular vulnerability because of uneven access to water, sanitation, roads, waste services and emergency support. Urban and peri-urban areas such as Mandeni, Sundumbili, Manda Farm and Isithebe-linked settlements face concentrated risks linked to drainage, waste, housing, public facilities, heat and service infrastructure. Coastal and estuarine areas, including Tugela Mouth, Dokodweni, Mbizimbelwe and the aMatigulu/iNyoni system, face high to very high vulnerability from erosion, storm surge,

flooding, dune movement, estuary-mouth dynamics and sea-level rise. Industrial, agricultural and logistics systems, including Isithebe Industrial Estate, SAPPI Tugela Mill, sugarcane, forestry and the N2/R102/rail corridor, face both physical climate risks and transition risks linked to energy, emissions, water, waste and market expectations.

The strategy is organised around ten Strategic Focus Areas which provide the core structure for Mandeni's climate response. These include:

- Heat, public health and climate-responsive settlements
- Water security and drought-readiness
- Flood-readiness, stormwater and resilient drainage
- Coastal, estuarine and dune resilience
- Fire, lightning, wind and hail risk management
- Spatial and resource inclusivity
- Low-carbon energy, industry and green economic development
- Climate-resilient municipal buildings, public facilities and infrastructure
- Mobility, access and livelihoods; and
- Circular waste economy and pollution reduction.

Five Cross-Cutting Work Areas provide the enabling systems required for implementation. These are:

- Mainstreaming, governance, research and knowledge management
- Economic impacts, livelihoods and green economy opportunities
- Business models, municipal finance and climate funding
- Communication, collaboration, public participation and skills development
- Human health, ecosystem health and environmental justice.

These cross-cutting areas are essential because climate change cannot be addressed by one department alone. It requires coordination across municipal departments, iLembe District Municipality, provincial and national departments, traditional authorities, communities, businesses, industry, farmers, civil society, research institutions and environmental partners.

The strategy prioritises immediate no-regret actions that can begin without waiting for perfect data. These include establishing a Climate Change Steering Committee, developing climate-risk screening for land-use and capital projects, compiling a georeferenced register of flood-prone roads, stormwater drains, culverts, bridges, public facilities and vulnerable households, establishing a waste and watercourse-pollution hotspot programme, strengthening early-warning communication, reviewing floodline, wetland, coastal and estuary buffer controls, preparing a municipal emissions-screening template, identifying priority ecological restoration sites and packaging climate actions for inclusion in the IDP, SDBIP and budget review process.

Implementation is phased over three-time horizons:

- Immediate actions over 0–2 years focus on governance, mapping, registers, screening tools, early warning, waste hotspot response, drainage maintenance, public awareness, emissions data collection and coordination with iLembe District Municipality.
- Medium-term actions over 3–5 years focus on stormwater upgrades, public-facility retrofits, coastal hazard updates, floodline refinement, restoration projects, cleaner-production partnerships, green-economy projects and climate-finance packaging.

- Long-term actions over 5 years and beyond include major infrastructure resilience, settlement redesign or relocation where unavoidable, long-term coastal adaptation, large-scale ecological restoration, low-carbon transition and expanded circular economy implementation.

Monitoring, evaluation and learning are central to keeping the strategy active and accountable. The municipality will track implementation through quarterly departmental reporting, annual IDP and SDBIP review processes, an action-plan tracker, climate indicators, post-event learning reviews and a five-year strategy review. Key indicators include the establishment of climate governance structures, use of climate-risk screening, completion of flood and drainage registers, reduction of waste hotspots, improvement of early-warning systems, protection of ecological infrastructure, assessment of public facilities, emissions-screening progress, green-economy project development and submission of climate-funding applications.

The overall message of the strategy is clear: climate change will make Mandeni's development challenges more severe, more expensive and more difficult to reverse unless action is taken now. By mainstreaming climate risk into municipal planning, protecting vulnerable communities, restoring ecological infrastructure, improving service-delivery resilience, supporting a greener and more resource-efficient economy, and strengthening institutional accountability, Mandeni can reduce climate risk while advancing safer, more inclusive and more sustainable local development.

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Acronyms and Abbreviations

Acronym / Abbreviation	Full term
AQMP	Air Quality Management Plan
CBA	Critical Biodiversity Area
CBD	Central Business District
CCWA	Cross-Cutting Work Area
COGTA	Cooperative Governance and Traditional Affairs
CMP	Coastal Management Programme
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DWS	Department of Water and Sanitation
EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
EMP	Estuary Management Plan
EPWP	Expanded Public Works Programme
ESA	Ecological Support Area
GHG	Greenhouse Gas
IDP	Integrated Development Plan
IEP	Integrated Environmental Programme
IWMP	Integrated Waste Management Plan
KZN	KwaZulu-Natal
LED	Local Economic Development
LUMS	Land Use Management Scheme
MANCO	Management Committee
MPA	Marine Protected Area
MTDP	Medium-Term Development Plan
MTREF	Medium-Term Revenue and Expenditure Framework
N2	National Route 2
NEMA	National Environmental Management Act
NGO	Non-Governmental Organisation
P415 / P459	Provincial roads referenced in Mandeni transport and disaster-risk planning
R102	Regional road corridor in Mandeni
SAWS	South African Weather Service
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SDP	Spatial Development Plan
SFA	Strategic Focus Area
SMME	Small, Medium and Micro Enterprise
SPLUMA	Spatial Planning and Land Use Management Act
uThukela	Tugela River / uThukela River system

Glossary

Term	Definition
Adaptation	Adjustments in natural or human systems in response to actual or expected climate change impacts. Adaptation reduces harm, strengthens resilience and helps communities, infrastructure, ecosystems and the economy cope with climate risks.
Adaptive capacity	The ability of people, institutions, infrastructure, ecosystems or economic sectors to prepare for, respond to, recover from and adjust to climate impacts. Low adaptive capacity increases vulnerability.
Climate change	A long-term change in climate patterns, including temperature, rainfall, sea level, storm behaviour and extreme events. The Climate Change Act frames climate change as requiring an effective response and a just transition to a low-carbon and climate-resilient economy and society.
Climate finance	Funding or financial mechanisms used to support climate adaptation, mitigation, resilience-building, green economy projects, emissions reduction, ecosystem restoration and climate-risk management.
Climate hazard	A climate-related event or process that may cause harm. Mandeni's priority hazards include extreme rainfall, flooding, drought, heat, fire, lightning, hail, strong winds, storm surge, sea-level rise and coastal erosion. The Mandeni climate vulnerability evidence identifies extreme rainfall, flood risk, extreme heat and drought stress as key climate hazards.
Climate justice	An approach that recognises that climate impacts are not experienced equally. It prioritises vulnerable communities and ensures that climate responses are fair, inclusive and supportive of poverty reduction, livelihoods, health, basic services and dignity.
Climate risk	The potential for climate hazards to cause harm to people, infrastructure, ecosystems, services, livelihoods or the economy. Climate risk is shaped by hazard, exposure, sensitivity and adaptive capacity. The Mandeni vulnerability evidence states that local climate risk is produced by the interaction between hazards and pre-existing vulnerability.
Climate-risk screening	A process of checking whether a plan, project, land-use application, capital investment, infrastructure asset or housing project is exposed to climate hazards such as flooding, heat, fire, drought, coastal erosion or storm surge.
Ecological infrastructure	Natural or semi-natural systems that provide services to people and the municipality. In Mandeni, ecological infrastructure includes rivers, wetlands, estuaries, dunes, forests, grasslands, biodiversity corridors and protected areas. The environmental vulnerability assessment confirms that these ecosystems can reduce flood, drought, erosion, heat and coastal risks when protected and restored.
Ecosystem-based adaptation	The use of biodiversity and ecosystem services to help people adapt to climate change. Examples include wetland restoration, dune rehabilitation, alien invasive clearing, estuary protection, river-buffer restoration and coastal vegetation rehabilitation. The uThukela MPA Ecosystem-based Adaptation Project focuses on ecosystem protection, restoration, resilience of vulnerable people and nature-based adaptation.
Emission screening	A first-stage assessment that identifies likely sources of greenhouse-gas or air-pollution emissions before a full emissions inventory is available. For Mandeni, this includes municipal electricity use, fleet fuel, generators, waste, wastewater, transport, industry, agriculture and biomass burning.
Exposure	The presence of people, infrastructure, ecosystems, services or economic activities in places that could be affected by climate hazards.
Greenhouse gas	A gas that traps heat in the atmosphere and contributes to climate change. Examples include carbon dioxide, methane and nitrous oxide.
Greenhouse-gas inventory	A structured calculation of greenhouse-gas emissions from defined sources over a specific period. Mandeni does not yet have a full greenhouse-gas inventory, and the 2026 vulnerability evidence notes that the current evidence synthesis does not replace one.

Term	Definition
Just transition	A transition towards a low-carbon and climate-resilient economy and society that is fair, inclusive and supportive of vulnerable people, workers, communities and local economies.
Low-carbon development	Development that reduces greenhouse-gas emissions while supporting economic growth, service delivery and social well-being. For Mandeni, this strategy uses the term “progressively low-carbon” because emissions data is still being developed.
Mainstreaming	Integrating climate change into existing municipal plans, budgets, policies, projects, procedures and decisions, rather than treating it as a separate issue.
Maladaptation	An action that may appear to reduce climate risk in the short term but increases vulnerability or emissions over time. For example, hard protection in a dynamic coastal area may worsen erosion elsewhere if not properly assessed.
Mitigation	Actions that reduce greenhouse-gas emissions or increase carbon storage. In Mandeni, mitigation includes energy efficiency, cleaner production, waste diversion, improved fleet and fuel management, industrial emissions screening, renewable-energy readiness and ecosystem protection.
Nature-based solution	An action that protects, restores or manages ecosystems to address social, environmental and climate challenges. Examples include wetland restoration, dune rehabilitation, river buffers, urban tree planting and alien invasive clearing.
No-regret action	An action that is beneficial even if future climate conditions differ from projections. The Mandeni vulnerability evidence identifies no-regret priorities such as drainage maintenance, waste control, buffer enforcement, early warning, ecosystem restoration, critical-service protection and prevention of new development in known hazard areas.
Resilience	The ability of people, settlements, infrastructure, ecosystems, institutions and the economy to withstand, recover from and adapt to climate shocks and stresses.
Sensitivity	The degree to which a person, community, ecosystem, asset or economic sector is affected by a climate hazard.
Transition risk	Economic, regulatory, market or reputational risk linked to the shift toward a low-carbon economy. In Mandeni, this is relevant to industry, manufacturing, agriculture, transport, waste and municipal operations.
Vulnerability	The degree to which people, infrastructure, ecosystems, services or economic sectors are likely to be harmed by climate hazards. Vulnerability is shaped by exposure, sensitivity and adaptive capacity. The Mandeni evidence classifies vulnerability across socio-economic, economic, environmental, physical and coastal dimensions.

1 Introduction

Climate change is no longer a distant environmental issue for Mandeni Local Municipality. It is a present and growing development, service-delivery, disaster-risk, spatial-planning, infrastructure, economic and public-health challenge. Mandeni's location and structure make the municipality particularly exposed: it is simultaneously a coastal municipality, an industrial municipality, an agricultural municipality, a rural municipality and an urbanising municipality. This creates a complex climate-risk profile in which flooding, coastal erosion, drought stress, heat, veld fires, lightning, hail, strong winds, storm surges, sea-level rise, water pollution, waste pressures and infrastructure vulnerability interact with poverty, unemployment, service backlogs, traditional-authority land governance, informal and traditional housing, and settlement expansion into environmentally sensitive or hazard-prone areas.

The Mandeni Integrated Development Plan recognises that the municipality is highly vulnerable to climate impacts because of its rural character and the dependence of communities and economic sectors such as agriculture, tourism and manufacturing on ecological infrastructure. It identifies likely climate-related pressures including water stress, vegetation change and extreme events such as floods. It also recognises that flood vulnerability is increased by the density of rivers, encroachment of agriculture and settlements onto floodplains, and the loss of ecological functions in riparian and estuarine areas.

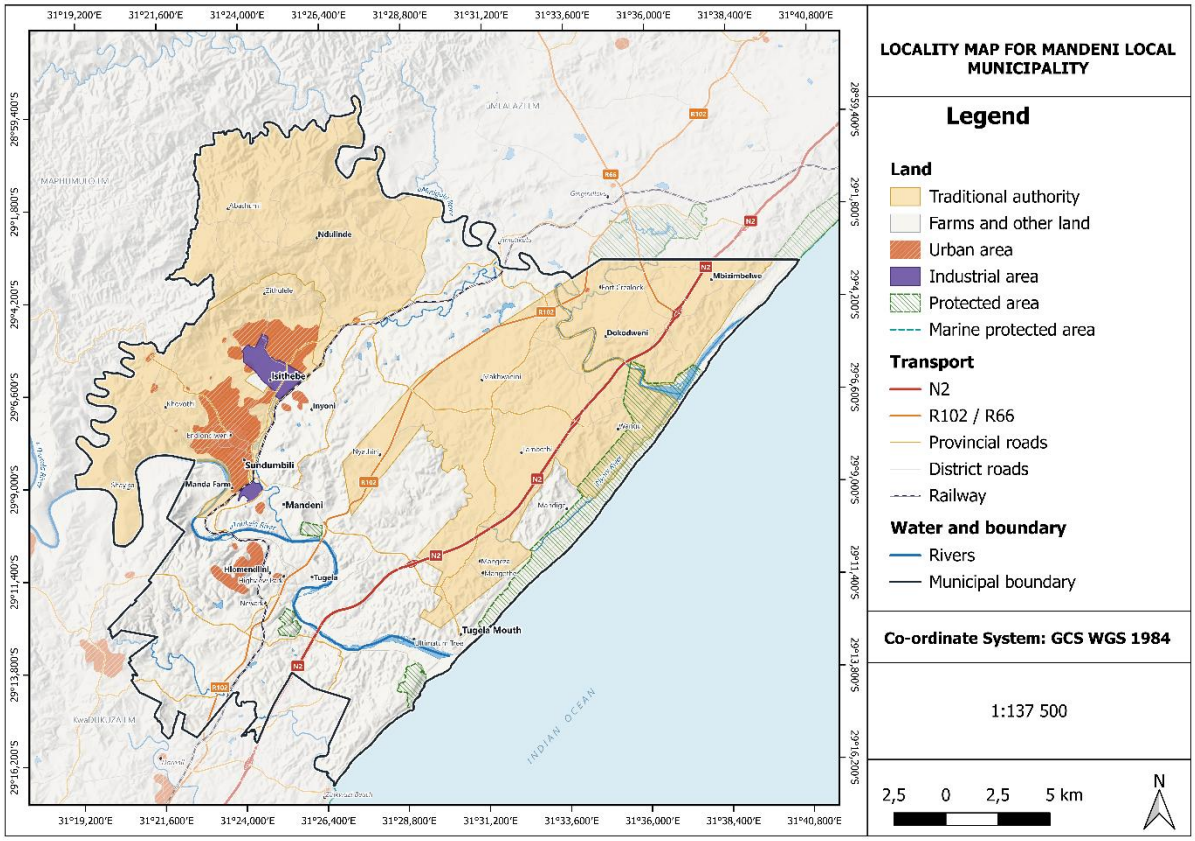

Figure 1: Mandeni Local Municipality

Mandeni's climate change response must therefore protect people, livelihoods, infrastructure and ecosystems at the same time. The municipality's natural systems — including rivers, wetlands, estuaries, dunes, coastal forests, grasslands, protected areas, ecological corridors and agricultural landscapes — are not only environmental assets. They are also ecological

infrastructure that can reduce flooding, erosion, drought, heat and coastal risk when they are protected, restored and incorporated into planning decisions. The Mandeni SDF similarly recognises the importance of protecting, restoring and managing ecological infrastructure in response to biodiversity loss, pollution, invasive alien species, sand mining, settlement pressures and climate change.

This Climate Change Strategy provides a coordinated municipal response to these risks. It is intended to guide decisions across the Integrated Development Plan, Spatial Development Framework, Land Use Management Scheme, Disaster Risk Management planning, Integrated Waste Management Plan, Human Settlements planning, Local Economic Development planning, Coastal Management Programme, Estuary Management Plan, infrastructure planning and annual budgeting. It is also intended to provide a practical framework for collaboration between Mandeni Local Municipality, iLembe District Municipality, provincial and national departments, traditional authorities, communities, business, civil society, research institutions and environmental partners.

The strategy follows the same broad logic as the City of Cape Town Climate Change Strategy, which provides high-level strategic guidance for decision-making, planning, programme development and project implementation, and which is supported by a more detailed action plan. For Mandeni, however, the strategy is adapted to the municipality's own mandate, resources, institutional capacity, spatial form and local climate-risk profile.

1.1 Background

The global climate is changing as a result of increased greenhouse-gas emissions and changes in the earth's atmospheric system. South Africa is already experiencing climate variability and climate-related disasters, including more intense rainfall events, heat stress, drought conditions, coastal erosion and storm impacts. The Climate Change Act, 2024 (Act No. 22 of 2024) provides a national framework for an effective climate change response and a long-term just transition to a low-carbon and climate-resilient economy and society. It also frames adaptation as a coordinated response that must reduce the vulnerability of society, the economy and the environment, strengthen resilience, and enhance adaptive capacity. The phased commencement of the Act and Mandeni's role as a local municipality are explained in Section 3.3.

For Mandeni, climate change is experienced through flooded roads and settlements, blocked drainage, waste washing into streams, degraded wetlands, vulnerable coastal and estuarine areas, pressure on water and sanitation services, veld and structural fires, lightning risk, damaged roofs and public facilities, transport disruptions, risks to agriculture and industry, and increased pressure on poor households with limited ability to recover after shocks. Field observations confirm that these risk pathways are already active, including dumping despite signage and skips, polluted watercourses, sewage near streams, disturbed wetland margins, flooding linked to poor drainage, houses on recognised floodlines, industrial air and water concerns, shoreline erosion and property or infrastructure close to dynamic estuary and beach systems.

Mandeni's climate response must therefore be practical and implementation-oriented. The highest-priority conclusion of the vulnerability evidence is that Mandeni should not wait for a perfect dataset. Existing evidence is already sufficient to justify drainage maintenance, waste control, buffer enforcement, early warning, ecosystem restoration, protection of critical services and prevention of new development in known hazard areas.

1.2 Purpose of this strategy

The purpose of this Climate Change Strategy is to provide Mandeni Local Municipality with a clear, practical and coordinated framework for responding to climate change through adaptation, mitigation, resilience-building and climate-responsive development.

The strategy aims to:

1. **Policy alignment:** set a Mandeni-specific climate vision and align it with the IDP, SDF, LUMS, SDBIP, Disaster Risk Management, IWMP, Human Settlements, Coastal Management, Estuary Management and LED planning.
2. **Risk reduction:** identify and prioritise the main climate risks to communities, infrastructure, ecosystems, public facilities, coastal systems and the local economy.
3. **Low-carbon transition:** start a phased, practical pathway for emissions screening, resource efficiency, cleaner industry, waste diversion, sustainable mobility and a future greenhouse-gas inventory.
4. **Governance and accountability:** clarify institutional roles across Mandeni, iLembe District Municipality, provincial and national departments, traditional authorities, business and civil society.
5. **Implementation:** provide the basis for a detailed action plan with timeframes, responsibilities, indicators, budget implications, monitoring and annual reporting.

The strategy is also intended to support Mandeni's existing municipal priorities. The IDP identifies priorities including building safer communities, waste and the environment, infrastructure development, jobs and a growing economy, financial sustainability, responsive and transparent government, and climate change mitigation. The strategy therefore does not create a separate climate agenda outside municipal planning. It provides a climate lens through which Mandeni can strengthen existing service-delivery, spatial-planning, infrastructure, environmental, economic and disaster-management work.

1.3 Strategy approach

This strategy is based on five working principles, namely:

- Climate change must be treated as a **shared municipal risk** rather than the responsibility of one department only. Disaster management, planning, environmental management, infrastructure, waste, human settlements, finance, local economic development, community services and communications all have roles to play.

Table 1: Indicative RACI responsibility matrix for major climate-action clusters

Action cluster	Responsible (R)	Accountable (A)	Consulted (C)	Informed (I)
Climate-risk screening	Planning / Environmental Management	Municipal Manager / MANCO	Technical Services, Human Settlements, Disaster Management, Finance	Council, applicants, ward structures
Flood/drainage risk register	Technical Services / GIS	Technical Services senior management	Disaster Management, Planning, Waste, ward committees	MANCO, Council, affected communities

Action cluster	Responsible (R)	Accountable (A)	Consulted (C)	Informed (I)
Waste and pollution hotspots	Waste Management / Environmental Management	Community Services and Public Safety	Technical Services, Public Safety, traditional authorities, ward committees	Residents, businesses, Council
Coastal/estuary controls	Planning / Environmental Management	Economic Development, Planning and Human Settlements	EDTEA, DFFE, iLembe DM, EAF, traditional authorities	Coastal users, communities, investors
Annual implementation reporting	Environmental Management / IDP	Municipal Manager	All departments, iLembe DM, Finance	Council, portfolio committee, public

- The strategy must be **evidence-based but action-oriented**. The Climate Risk and Vulnerability Assessment Report is strong enough to begin implementation, even where technical studies such as detailed flood modelling, coastal-process modelling or a full greenhouse-gas inventory still need to be completed.
- The strategy must be **place-based**. Different parts of Mandeni face different combinations of risk. Rural and traditional-authority wards require strong attention to water, sanitation, fire, access, early warning and livelihoods. Sundumbili, Manda Farm and other urban or peri-urban areas require attention to drainage, waste, informal housing, heat and public facilities. Tugela Mouth, Dokodweni, Mbizimbelwe and the aMatigulu/iNyoni system require coastal, estuarine and land-use controls. Isithebe, SAPPI, the N2/R102/rail system and agricultural areas require business continuity, emissions screening and infrastructure resilience.
- The strategy must protect and restore **ecological infrastructure**. Rivers, wetlands, dunes, estuaries, grasslands, forests and biodiversity corridors (i.e. natural or semi-natural areas that allow species, ecological processes and ecosystem services to move or function across the landscape) are critical to Mandeni's resilience and must be integrated into land-use management, disaster risk reduction, capital investment and maintenance planning.
- The strategy must support a **just and inclusive transition**. Climate action must reduce risk for vulnerable communities, improve service delivery, protect livelihoods, create opportunities for green jobs and support a more resilient local economy.

2 Problem Statement and Consequences of Failure

For Mandeni Local Municipality, the problem is not only that climate hazards are increasing. The deeper issue is that climate hazards are interacting with existing development pressures, service-delivery constraints, poverty, spatial vulnerability, ecosystem degradation, industrial and agricultural concentration, and uneven institutional capacity.

Mandeni's climate change response must therefore be framed as a municipal development priority, not only as an environmental programme. Climate change threatens lives, livelihoods, infrastructure, ecosystems, land-use decisions, economic activity and the financial sustainability of the municipality.

2.1 Problem statement

Mandeni Local Municipality is already exposed to multiple climate-related hazards, including extreme rainfall, flooding, drought stress, extreme heat, veld fires, lightning, hailstorms, strong winds, storm surges, coastal erosion and sea-level rise. These hazards are not experienced evenly across the municipality. Their impacts differ between rural traditional-authority areas, urban and peri-urban settlements, coastal settlements, industrial areas, agricultural landscapes, transport corridors and ecologically sensitive systems.

Mandeni is simultaneously coastal, industrial, agricultural, rural and urban, and its climate risk is produced by the interaction between hazards and pre-existing vulnerability. These vulnerabilities include poverty, unemployment, informal and traditional housing, weak water, sanitation and waste services, floodplain and wetland occupation, drainage and road constraints, ecosystem degradation, industrial and agricultural concentration, and uneven institutional capacity.

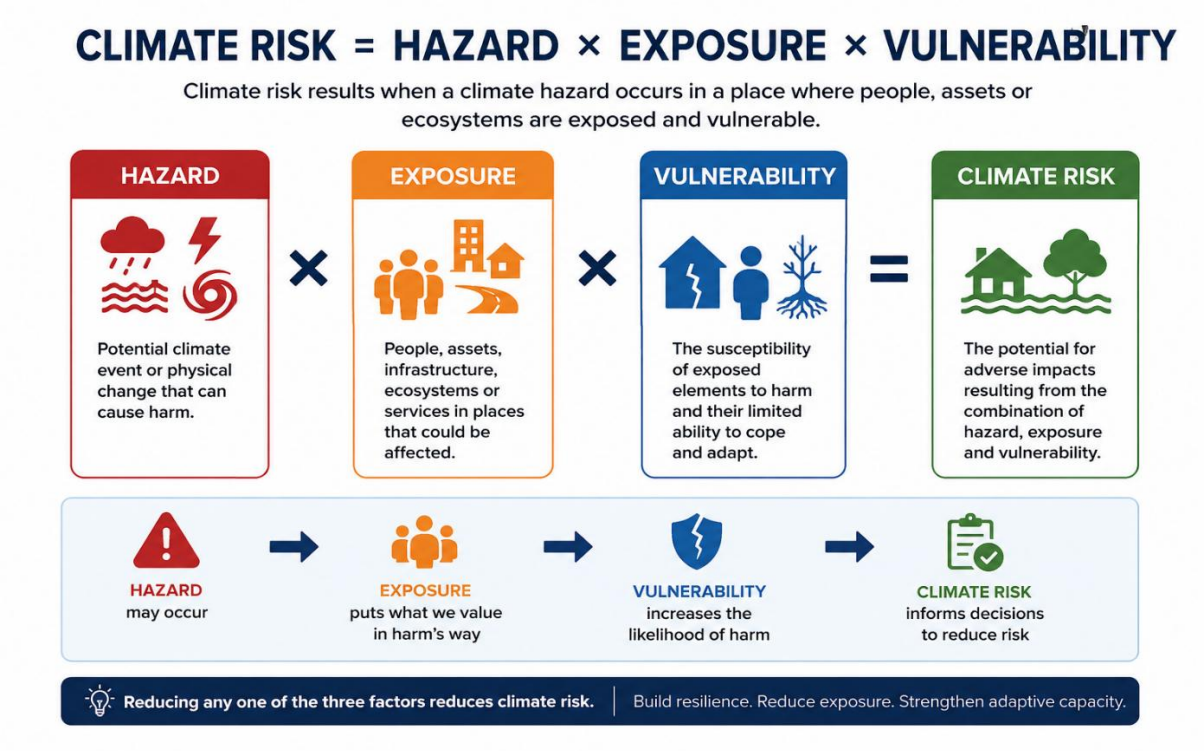

Figure 2: Climate Risk Framework

2.1.1 Climate hazards are intensifying existing development risks

Climate change is increasing the likelihood that existing risks will become more frequent, more intense or more costly. Heavy rainfall can overwhelm drainage systems, damage roads and bridges, flood low-lying settlements, mobilise waste and sewage, and increase erosion. Heat can affect public health, labour productivity, schools, clinics, informal dwellings and poorly-ventilated households. Drought can place pressure on water supply, agriculture, sanitation and vegetation, while coastal storms and sea-level rise can affect estuaries, coastal access and infrastructure. The nature and magnitude of change differ by hazard, scenario and location; the Strategy therefore uses local observations to identify current vulnerabilities and climate projections to guide longer-term preparedness.

The Climate Change Act, 2024 (Act No.22 of 2024) recognises that climate variability and increasing extreme weather events affect human health, access to food and water, biodiversity, ecosystems, the coast, coastal infrastructure and human settlements, and that climate impacts can undermine development goals. These risks are directly relevant to Mandeni's municipal mandate because they affect land-use management, disaster risk reduction, infrastructure planning, waste management, environmental management, human settlements, public facilities and local economic development.

2.1.2 Flooding, stormwater and drainage are immediate risks

Flooding is one of Mandeni's most immediate climate risks. Flooding is a priority because settlements, roads, culverts and public facilities may be exposed, while drainage and maintenance constraints can worsen impacts. Field observations recorded poor drainage and localised flooding concerns in Sundumbili, damaged infrastructure and waste near drainage routes. Homes near flood-prone corridors require exposure screening: property locations and the applicable floodline information must be checked before individual risk is assigned. Table 2 sets out these concerns and the asset inspections, incident records and hydraulic assessments needed to confirm site-level priorities.

Table 2: Flood-readiness evidence summary

Risk element	Examples / priority locations	Evidence and verification status	Proposed municipal response
Flood-prone roads and drainage lines	Sundumbili, Mandeni/Manda Farm areas, uThukela corridor and rural access routes	April 2026 drainage observations and municipal screening maps; exact locations and recurrence require incident/GIS verification	GIS register, pre-rainy-season clearing, culvert inspections and capital prioritisation
Culverts and bridges	Low-lying road crossings, bridge approaches and potentially blocked or undersized culverts	Screening concern; obtain asset condition, maintenance and hydraulic-capacity records	Condition assessments, blocked-culvert clearing and upgrade prioritisation
Public facilities and critical services	Halls, schools, clinics, depots, emergency-support facilities and access routes	Candidate facilities identified for screening; facility audits and incident histories to be compiled	Facility risk profiles, emergency-use designation and drainage/roof/access upgrades
Vulnerable settlements and households	Homes near flood-prone corridors and low-lying settlement	Ward and settlement screening indicates possible exposure;	Preparedness, drainage improvements,

Risk element	Examples / priority locations	Evidence and verification status	Proposed municipal response
	pockets; assess informal and traditional dwellings separately	verify property locations, floodlines and household conditions	upgrading support and relocation assessment only where risk is unacceptable
Waste-linked flooding	Dumping near drains, culverts, channels and watercourses	Observed waste near drainage and watercourses; verify dates, locations and recurrence in the waste/drainage register	Hotspot clean-ups, enforcement, skip/drop-off optimisation and community reporting

The Disaster Risk Management Sector Plan identifies flooding, lightning, fire, hailstorms and strong winds as priority hazards and includes municipal vulnerability mapping for each of these risks. This means the climate strategy must not treat flooding as a once-off disaster-response issue. It must treat flooding as a recurring planning, maintenance, infrastructure and land-use management challenge.

2.1.3 Rural and traditional-authority areas face high social vulnerability

Rural settlements can face long access routes, unreliable water and sanitation, constrained waste services and limited resources for recovery. These conditions can increase the consequences of drought, heat, storms, flooding, fire and road disruption. Traditional-authority tenure and rural location are not, by themselves, measures of household vulnerability. Targeting must consider actual service access, household circumstances and exposure, using historical ward-planning information as a starting point for local verification

The ward and traditional authority figure below help explain why vulnerability differs across the municipality and why rural settlements require a differentiated adaptation and service-delivery response. This context helps organise ward engagement, service planning and liaison with traditional leadership.

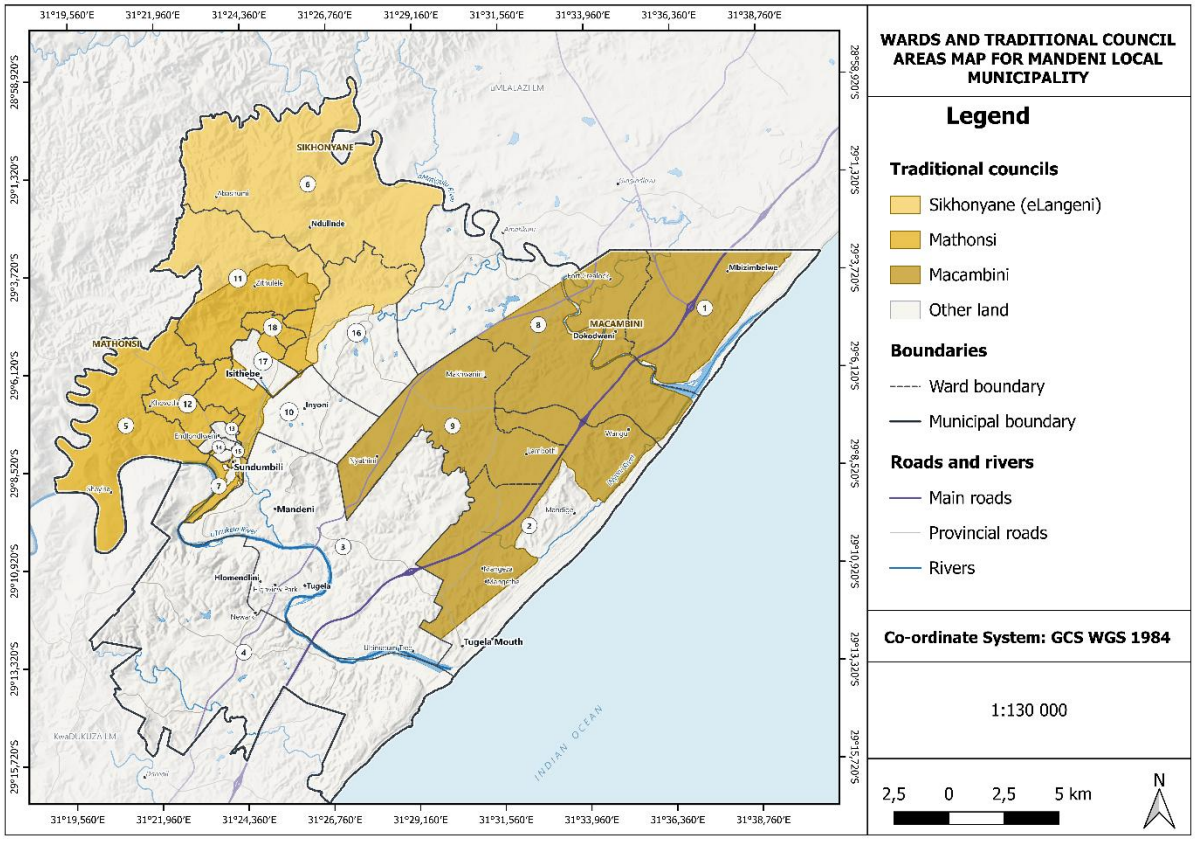

Figure 3: Mandeni wards and traditional-authority areas

Informal dwellings and traditional dwellings must be recorded as distinct categories when assessing settlement risk. In both categories, vulnerability depends on siting, construction and condition, ventilation, fire safety, service reliability and emergency access. This distinction allows heat, fire and flood measures to respond to the needs of each household and avoids treating traditional construction as inherently unsafe.

Historical ward-planning information records rural and agricultural areas under Macambini and Mathonsi traditional leadership, including settlements where infrastructure and access require attention. This provides planning context rather than a verified inventory of current household conditions. Ward boundaries, settlement locations, service access and the responsible traditional structures will be checked with municipal GIS, ward committees and traditional councils before household-level priorities are finalised.

This variation in exposure, services and recovery capacity requires a climate-justice response that directs support to households facing the greatest practical barriers to safety and recovery. Community validation will help identify those barriers and the measures that can address them.

2.1.4 Urban and peri-urban areas face concentrated infrastructure and service risks

Mandeni, Sundumbili, Manda Farm, Isithebe and surrounding peri-urban areas require coordinated attention to drainage, waste accumulation, settlement density, housing condition, heat exposure and public facilities. Historical ward-planning information also records formal and informal economic activity in these areas. The Strategy uses these locations to guide initial screening; current household and small, medium and micro enterprise (SMME) exposure must be verified before assigning property-level risk or setting numerical targets.

Urban and peri-urban risk is not only about the number of people exposed. It is also about the concentration of roads, electricity infrastructure, schools, clinics, municipal facilities, stormwater systems, waste services, SMMEs and households in areas where a single flood, storm, fire or heat event can disrupt multiple systems at once.

2.1.5 Coastal and estuarine systems are highly vulnerable

Mandeni's active beach-dune systems, estuarine functional zones, low-lying river-mouth areas and exposed coastal assets require priority attention. A mobile sandy shoreline, active dunes, estuarine processes, sensitive vegetation, shallow coastal groundwater and land-use pressures, including reported river-sand extraction, create pathways for erosion, flooding, storm impacts, salinity change, pollution and habitat loss. These are qualitative screening priorities rather than calibrated site-risk scores; site investigations and verified incident records must establish the conditions relevant to each decision (Qpoint Group, 2026a).

Screening should give particular attention to Tugela Mouth, Dokodweni, Mbizimbelwe and the aMatigulu/iNyoni system. The Land Use Management Scheme defines a coastal buffer zone extending 100 m from the high-water mark in Sections 4.6.4(ii)(b) and 9.7(iii). Its coastal development provisions also address the Coastal Management Programme and public access. Planning must apply the relevant scheme provisions and any applicable amendments alongside verified estuarine functional zones, flood-prone land, active dunes, wetlands and shoreline information. The buffer does not define the full climate-risk area or establish that land beyond it is safe for development.

2.1.6 Ecosystem degradation is increasing climate risk

Mandeni's rivers, wetlands, estuaries, dunes, grasslands, forests and biodiversity corridors provide ecological infrastructure that helps regulate runoff, maintain water quality, stabilise banks and reduce heat and coastal exposure. Their vegetation and soils also store carbon and can sequester additional carbon where ecological condition is maintained or restored, providing mitigation co-benefits alongside adaptation and biodiversity protection. Habitat transformation, settlement and infrastructure expansion, pollution, invasive alien plants, inappropriate fire management and climate stress can weaken these functions. The uThukela River corridor, threatened coastal grassland and the other ecosystems listed in Table 3 are therefore priorities for protection and further assessment. Restoring the appropriate natural habitat and maintaining ecological connectivity will support both communities and the wider catchment and coastal ecosystems.

Table 3: Priority restoration screening table for ecological infrastructure

Priority ecological-infrastructure area	Responsible partners	Expected risk-reduction benefits
Wetlands and riparian buffers	Environmental Management, DWS, EDTEA, iLembe DM, community groups	Flood attenuation, water-quality improvement, erosion control and drought resilience
uThukela River corridor and tributaries	Environmental Management, Technical Services, traditional authorities, landowners	Reduced erosion, sediment management, floodplain protection and watercourse health
Coastal dunes and estuarine vegetation	Environmental Management, EDTEA, DFFE, WILDTRUST, EAF	Storm-surge buffering, erosion reduction, habitat protection and coastal access resilience

Priority ecological-infrastructure area	Responsible partners	Expected risk-reduction benefits
Threatened coastal grassland and biodiversity corridors	Environmental Management, Ezemvelo, EDTEA, landowners, stewardship partners	Fire-risk management, biodiversity connectivity, carbon storage and livelihood support
Alien invasive and erosion hotspots	Environmental Management, EPWP/green jobs teams, community groups	Reduced water loss, reduced fire load, improved slope/riverbank stability and local employment

The iLembe Biodiversity Sector Plan identifies Critical Biodiversity Areas and Ecological Support Areas that should guide land-use planning, environmental assessment, natural-resource management, stewardship and invasive alien plant control (Ezemvelo KZN Wildlife, 2014). Municipal screening should use the best available biodiversity layers and confirm their date, scale and site relevance with Ezemvelo KZN Wildlife. This will help protect connected habitats and ecological processes while directing restoration to degraded areas. Indigenous grasslands, wetlands and other naturally open habitats should be restored according to their ecological character, so that greening and carbon objectives do not displace biodiversity or weaken water-resource functions.

2.1.7 Waste, pollution and air-quality pressures are climate-risk multipliers

Waste management is a climate-risk issue in Mandeni because waste blocks drainage, increases flood impacts, pollutes rivers and wetlands, contributes to health risks, and can increase emissions when waste is burned or poorly managed. The IWMP identifies illegal dumping, littering, by-law enforcement, waste collection, waste minimisation, recycling, transfer and disposal as key waste-management issues requiring ongoing planning and implementation.

Figure 4 show litter and discoloured water in a watercourse and waste beside a collection point. These conditions warrant investigation because heavy rainfall could mobilise waste, obstruct drainage and affect water quality and public health. Visual appearance alone does not establish contamination. Waste Management and Environmental Management will confirm observation dates, coordinates, wards and sources in the hotspot register, arrange testing where indicated, and use verified findings to target clean-ups, service improvements and follow-up inspections



Figure 4: Site observations informing watercourse and waste-risk management

Table 4: Waste and pollution maintenance checklist

Rainy-season waste/drainage maintenance item	Responsible lead	Minimum action before high-rainfall season
Update illegal dumping and watercourse-pollution hotspot map	Waste Management / Environmental Management	Verify hotspots, take photographs, record GPS points and assign clean-up/enforcement status
Clear drains, culverts and stormwater channels at priority hotspots	Technical Services / Waste Management	Inspect blocked points, remove waste and log maintenance date and follow-up needs
Check skips, drop-off points and high-use collection areas	Waste Management	Confirm capacity, collection frequency, signage and community reporting arrangements
Inspect polluted streams and sewage-risk areas	Environmental Management / iLembe DM	Log pollution source, health risk, required intervention and responsible authority
Public reporting and communication	Communications / ward committees	Issue reporting channels for blocked drains, dumping, burning and polluted watercourses

Air quality is also relevant. The KwaZulu-Natal Air Quality Management Plan identifies Mandeni among municipalities with a high probability of exposure to multiple air-pollution sources. It also highlights emissions from industry, vehicles, biomass burning, mines and quarries, waste burning, residential fuel burning and agriculture as important air-quality concerns.

2.1.8 The local economy is exposed to both physical and transition risks

Mandeni's economy depends on climate-sensitive and resource-dependent sectors, including manufacturing, agriculture, forestry, logistics, tourism, fishing, SMMEs and informal trade. The 2025 LED Strategy Review identifies manufacturing, tourism, commercial activity, agriculture, SMMEs, the informal sector and the green economy as key economic sectors.

Isithebe Industrial Estate, SAPPI Tugela Mill, sugarcane and forestry, the N2–R102–rail logistics system, informal businesses, and coastal tourism and fishing are priority economic systems for climate-risk management. Flooding, water stress, energy and transport disruption, and coastal hazards can interrupt these activities; regulatory change, emissions reporting requirements and changing markets create additional pressures. Table 5 identifies the information needed to quantify these risks and target a proportionate response.

Table 5: Economic quantification priorities for future updates

Economic system	Quantification to add where available	Likely disruption pathway
Isithebe Industrial Estate and SAPPI Tugela Mill	Jobs, firms, energy and water demand, production dependency, emissions and compliance data	Flood/water/energy disruption, emissions reporting, cleaner-production and transition pressures
Agriculture and forestry	Hectares, producers, crop/livestock value, irrigation dependence, fire and drought exposure	Drought stress, flood erosion, fire, pests and market/access disruption

Economic system	Quantification to add where available	Likely disruption pathway
N2/R102/rail logistics system	Traffic/freight volumes, critical links, bridge/culvert exposure and alternative routes	Road flooding, bridge damage, freight delays and emergency-access constraints
SMMEs and informal trade	Enterprise counts, trading locations, markets, public transport nodes and vulnerable business areas	Flooding, heat, power/water interruptions, transport disruption and loss of income
Coastal tourism and fishing	Tourism assets, public access points, livelihoods and exposed coastal infrastructure	Erosion, storm surge, access loss, estuary change and beach/dune instability

Mandeni therefore faces two forms of economic climate risk. Physical risk includes damage or disruption from floods, drought, storms, heat, coastal erosion and fire. Transition risk includes the possibility that industries, transport systems and municipal operations will face increasing pressure to reduce emissions, report carbon impacts, improve energy efficiency and comply with climate-related regulations.

2.1.9 Climate risks are being locked in through land-use and infrastructure decisions

Land-use decisions made now will shape Mandeni's climate risk for decades. Development in flood-prone areas, wetlands, estuarine functional zones, coastal erosion zones, steep or unstable areas, poorly serviced settlements and areas without adequate road access can create long-term exposure and future municipal liabilities.

The Land Use Management Scheme includes provisions relevant to climate risk, including management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, sea shore, dams, landfill sites, sewerage works, waterworks and traditional authority environmental areas. The climate strategy must strengthen the use of these tools so that climate-risk screening becomes a routine part of land-use applications, capital projects, housing projects, infrastructure design and municipal maintenance planning.

2.2 Consequences of failure

Failure to respond to climate change in Mandeni will have direct consequences for people, infrastructure, ecosystems, the local economy and municipal governance. These consequences will not occur in isolation. They will compound over time, with repeated shocks reducing household recovery capacity, increasing public costs and making future adaptation more difficult.

2.2.1 Increased risk to life, health and household safety

Without stronger climate adaptation, Mandeni residents face increasing risks from flooding, heat stress, lightning, fires, strong winds, hail, water contamination and coastal hazards. Children, older persons, people with disabilities and low-income households may require targeted support where exposure, health conditions, unsafe housing or unreliable services limit their ability to prepare and recover. Informal or traditional dwelling type alone does not establish household vulnerability; support must follow the verified needs and conditions described in Section 2.1.

The Climate Change Act recognises that climate variability and extreme events affect human health, food and water access, biodiversity, the coast and human settlements. In Mandeni, the

drainage constraints, potentially exposed housing and waste near watercourses described in Section 2.1 create practical priorities for investigation and prevention. Property locations, flood exposure and suspected pollution require verification and testing before site-specific conclusions are drawn.

2.2.2 Repeated damage to roads, drainage, bridges and public infrastructure

Failure to address drainage, stormwater and flood-risk management will lead to repeated damage to roads, bridges, culverts, public parks, fences, community facilities and municipal assets. Poorly maintained or undersized drainage systems can turn ordinary rainfall into local flooding, while extreme rainfall can cause more serious damage.

Mandeni needs a georeferenced flood, drainage, bridge and culvert register that links asset condition and maintenance needs to verified hazard and incident information, together with climate-risk screening for major capital projects and land-use decisions. Without this information, the municipality may continue repairing damaged infrastructure without reducing the underlying risk.

2.2.3 Higher disaster-response and recovery costs

If climate risks are not reduced proactively, municipal spending will increasingly shift toward emergency response, relief, repairs and recovery. This can crowd out planned development spending and weaken service delivery. The Disaster Management Emergency Relief Aid Policy already recognises the need to provide disaster relief for food, water, health, clothing, shelter, sanitation, hygiene, relief supplies and transparent distribution after incidents.

A strategy that only responds after disasters occur will be more expensive and less effective than one that reduces risk before disasters happen.

2.2.4 Worsening water security and sanitation risks

Drought, heat, infrastructure damage and water pollution can increase water insecurity, especially in rural and traditional-authority areas. Flooding can damage sanitation systems, spread sewage and contaminate rivers, wetlands and household environments. Strengthening rural water and sanitation resilience is therefore an immediate priority for reducing existing health and service risks while preparing for climate hazards.

Failure to act will increase health risks, service-delivery pressure and household vulnerability, particularly where communities rely on communal water points, tankers, boreholes, springs or other climate-sensitive sources.

2.2.5 Loss of ecological infrastructure and higher future risk

If wetlands, rivers, dunes, estuaries, grasslands, forests and biodiversity corridors continue to degrade, Mandeni will lose natural systems that currently reduce flood, drought, erosion, heat and coastal risk. Their condition and ecological connectivity are therefore essential considerations in municipal infrastructure, land-use and restoration decisions.

The consequence of ecological degradation is not only biodiversity loss. It also means higher flood peaks, greater erosion, more sedimentation, reduced water quality, weaker coastal protection, higher fire risk, lower tourism value and reduced resilience of agricultural landscapes.

2.2.6 Increased coastal and estuarine losses

Failure to manage coastal and estuarine risk will increase exposure to erosion, flooding, storm surge, sea-level rise, estuary-mouth movement, dune instability, salinity change and damage to coastal access and tourism assets. Mandeni's response is to keep hazardous areas free of new permanent development, maintain space for coastal systems to move, restore natural buffers and assess adaptation or relocation of existing assets where risk becomes unacceptable. Site investigations and the applicable controls will guide these decisions, as set out in Section 6.4.

If Mandeni fails to apply this approach, new development may be locked into areas where future protection, repair or relocation costs become unaffordable.

2.2.7 Disruption to jobs, livelihoods and the local economy

Climate impacts can disrupt Mandeni's major economic systems: manufacturing in Isithebe, SAPPI-related activity, sugarcane and forestry, transport along the N2/R102/rail system, SMMEs, informal trade, tourism and coastal livelihoods. Flooding can interrupt transport and supply chains; drought can affect agriculture and industrial water use; heat can affect labour productivity; coastal erosion can affect tourism and access; and stricter climate policy can affect high-emitting industries.

The LED Strategy Review identifies agriculture, manufacturing, tourism, SMMEs, informal trade and the green economy as central to local economic development. Failure to climate-proof these sectors will weaken job creation, investment confidence, household income and Mandeni's broader economic resilience.

2.2.8 Worsening waste, pollution and public-health impacts

Without stronger waste and pollution control, illegal dumping and waste burning will continue to block drainage systems, pollute rivers and wetlands, worsen flooding, create public-health risks and undermine environmental quality. The IWMP identifies waste collection, waste minimisation, recycling, disposal, illegal dumping, littering and by-law enforcement as core waste-management issues.

In a changing climate, waste and pollution pressures become more dangerous because heavy rainfall can move pollutants quickly into rivers, wetlands, estuaries and coastal waters.

2.2.9 Increased air-quality, emissions and transition risks

Failure to address emissions and air-quality risks could expose Mandeni to increasing health, regulatory and economic pressure. The KZN Air Quality Management Plan identifies Mandeni as having areas with high probability of exposure to multiple air pollution sources. The iLembe Air Quality Management Plan also includes greenhouse-gas emissions, industry, domestic fuel burning, vehicles, waste treatment and disposal, agriculture and biomass burning as relevant emission-source categories for the district.

Mandeni does not yet have a full municipal greenhouse-gas inventory. Failure to develop at least an emissions-screening approach will limit the municipality's ability to plan for cleaner energy, industrial transition, waste diversion, green-economy opportunities and climate-finance readiness.

2.2.10 Reduced access to funding and weaker statutory alignment

Climate finance and infrastructure funding increasingly require evidence of risk screening, resilience planning, environmental compliance, emissions reduction and measurable adaptation outcomes. Failure to mainstream climate change into the IDP, SDF, LUMS, SDBIP, disaster management, IWMP, human settlements, coastal management and LED planning could weaken Mandeni's ability to access future funding and partnerships.

Climate actions must therefore be integrated into these plans, estuary management planning and municipal budgets, linking risk reduction to project selection, funding and implementation.

2.3 Strategic implications for Mandeni

Figure 5 provides planning context for place-specific action. Site priorities require verified hazard layers, asset records and local assessment.

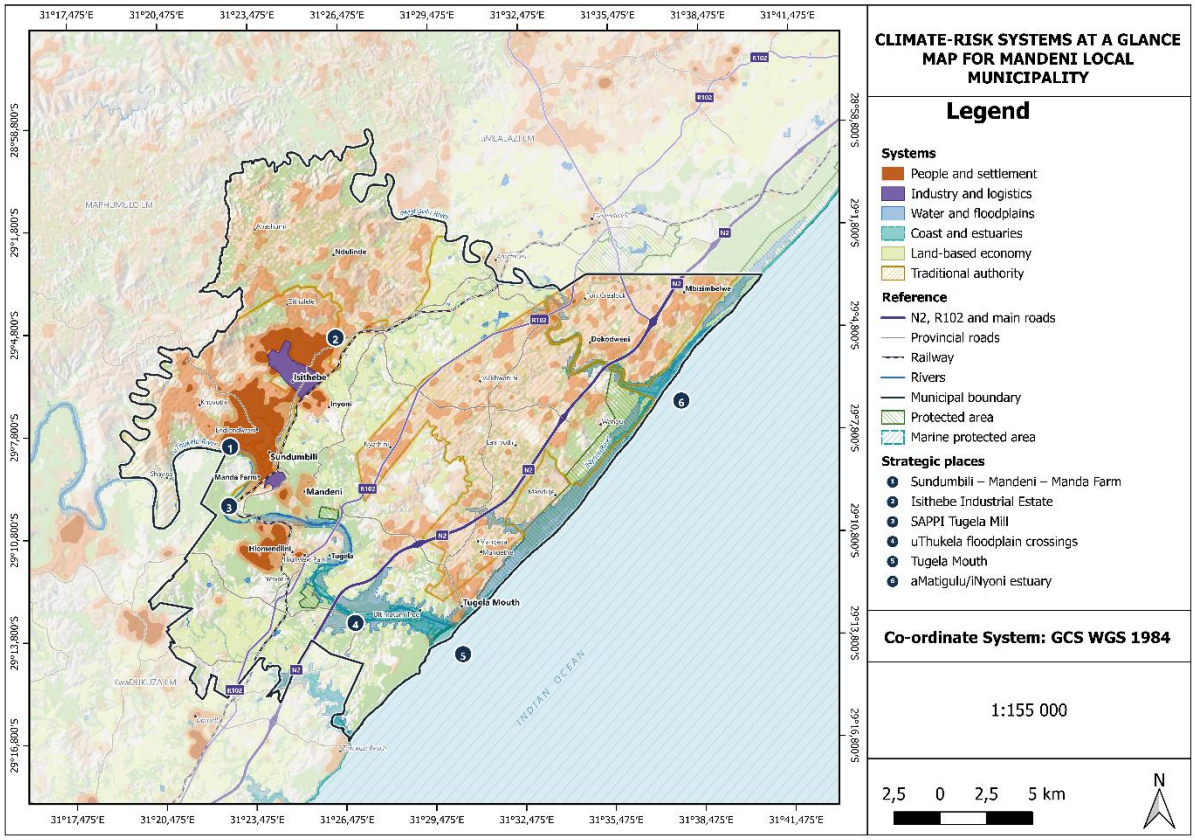

Figure 5: Mandeni climate-risk systems at a glance

The problem statement and consequences of failure point to five strategic implications for this Climate Change Strategy.

Table 6: Strategic implications

Strategic implication	Meaning for Mandeni
Climate change must be treated as a core municipal risk	It must be embedded in planning, budgeting, infrastructure, land use, disaster management, waste, economic development and environmental governance.

Strategic implication	Meaning for Mandeni
Adaptation must be place-based	Different wards and systems require different responses: coastal, rural, industrial, urban, agricultural and ecological areas cannot be treated the same.
No-regret actions must start immediately	Drainage maintenance, waste control, buffer enforcement, early warning, ecosystem restoration and climate-risk screening should not wait for perfect data.
Ecosystems must be managed as infrastructure	Rivers, wetlands, dunes, estuaries, forests, grasslands and biodiversity corridors must be protected and restored as part of disaster-risk reduction and water security.
Mitigation must begin with screening and practical opportunities	Mandeni should start with municipal energy use, waste, transport, industrial engagement, air-quality data, green economy opportunities and a phased greenhouse-gas inventory.

The key conclusion for Section 2 is that failure to act will make Mandeni's development challenges more severe, more expensive and harder to reverse. The municipality therefore requires a coordinated climate change strategy that reduces risk before disasters occur, guides climate-safe development, protects vulnerable communities, strengthens ecological infrastructure, supports a resilient local economy and builds institutional capacity for long-term implementation.

3 Framing the Strategy

This section organises Section 3 around five elements: the local climate context, greenhouse-gas emissions, commitments to addressing climate change, the evidence base, and implementation challenges.

For Mandeni, this framing must be adapted to the municipality's own character. Mandeni is not a large metropolitan municipality with a comprehensive municipal greenhouse-gas inventory and extensive in-house technical modelling capacity. It is a coastal, industrial, agricultural, rural and urban municipality that must respond to climate change through a practical, integrated and phased approach. The strategy therefore gives priority to risk reduction, service-delivery resilience, climate-safe spatial planning, ecological infrastructure, community protection, green economic opportunities and a phased emissions-screening process.

3.1 Mandeni's climate context

Mandeni lies on the KwaZulu-Natal north coast within iLembe District Municipality, adjoining KwaDukuza, Maphumulo and uMlalazi local municipalities and the Indian Ocean. Its climate context is shaped by the interaction between hazards and existing development vulnerabilities, including processes extending beyond municipal boundaries. Rainfall, runoff, pollution and sediment movement in the wider uThukela catchment can affect downstream flood risk, water quality, the estuary and adjacent coastal and marine ecosystems. Shared transport routes and economic corridors can also transmit disruption between municipalities. The Strategy therefore connects local action with catchment, coastal and marine coordination while addressing extreme rainfall, flooding, drought, heat, veld fires, lightning, hailstorms, strong winds, coastal storms, storm surge, shoreline erosion and sea-level rise within Mandeni.

Mandeni's climate context combines current exposure to heavy rainfall, flooding, heat, drought, fire and coastal hazards with future changes assessed through climate models. GreenBook provides planning-scale projections, including simulations at approximately 8 km resolution under Representative Concentration Pathways RCP4.5 and RCP8.5; its core heat products compare a 1961-1990 baseline with 2021-2050 conditions (Engelbrecht, 2019). Each extract must retain its own reference period, future period, scenario, statistic and units. These model outputs guide preparedness and investment; they are not measured 2026 conditions or predictions of individual local disasters.

Risks differ with the location of people, assets and ecosystems and their sensitivity and capacity to respond. Poverty, unreliable services, drainage constraints, exposed transport links, ecosystem degradation and economic dependence on water, energy and access can increase the consequences of a climate hazard. Informal and traditional dwellings require separate assessment of their condition and siting. The Strategy therefore considers household and service conditions, economic dependencies, ecosystems, physical infrastructure and coastal processes together to guide a differentiated response, using the evidence and validation rules in Section 3.4.

Mandeni's climate context can be understood through the following place-based risk systems.

Table 7: Climate-risk systems

Climate-risk system	Main locations and systems	Strategic implication
Rural and traditional-authority climate vulnerability	Rural and traditional-authority wards, including Macambini, Mathonsi and Sikhonyane areas	Climate action must address water access, sanitation, refuse services, access roads, early warning, fire/lightning preparedness, livelihood protection and traditional-authority coordination.
Urban and peri-urban settlement risk	Mandeni, Sundumbili, Manda Farm, Hlomendlini, Isithebe-linked settlements and vulnerable urban pockets	Climate action must address stormwater, drainage, solid waste, informal housing, heat, public facilities and emergency access.
Industrial and economic concentration risk	Isithebe Industrial Estate, SAPPI Tugela Mill, logistics routes, SMMEs and suppliers	Climate action must address business continuity, air and water quality, energy security, emissions screening, cleaner production and transition risk.
River, wetland and floodplain risk	uThukela River, Mandeni Stream, wetlands, tributaries, culverts, bridges and flood-prone roads	Climate action must treat ecological infrastructure, drainage maintenance and watercourse protection as disaster-risk-reduction measures.
Coastal and estuarine risk	Tugela Mouth, Dokodweni, Mbizimbelwe, aMatigulu/iNyoni estuary system and active dune/beach systems	Climate action must protect coastal buffers, avoid new permanent development in high-risk areas, restore dunes and estuaries, and update coastal hazard and asset data.

The place-based risks in Table 7 translate into practical priorities: a georeferenced flood, drainage, bridge and culvert register; a waste and watercourse-pollution hotspot programme; updated floodline and coastal-management controls; protection and restoration of wetlands, rivers, dunes and estuaries; rural water and sanitation resilience; critical-facility and business-continuity planning; fire, lightning, wind and hail preparedness; industrial air, water, energy and emissions screening; and climate-risk screening for major capital projects and land-use decisions. These priorities will be implemented subject to the proportionate assessment and authorisation requirements in Section 4.2.8.

Mandeni's rivers, wetlands, dunes, estuaries and connected habitats support water regulation, erosion control and resilience. Coastal, riparian and wetland systems are therefore priority areas for ecological screening and restoration. This prioritisation reflects the ecological functions and pressures described in Section 2.1.6; it does not establish the condition of an individual site or the benefits achievable through a particular restoration project. Those decisions require assessment of ecological condition, exposure and appropriate restoration measures.

Coastal planning must also allow for erosion, inundation, estuary processes and the movement of dunes and shorelines. The Strategy accordingly prioritises protection of natural buffers, space for coastal systems to adjust, and assessment of exposed access routes and assets. Decisions on development controls, protective works or relocation require the current statutory instruments, verified hazard information and site-specific assessment described in Section 6.4.

3.2 Mandeni's greenhouse-gas emissions

Mandeni does not yet have a complete municipal or community-scale greenhouse-gas emissions inventory. Available screening identifies emissions-relevant activities and data

requirements, including electricity and fuel use, waste, transport, industry, agriculture and land-use change, but does not establish verified annual emissions totals or an emissions baseline. Table 8 sets out the proposed inventory boundary, contributors and phased method needed to fill this gap.

Table 8: Proposed greenhouse-gas inventory boundary and method

Inventory component	Initial boundary / method	Data owner or contributor	Baseline approach
Phase 1: municipal operations	Municipal buildings, public lighting, fleet, generators, depots and facilities; use electricity bills and fuel records	Finance, Technical Services, facility managers	Compile 2026/27 or first complete financial-year baseline
Phase 2: municipal services and waste	Waste, wastewater, organic waste, waste burning and transfer/disposal data	Waste Management, iLembe DM, Environmental Management	Use tonnages, collection records and waste/wastewater operational data
Phase 3: community-scale screening	Transport, industry, agriculture, forestry, biomass burning and land-use change	LED, industry, EDTEA, iLembe DM, agriculture partners	Screen sources before full inventory; confirm data availability and boundaries
Method alignment	Use a transparent inventory method aligned where feasible with GPC/ICLEI municipal inventory guidance	Environmental Management / appointed technical support	Document assumptions, data gaps and emission factors for auditability

For this reason, this strategy does not set a quantified carbon-neutrality target at this stage. Instead, it adopts a phased emissions-screening approach**.** The first phase should identify the main sources of emissions under municipal control and within the broader Mandeni economy, while the second phase should develop a more complete greenhouse-gas inventory once electricity, fuel, waste, transport, industrial and land-use data are available. The priority emissions-screening categories for Mandeni are:

Table 9: Priority emissions-screening categories

Emissions area	Why it matters for Mandeni	Initial data required
Municipal electricity use	Municipal buildings, streetlights, pumps, depots and facilities depend on electricity and may offer energy-efficiency opportunities.	Electricity bills, meter data, facility list and streetlight records.
Municipal fuel use	Fleet, plant, generators and emergency operations produce direct emissions and are exposed to fuel-price risks.	Fleet list, fuel purchases, generator use and plant/equipment records.
Industrial energy and process emissions	Isithebe Industrial Estate and SAPPI Tugela Mill are central to jobs and economic activity but may face air-quality, water, energy and transition risks.	Industrial energy, emissions, water-use and compliance data where available.
Transport and logistics	The N2, R102, P415, P459, rail and local road network support workers, freight, farms, tourism and emergency access.	Traffic data, municipal fleet data, freight routes and public-transport information.
Waste and wastewater	Waste disposal, waste burning, illegal dumping, landfill or transfer operations, organic waste and wastewater can contribute to emissions and public-health risk.	Waste tonnages, landfill/transfer data, illegal dumping data, wastewater treatment data and organic-waste estimates.

Emissions area	Why it matters for Mandeni	Initial data required
Agriculture, forestry and biomass burning	Sugarcane, forestry, veld fires and biomass burning affect air quality, livelihoods, soil condition and greenhouse-gas emissions.	Agricultural land-use data, fire/burning records, forestry and sugarcane information.
Ecosystems and land use	Wetlands, dunes, forests, grasslands and estuaries can store carbon and provide adaptation benefits when protected.	Land-cover change, wetland condition, alien invasive clearing and restoration data.

The district and provincial air-quality plans already identify several relevant emissions and air-quality source categories, including industry, vehicles, agriculture, biomass burning, residential fuel use, waste burning, mines and quarries, waste treatment and disposal, and greenhouse gases. The KwaZulu-Natal Air Quality Management Plan also places Mandeni among areas with a high probability of exposure to multiple air-pollution sources.

Mandeni's economy includes Isithebe Industrial Estate, SAPPI Tugela Mill, agriculture and forestry, retail and services, informal enterprises, logistics and coastal activities. Water scarcity and electricity costs can affect operating resilience, while carbon reporting, stricter emissions standards, waste obligations, customer procurement standards and reputational pressures create transition risks. Cleaner production, energy efficiency, renewable energy, water reuse, industrial symbiosis, skills and supplier development can therefore strengthen economic resilience as well as reduce emissions.

The strategy therefore frames mitigation in Mandeni as a practical municipal and local-economic-development agenda. It should begin with data collection, energy efficiency, waste diversion, cleaner production partnerships, air-quality integration, fleet and facility improvements, and protection of carbon-storing ecosystems. A full greenhouse-gas inventory should be prepared as an early implementation action.

3.3 Mandeni's commitments to addressing climate change

Mandeni's climate change response is framed by national, provincial, district and municipal commitments.

At national level, the Climate Change Act, 2024 (Act No. 22 of 2024) establishes the framework for an effective climate change response and a long-term just transition to a low-carbon and climate-resilient economy and society. Proclamation 251 of 2025 brought the Act into operation on 17 March 2025, except for sections 12(6), 13(1), 13(2), 13(3)(b), 14(3)(a), 15(5), 15(6), 17, 18, 19, 20, 21, 22, 25(4)(c), 26(2)–(6), 27, 28 and 30(2)(a)–(b). Section 7 requires relevant organs of state to review, revise, coordinate and harmonise their policies, measures, programmes and decisions to account for climate risks and vulnerabilities. Section 9 provides for each district intergovernmental forum to serve as a Municipal Forum on Climate Change. These commenced provisions support Mandeni's policy integration and participation in district coordination. The municipality's legal register must be checked before adoption and during annual review for any further commencement notices, regulations or guidance affecting implementation.

Mandeni is a local municipality. Section 17's formal climate change needs and response assessment and climate change response implementation plan duties, when operative, are assigned to the relevant MEC and the mayor of a metropolitan or district municipality. Once adopted by Council, this Strategy will provide Mandeni's local implementation framework and evidence contribution to iLembe District Municipality's Municipal Forum on Climate Change and district climate planning. Mandeni will implement actions within its own mandate,

coordinate shared priorities with iLembe, and seek the necessary support and decisions from provincial and national departments, traditional authorities, business and civil society. Its internal Climate Change Steering Committee will support this work without assuming the statutory role of the district forum. Mandeni's commitments under this Strategy are therefore as follows:

- **Climate-risk mainstreaming**: Integrate climate risk into the IDP, SDF, LUMS, SDBIP, Disaster Risk Management planning, IWMP, Human Settlements planning, Coastal Management Programme, Estuary Management Plan, LED Strategy and capital project screening.
- **Adaptation-first implementation**: Prioritise no-regret actions that reduce immediate risk to people, infrastructure, livelihoods and ecosystems.
- **Phased mitigation**: Start with emissions screening, municipal energy efficiency, fleet and facility data, waste diversion, industrial engagement and a future greenhouse-gas inventory.
- **Climate justice and inclusion**: Prioritise vulnerable households, rural and traditional-authority areas, informal settlements, floodline households and communities with weak service access.
- **Ecological infrastructure protection**: Protect and restore rivers, wetlands, dunes, estuaries, grasslands, forests, biodiversity corridors and protected areas as part of risk reduction.
- **Climate-safe spatial development**: Avoid new development in known hazard areas and strengthen floodline, coastal, wetland, estuary and environmental buffer controls.
- **Green and resilient local economy**: Support cleaner production, resource efficiency, climate-smart agriculture, resilient tourism, SMMEs, local green jobs and business continuity.
- **Monitoring and accountability**: Establish indicators, annual reporting, departmental responsibilities and a review cycle aligned to municipal planning and budgeting.

Table 10: Governance responsibility

Institution / partner	Primary climate role in this strategy	Examples of responsibility
Mandeni Local Municipality	Local implementation and mainstreaming within municipal operational control	IDP/SDF/LUMS integration, local roads and stormwater, waste, local DRM, facilities, LED and local environmental management
iLembe District Municipality	District coordination and district functions	Water and sanitation, district air quality, district climate forum, district planning and regional disaster coordination
Provincial departments	Sector support, oversight and technical alignment	Coastal governance, disaster support, roads, housing, agriculture, health, education and environmental authorisations
National departments	National policy, legislation, funding and technical standards	Climate Change Act implementation, DFFE support, DWS water regulation, national disaster and sector guidance
Traditional authorities	Local land-governance and community implementation partners	Rural land-use coordination, settlement risk avoidance, buffer awareness and local reporting

Institution / partner	Primary climate role in this strategy	Examples of responsibility
Business, industry and civil society	Implementation partners and data contributors	Cleaner production, business continuity, emissions/water/waste data, restoration, skills and green jobs

These commitments also align with the iLembe District Development Model One Plan, which frames iLembe's long-term vision around a sustainable, diverse and growing economic hub that provides social well-being and equity of access, and which recognises sustainable development, renewable energy, responsible infrastructure, green initiatives and multi-stakeholder collaboration as important long-term development considerations.

3.4 Evidence base

The Strategy combines municipal and sector planning information, field observations and spatial screening evidence to explain risks and guide action. The findings presented in Sections 2 and 3 cover drainage constraints, waste near watercourses, potentially exposed settlements and coastal assets, service and access limitations, ecosystem pressures and economic dependencies. The maps locate administrative areas, water systems, flood-screening areas, biodiversity priorities, settlements, transport and facilities. Table 11 records the evidence sources and their role. Published planning information, dated observations, modelled hazards and matters requiring local validation remain distinct; departmental and community checks will update this evidence through implementation and monitoring.

Table 11: Evidence base

Evidence category	Key documents and data used	Role in this strategy
Climate risk and vulnerability evidence	Climate Risk and Vulnerability Assessment Report and site visit field notes	Drainage constraints, waste near watercourses, potentially exposed settlements and coastal assets guide initial action; site-level validation remains necessary.
Municipal planning instruments	Mandeni IDP 2025/26 Review; SDF 2025/26 Review; Spatial Development Plan; Land Use Management Scheme	Provides the municipal development, spatial, land-use and implementation framework into which climate action must be mainstreamed.
Disaster risk management evidence	Disaster Risk Management Sector Plan 2025/26; Disaster Risk Management Plan; Disaster Management Policy Framework; Summer Contingency Plan; Emergency Relief Aid Policy; hazard maps	Provides hazard and preparedness context. Recent incident/fire/relief records and current summer/winter arrangements must be consolidated for local validation.
Environmental and biodiversity evidence	iLembe Biodiversity Sector Plan; Greening Plan; Protected Areas, Wetlands, Biodiversity Corridors and FSCP maps	Provides the ecological infrastructure, biodiversity priority areas and restoration context.
Coastal and estuarine evidence	Mandeni Coastal Management Programme; aMatigulu/iNyoni Estuary Management Plan; coastal process screening; uThukela MPA ecosystem-based adaptation material	Informs coastal, estuarine, dune, shoreline, access and ecosystem-based adaptation priorities. Use EMP technical information for screening while

Evidence category	Key documents and data used	Role in this strategy
		its version and statutory approval are reconciled under Section 6.4; apply relevant legislation and adopted controls.
Waste and pollution evidence	Integrated Waste Management Plan; communal skip map; field notes; illegal dumping evidence	Provides waste-service, illegal dumping, waste minimisation, enforcement and waste-climate linkages.
Economic and air-quality evidence	LED Strategy Review 2025; LED Implementation Plan; iLembe AQMP; KZN AQMP; Isithebe/SAPPI-related evidence	Provides economic-risk, transition-risk, industrial, air-quality, agriculture, tourism, logistics and green-economy context.
Human settlements and infrastructure evidence	Human Settlements Sector Plan; housing project maps; water infrastructure maps; transport infrastructure maps	Provides settlement, housing, service-access and infrastructure exposure context.
Ward-based evidence	Ward-Based Plans for Wards 1–18 and ward-level hazard maps	Provides dated structural and service-access context; current demographics, boundaries and household exposure require verification.

The strategy uses this evidence with the following interpretation rules:

- Recent municipal planning documents, especially the IDP, SDF, Disaster Risk Management Sector Plan and 2026 vulnerability evidence, are treated as the most current strategic sources. Older documents such as the 2013 Coastal Management Programme, 2014 Biodiversity Sector Plan, 2021 IWMP and 2022 LUMS remain important, but their spatial and technical details should be verified before being used for site-level decisions.
- Ward-based planning information is used to identify structural vulnerability, not exact current household totals. The 2026 evidence synthesis notes that most demographic and service figures in the Ward-Based Plans are derived from Census 2011 and contain some inconsistencies, so they should be interpreted as evidence of persistent vulnerability rather than precise 2026 conditions.
- The evidence base is sufficient to act, but not sufficient to replace technical studies. The 2026 evidence synthesis states that it does not replace engineering design, verified floodline or coastal-process modelling, environmental authorisation, laboratory water-quality results, cadastral verification or a greenhouse-gas inventory.
- Field notes and uploaded maps are used as practical evidence of active risk pathways. The 24 April 2026 site evidence records dumping despite signage and skips, tyres, rubble and potentially hazardous containers, polluted watercourses, sewage near streams, disturbed wetland margins, flooding linked to poor drainage, houses on recognised floodlines, industrial air and water concerns, exposed coastal tree roots, shoreline erosion, and property or infrastructure close to dynamic estuary and beach systems.

3.5 Challenges for the implementation of this strategy

Several challenges may affect implementation of this strategy. The City of Cape Town strategy recognises that climate strategy implementation can be constrained by municipal finances, partial mandates, dependence on national systems, high upfront adaptation costs, climate

uncertainty and the risk of maladaptation. These challenges are also relevant to Mandeni, but they appear in a different local form.

For Mandeni, the main implementation challenges are as follows:

Table 12: Implementation challenges

Implementation challenge	Mandeni-specific issue	Strategy response
Limited municipal resources	Climate action must compete with urgent service-delivery, maintenance and infrastructure needs.	Focus first on no-regret actions that also improve basic services, such as drainage maintenance, waste control, road access, early warning and ecological restoration.
Fragmented mandates	Water, sanitation, roads, electricity, disaster response, traditional-authority land, industry and coastal governance involve multiple institutions.	Establish clear governance arrangements, departmental responsibilities and partnerships with iLembe District, provincial departments, traditional authorities, business and communities.
Data gaps	Mandeni lacks a full greenhouse-gas inventory, detailed floodline data, updated coastal hazard lines, verified exposed-asset registers and complete drainage/culvert inventories.	Create a phased climate data-improvement programme; apply Section 4.2.8 to identify actions that can proceed and studies required before site decisions.
Spatial enforcement and land governance	Development pressure, traditional-authority areas, floodline occupation, coastal buffers, wetlands and estuarine functional zones require careful governance.	Use the SDF, LUMS, coastal controls, floodline screening and traditional-authority engagement to prevent new risk from being locked in.
Maintenance backlogs	Blocked drains, poor stormwater management, damaged roads, illegal dumping and vulnerable public assets increase climate risk.	Link climate action directly to routine maintenance, asset management, ward-based reporting and capital project prioritisation.
Socio-economic vulnerability	Poverty, unreliable services and unsafe or exposed housing can reduce recovery capacity; rural location or dwelling type alone does not determine household vulnerability.	Target early warning, social support, relief planning, resilient housing, water and sanitation resilience, and inclusive communication to vulnerable groups.
Industrial and economic transition risk	Isithebe, SAPPI, logistics, agriculture and SMMEs may face physical climate disruption and future carbon, air-quality and resource-efficiency pressures.	Promote cleaner production, energy efficiency, water reuse, business-continuity planning, green jobs and industrial emissions screening.
Ecosystem degradation	Wetland, river, dune, estuary and grassland degradation reduces Mandeni's natural climate buffers.	Treat ecological infrastructure as municipal risk-reduction infrastructure and prioritise protection, restoration and alien invasive clearing.
Institutional capacity	Stakeholder comments on earlier climate work called for stronger implementation focus, clearer accountability, better emissions screening and integration into budgets and municipal planning cycles.	Assign departmental leads, establish a monitoring framework, align actions with the SDBIP and budget cycle, and build internal climate capacity.
Public awareness and behaviour change	Illegal dumping, waste burning, settlement in hazard-prone areas, fire risk and poor reporting of hazards require behavioural and governance responses.	Implement ward-based awareness, school and community programmes, clear reporting channels, by-law enforcement and partnerships with councillors and traditional leaders.

The key implementation principle is that Mandeni should not wait for a perfect dataset before acting. The evidence already supports drainage maintenance, waste control, buffer enforcement, early warning, ecosystem restoration, critical-service protection and prevention of new development in known hazard areas. New studies should refine, cost and prioritise actions, not delay them.

3.6 Strategic framing conclusion

This strategy is framed as an adaptation-led, mitigation-aware and development-integrated climate strategy.

For Mandeni, this means:

1. Adaptation is the immediate priority because flooding, drainage failure, coastal risk, drought, heat, fire, lightning, hail, wind, waste, water pollution and vulnerable settlements already affect communities and municipal systems.
2. Mitigation must begin with emissions screening because Mandeni does not yet have a complete greenhouse-gas inventory, but it already has clear emissions-relevant systems: municipal energy use, transport, waste, industry, agriculture, biomass burning and land-use change.
3. Climate change must be mainstreamed into municipal planning and budgeting because the most important decisions are already being made through the IDP, SDF, LUMS, Disaster Management Sector Plan, IWMP, Human Settlements Sector Plan, LED Strategy, Coastal Management Programme, Estuary Management Plan and capital project pipeline.
4. Ecological infrastructure must be protected as municipal infrastructure because rivers, wetlands, dunes, estuaries, grasslands, forests, protected areas and biodiversity corridors reduce climate risk and support water security, livelihoods and disaster resilience.
5. Implementation must be phased, accountable and partnership-based because Mandeni cannot address climate change through one department or one project. The strategy must be implemented through municipal departments, iLembe District Municipality, provincial and national departments, traditional authorities, communities, industry, civil society and environmental partners.

4 Vision, Principles and Desired Outcomes

This section sets out the climate change vision, supporting principles and long-term desired outcomes that guide the pathways, work areas and implementation programme. The vision is framed around a climate-resilient, resource-efficient and progressively low-carbon municipality, supported by resilience, economic inclusion, environmental sustainability, health and well-being, and coordinated implementation.

Mandeni's climate vision must respond to its combined coastal, industrial, agricultural, rural and urban risk profile. It must also align with the municipality's long-term IDP vision: "To be reliable, people-centred and sustainable economic hub by 2030."

Because Mandeni does not yet have a full greenhouse-gas inventory, this strategy does not adopt a quantified carbon-neutrality target at this stage. Instead, it uses the wording "progressively low-carbon" and requires emissions screening, municipal energy and fuel data collection, industrial engagement and a future greenhouse-gas inventory as part of implementation. A quantified emissions baseline and targets will follow the collection and quality checking of activity data and the preparation of that inventory.

4.1 Vision

Mandeni Local Municipality becomes a climate-resilient, resource-efficient and progressively low-carbon coastal-industrial-rural municipality that protects vulnerable communities, strengthens ecological infrastructure, supports inclusive livelihoods and enables safe, sustainable development across all wards.

Table 13: Measurable outcomes to support the vision

Outcome area	By 2030	By 2035
Governance and evidence	Climate Change Steering Committee active; climate action/evidence register and GIS risk layers established	Registers institutionalised and updated annually through IDP/SDBIP cycles
Flood, drainage and waste hotspots	Flood/drainage/culvert register completed; priority waste and watercourse hotspots mapped and reduced	Priority hotspots show measurable reduction in recurrence, clean-up costs or incident severity
Facilities and infrastructure	Priority municipal facilities and major capital projects climate-screened	Climate-resilient upgrades implemented for highest-risk facilities and critical routes
Ecological infrastructure	Priority restoration sites for wetlands, rivers, dunes and estuaries identified and project pipeline packaged	Selected restoration projects implemented and monitored with partners
Mitigation readiness	Municipal electricity and fuel baseline completed; emissions-screening template populated annually	Full GHG inventory completed or underway; target-setting considered once data quality is adequate
Public accountability	Annual Climate Change Implementation Report and dashboard prepared	Five-year strategy review completed and used to update actions and funding pipeline

This climate vision extends the municipality's IDP vision by placing climate resilience, environmental sustainability, disaster-risk reduction, spatial justice and low-carbon development at the centre of Mandeni's future growth path. It recognises that Mandeni's

development future depends on protecting people, infrastructure, ecosystems and livelihoods from increasing climate shocks and stresses, while still enabling economic growth, service delivery and investment.

The vision is also aligned with the Climate Change Act, 2024, which frames South Africa's climate response around an effective climate change response and a long-term just transition to a low-carbon and climate-resilient economy and society. For Mandeni, this means climate action must be practical, fair, locally implementable and connected to the municipality's development mandate.

4.2 Principles

The following principles will guide the interpretation and implementation of this strategy. They should be applied to all climate-related decisions, including planning, budgeting, land-use management, infrastructure design, maintenance, disaster risk reduction, coastal management, waste management, human settlements, local economic development and environmental management.

4.2.1 Resilience

Mandeni will work to ensure that municipal decisions, plans, projects and investments progressively strengthen the ability of communities, infrastructure, ecosystems and the local economy to prepare for, withstand, respond to and recover from climate shocks and stresses.

This principle requires the municipality to reduce vulnerability before disasters occur. Blocked drainage, disrupted road access and interruptions to water, sanitation and public facilities can turn a weather event into a wider health, livelihood and service-delivery emergency (Qpoint Group, 2026a). Early warning, preparedness, drainage maintenance, road and bridge protection, reliable rural services and community recovery planning must therefore begin where the required work is sufficiently understood, while technical investigations resolve the remaining site and design questions.

4.2.2 Climate justice and economic inclusiveness

Mandeni will prioritise climate actions that reduce risk for vulnerable households and communities, especially those affected by poverty, unemployment, weak services, traditional or informal housing, poor water and sanitation access, floodline exposure and limited recovery capacity.

Climate action must also support inclusive local economic development. This means protecting and strengthening livelihoods in agriculture, forestry, manufacturing, tourism, logistics, SMMEs, informal trade and coastal livelihoods. It also means ensuring that green economy opportunities, cleaner production, ecosystem restoration, waste diversion, skills development and climate-resilient infrastructure create benefits for local communities.

4.2.3 Embedded sustainability and ecological infrastructure

Mandeni will treat rivers, wetlands, estuaries, dunes, grasslands, forests, biodiversity corridors, protected areas and coastal systems as ecological infrastructure that supports municipal resilience.

The SDF links sustainable human settlements with a functioning environment, protection of Critical Biodiversity Areas and Ecological Support Areas, and resilience of life and property to

climate hazards. In Mandeni, coastal sand and dune systems, estuaries, wetlands, riparian areas, the uThukela River corridor and threatened coastal grassland provide habitats and natural functions that can moderate runoff, erosion, heat and coastal exposure (Qpoint Group, 2026a). Local condition, ecological function and exposure must be assessed before assigning a site-risk rating or selecting works, so that protection and restoration strengthen the appropriate flood, drought and coastal-resilience functions.

4.2.4 Resource efficiency and progressively low-carbon development

Mandeni will work towards a more resource-efficient and progressively low-carbon development pathway. This will begin with practical actions within municipal control, including energy efficiency in municipal facilities, improved fleet and fuel data, waste minimisation, recycling, organic-waste diversion, cleaner procurement, emissions screening, and partnerships with major industries and businesses.

For the wider municipality, this principle supports cleaner production in Isithebe, engagement with SAPPI and other large energy or emissions users, improved waste and air-quality management, support for renewable-energy and efficiency opportunities, and future development of a greenhouse-gas inventory.

4.2.5 Health, safety and well-being

Mandeni will ensure that climate action protects and improves human health, safety and well-being. This includes reducing risk from flooding, heat, fire, lightning, hail, strong winds, polluted watercourses, illegal dumping, waste burning, sewage exposure, air pollution and coastal hazards.

This principle links climate change to public health, disaster management, community safety, environmental management, housing quality, water and sanitation, school and clinic safety, emergency access and social protection. It also supports climate-sensitive awareness programmes in schools, wards, traditional-authority areas, informal settlements, public facilities and business areas.

4.2.6 Spatial resilience and risk avoidance

Mandeni will avoid creating new climate risk through land-use, housing, infrastructure and capital-investment decisions. Development should be directed away from flood-prone areas, wetlands, estuarine functional zones, active dunes, erosion-prone shorelines, unstable slopes, unserviced areas and other known hazard zones. Proposed adaptation works must also be assessed for maladaptation: measures that reduce risk at one site may increase flooding or erosion upstream, downstream or along the coast, damage protective ecosystems, or shift costs and exposure to vulnerable communities. Project appraisal must compare feasible locations and designs, including avoidance and ecosystem-based options, and record how transferred and residual risks will be managed.

The Land Use Management Scheme, SDF, Coastal Management Programme and disaster-risk information must be used together to screen development applications and municipal projects, supported by the Estuary Management Plan's technical information and approval checks described in Section 6.4. Coastal screening must account for present and projected sea-level rise, storm surge, wave exposure and erosion over a period appropriate to the proposed development's lifespan. These processes can affect low-lying river-mouth areas, active dunes and assets close to the shore or estuary margins, requiring avoidance of new permanent development in confirmed hazardous areas, space for coastal adjustment,

restoration of natural buffers and assessment of adaptation or relocation where existing risk becomes unacceptable. Applicable setbacks and buffers provide planning controls; a location outside a mapped buffer must still be assessed where climate or site evidence indicates risk.

4.2.7 Collaboration and integration

Mandeni will implement climate action through partnerships and integrated governance. Climate change cannot be addressed by one department or one sphere of government. It requires cooperation between Mandeni Local Municipality, iLembe District Municipality, provincial and national departments, traditional authorities, communities, business, farmers, civil society, research institutions, environmental organisations and neighbouring municipalities.

This principle is especially important because Mandeni's climate risks cut across mandates. Water and sanitation are district functions, many rural and coastal areas involve traditional-authority land governance, coastal and estuarine systems require provincial and national alignment, and industrial transition requires cooperation with business and regulators.

4.2.8 Evidence-based and no-regret action

Mandeni will use the best available evidence to guide decisions, while recognising that some actions can begin before every data gap is resolved. The Strategy will therefore use a no-regret approach where available evidence supports actions that reduce risk, improve services, protect ecosystems and benefit communities under a range of plausible climate conditions. The scale and type of assessment must remain proportionate to the intervention. Drainage or river works, coastal protection structures and other measures that could alter water flows, sediment movement or ecosystems require appropriate technical assessment and the applicable environmental, water-use and other authorisations before implementation.

Priority actions include routine drainage maintenance, waste control, early warning, critical-service preparedness, enforcement of applicable development controls and carefully designed ecosystem restoration. Removing confirmed obstructions, improving warnings and preparing essential services can reduce identifiable pressures while wider datasets are being completed. Implementation must still establish the location, method and responsible authority. Where an intervention's safety or ecological effects remain uncertain, the immediate action is to obtain the necessary assessment and design, while continuing preparedness and other measures that can safely proceed.

4.2.9 Good governance, accountability and transparency

Mandeni will ensure that climate action is supported by clear institutional responsibilities, measurable targets, transparent reporting, community participation and integration into municipal planning and budgeting.

Table 14: Public accountability mechanism

Accountability output	Timing	Audience / approval route
Quarterly climate action progress update	Quarterly, aligned to departmental reporting	MANCO and relevant portfolio committee
Mid-year implementation review	Biannually, before adjustments and IDP/budget review inputs	Municipal Manager, departments and Finance
Annual Climate Change Implementation Report	Annually, after departmental year-end inputs and before the IDP review is finalised	Council, portfolio committee, iLembe district climate forum and public summary

Accountability output	Timing	Audience / approval route
Public dashboard / summary	Annually after Council noting of the implementation report	Councillors, communities, business, traditional authorities and implementation partners
Five-year strategy review	Every five years or earlier after major events or new statutory requirements	Council approval and public participation as required

This principle requires climate actions to be linked to the IDP, SDBIP, budget, departmental plans, disaster management plans, SDF, LUMS, IWMP, Human Settlements Sector Plan, LED Strategy, Coastal Management Programme and Estuary Management Plan. It also requires annual reporting, periodic review and clear accountability for implementation.

4.3 Long-term desired outcomes

The following long-term desired outcomes describe the future Mandeni is working towards through this Climate Change Strategy. They provide the bridge between the vision and the strategic focus areas that follow in Section 6.

4.3.1 Climate change is mainstreamed into municipal decision-making

All major municipal policies, plans, programmes, projects, budgets and land-use decisions must incorporate climate change considerations. To give this outcome a consistent decision process, Mandeni will adopt and apply a formal climate-risk screening tool to capital and infrastructure projects, housing proposals, land-use applications, coastal development, public facilities and service-delivery planning. The screening record will identify the site and design life, current and future hazards, exposed people and assets, social and ecological vulnerability, service capacity, feasible alternatives and residual risk. It will specify whether the proposal may proceed with conditions, needs specialist investigation or redesign, or should avoid the location. Planning and the responsible project department will retain the record with the application or project approval documents, as detailed in Section 6.6.1.

4.3.2 Climate change is treated as a shared municipal and community risk

Climate change is understood as a shared risk across Mandeni's residents, traditional authorities, businesses, farms, industries, community organisations, schools, clinics, municipal departments and government partners. Climate information is accessible, ward-based awareness is strengthened, and communities know how to report hazards, prepare for events and participate in local resilience-building.

4.3.3 Vulnerable households and communities are better protected

Households in rural and traditional-authority areas, informal settlements, floodline locations, poorly serviced areas and climate-exposed coastal or peri-urban areas have improved access to early warning, relief support, safe shelter options, water and sanitation resilience, waste services, emergency access and post-disaster recovery support.

4.3.4 Flood, stormwater and drainage risks are reduced

Mandeni has a maintained, georeferenced and prioritised register of stormwater drains, culverts, bridges, flood-prone roads, damaged infrastructure, vulnerable households and critical facilities. Flood-prone areas are progressively addressed through maintenance,

upgrades, ecological restoration, enforcement against dumping, land-use controls and community reporting.

4.3.5 Water security and sanitation resilience are strengthened

Rural and urban communities have improved resilience to drought, water-supply disruptions, water pollution and sanitation failures. Mandeni works with iLembe District Municipality and other partners to protect water sources, reduce contamination, improve rural water reliability, protect sanitation infrastructure from flooding, and ensure that water and sanitation planning responds to climate risk.

4.3.6 Coastal and estuarine systems are protected and managed for long-term resilience

Tugela Mouth, Dokodweni, Mbizimbelwe, the aMatigulu/iNyoni system and other coastal and estuarine areas are managed through risk-based planning, coastal buffer enforcement, dune and estuary restoration, updated coastal hazard information, protection of public access, and avoidance of new permanent development in high-risk coastal and estuarine zones.

4.3.7 Ecological infrastructure is protected, restored and connected

Mandeni's rivers, wetlands, dunes, estuaries, grasslands, forests, biodiversity corridors, Critical Biodiversity Areas, Ecological Support Areas and protected areas are protected and restored as part of municipal resilience. Ecological infrastructure is incorporated into the SDF, LUMS, disaster risk reduction, capital investment, maintenance planning and community-based environmental programmes.

4.3.8 Human settlements and public facilities are climate-resilient

Housing projects, informal-settlement upgrading, public buildings, schools, clinics, community halls, sports facilities and emergency shelters are planned, designed, located and maintained with climate risks in mind. New settlements avoid known hazard areas and existing vulnerable settlements are progressively supported through upgrading, drainage, safe access, greening, awareness and risk-reduction measures.

4.3.9 Mandeni's economy is more resilient and more resource-efficient

Isithebe Industrial Estate, SAPPI Tugela Mill, agriculture, forestry, logistics, tourism, SMMEs, informal trade and coastal livelihoods are better prepared for climate shocks and transition risks. Businesses are supported to improve energy efficiency, water efficiency, waste reduction, business continuity, cleaner production, local procurement, green skills and climate-finance readiness.

4.3.10 Municipal operations lead by example

Mandeni's own facilities, fleet, public lighting, parks, depots, community facilities, procurement, waste systems and maintenance programmes progressively demonstrate climate-responsive practice. The municipality improves energy and fuel data collection, reduces avoidable resource use, introduces efficiency measures, and uses public projects to create local green jobs where possible.

4.3.11 Waste, pollution and air-quality risks are reduced

Illegal dumping, littering, waste burning, blocked drains, polluted streams and poorly managed waste hotspots are reduced through improved collection, enforcement, skip placement, recycling, waste minimisation, public awareness and maintenance budgeting. Waste management is treated as a climate-risk-reduction function because waste can worsen flooding, water pollution, public-health risks and emissions.

4.3.12 Climate governance is funded, monitored and reviewed

The Climate Change Strategy is supported by a practical action plan, assigned responsibilities, timeframes, indicators, budget links and reporting mechanisms. Implementation is reviewed annually through municipal performance and planning systems, and the strategy is updated periodically as climate science, municipal data, funding opportunities and local conditions change.

4.4 Summary of strategic intent

The vision, principles and desired outcomes establish the strategic intent of the Mandeni Climate Change Strategy. They confirm that Mandeni's response should be:

- Adaptation-led, because flooding, coastal risk, heat, drought, fire, lightning, hail, wind, water insecurity, waste and vulnerable settlements are already affecting the municipality.
- Mitigation-aware, because Mandeni must begin emissions screening and resource-efficiency work even before a full greenhouse-gas inventory is available.
- Development-integrated, because climate action must strengthen the IDP, SDF, LUMS, SDBIP, disaster management, waste management, human settlements, coastal management, estuary management and local economic development.
- Justice-focused, because climate impacts fall hardest on communities with the least capacity to prepare, respond and recover.
- Implementation-oriented, because existing evidence is already sufficient to begin no-regret action while further studies refine, cost and prioritise longer-term interventions.

5 Pathways, Work Areas and a Framework for Action

This section translates Mandeni Local Municipality's climate vision, principles and desired outcomes into an implementation framework. Pathways provide the high-level direction of travel, strategic focus areas and cross-cutting work areas organise the work, and a framework for action identifies the types of actions required to implement the strategy.

For Mandeni, this framework must be practical, place-based and implementation-oriented. Coastal settlements, industrial centres, agricultural land and rural and urban communities face different combinations of hazards and service needs. Poverty, unemployment, unreliable water, sanitation and waste services, unsafe or exposed housing, occupation of floodplains or wetlands, ecosystem degradation and constrained institutional capacity can increase losses and slow recovery; industrial and agricultural disruption can also affect wider employment and supply chains. The strategy therefore requires coordinated action across municipal planning, disaster risk reduction, infrastructure, land use, waste, environmental management, human settlements, local economic development and governance, with current site and household conditions used to set priorities.

5.1 Overview

The purpose of this section is to show how Mandeni will move from strategy to implementation. The strategy uses four connected layers:

- Vision, principles and desired outcomes: define what Mandeni wants to become and what long-term outcomes the municipality is working towards.
- Pathways: provide the high-level transition routes required to reach the vision.
- Strategic focus areas and cross-cutting work areas: organise the municipality's climate work into practical areas for implementation.
- Framework for action: identifies the types of actions, institutional entry points and implementation tools required to deliver the strategy.

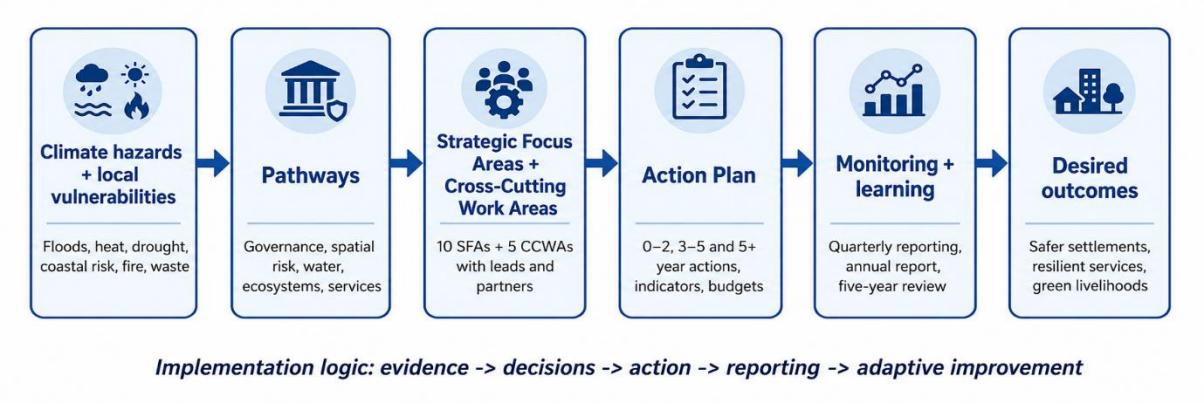

Figure 6: Strategy logic for implementing Mandeni's Climate Change Strategy

Pathways provide a conceptual roadmap; strategic focus areas and cross-cutting work areas organise the work; and the framework for action identifies different types of actions needed to implement the goals. For Mandeni, this approach is adapted to a smaller local municipality with constrained resources, strong rural and traditional-authority dimensions, significant coastal and ecological assets, key industrial and agricultural nodes, and a need to mainstream climate action through existing municipal systems.

Mandeni will begin with actions that address identifiable pressures: clearing confirmed drainage obstructions, controlling waste, enforcing applicable buffers, improving warnings, preparing critical services and preventing new exposure in known hazard areas. Ecosystem restoration and works that alter drainage, river or coastal processes must follow the proportionate assessment and approval requirements in Section 4.2.8. Completing wider datasets will improve targeting and design without preventing preparedness and maintenance that can safely proceed.

5.2 Pathways to delivering on the vision, principles and desired outcomes

The following pathways provide the long-term direction for Mandeni's climate response. They are not individual projects. They are transition routes that guide the strategic focus areas, cross-cutting work areas and action plan.

Table 15: Implementation crosswalk to reduce complexity

Pathway	Primary Strategic Focus Area link	Main enabling Cross-Cutting Work Area
Leadership, governance and institutional coordination	All SFAs	CCWA 1 and CCWA 3
Climate-safe spatial development and resilient settlements	SFA 1, SFA 6, SFA 8	CCWA 1 and CCWA 5
High-value ecosystems and ecological infrastructure	SFA 3, SFA 4, SFA 10	CCWA 5
Risk reduction, preparedness and anticipatory action	SFA 3, SFA 5, SFA 8, SFA 9	CCWA 4
Municipal operations and public infrastructure	SFA 8, SFA 10	CCWA 1 and CCWA 3
Water, sanitation and service-delivery resilience	SFA 2, SFA 3, SFA 6	CCWA 5
Coastal, estuarine and marine ecosystem resilience	SFA 4, SFA 9	CCWA 1 and CCWA 5
Inclusive green economy, livelihoods and local value chains	SFA 7, SFA 9, SFA 10	CCWA 2 and CCWA 3
Emissions screening and resource efficiency	SFA 7, SFA 8, SFA 10	CCWA 1 and CCWA 3
Communication and public participation	All SFAs	CCWA 4

5.2.1 Pathway 1: Leadership, governance and institutional coordination

Mandeni will exercise climate leadership through coordinated municipal governance, clear institutional responsibilities, climate-responsive planning, data management, public participation and partnerships. Climate change must be embedded into the work of Council, the Municipal Manager, senior management, Disaster Management, Environmental Management, Planning, Technical Services, Community Services, Human Settlements, Waste Management, Local Economic Development, Finance and Communications.

This pathway requires climate change to be mainstreamed into the IDP, SDF, LUMS, SDBIP, Disaster Risk Management Sector Plan, IWMP, Human Settlements Sector Plan, Coastal Management Programme, Estuary Management Plan and LED Strategy. Departments will translate the relevant actions into spatial controls, maintenance programmes, project briefs, service standards, budgets and performance indicators within these instruments, coordinating responsibilities where a hazard or service disruption crosses departmental boundaries.

5.2.2 Pathway 2: Climate-safe spatial development and resilient settlements

Mandeni will reduce future climate risk by ensuring that land-use, housing, infrastructure and capital-investment decisions do not create new exposure. This means preventing new development in flood-prone areas, wetlands, estuarine functional zones, active dunes, erosion-prone shorelines, unstable slopes, unserviced areas and other known hazard zones.

The SDF is intended to guide orderly and desirable spatial development, including analysis of environmental, agricultural, infrastructure, tourism and social constraints and opportunities. The Land Use Management Scheme also provides important tools for climate-responsive development control, including management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, sea shore, dams, landfill sites, sewerage works, waterworks and traditional authority environmental areas.

5.2.3 Pathway 3: High-value ecosystems and ecological infrastructure

Mandeni will protect, restore and manage ecological infrastructure as part of its climate response. Rivers, wetlands, estuaries, dunes, grasslands, forests, biodiversity corridors and protected areas must be treated as infrastructure because they reduce flood, drought, erosion, heat and coastal risks.

Coastal sand and dune systems, estuaries, wetlands, riparian areas, the uThukela River corridor and threatened coastal grassland require attention because their vegetation, soils and physical structure help regulate water, sediment and habitat connections; degradation can weaken these functions and increase exposure elsewhere in the catchment or along the coast. Their local condition and risk-reduction functions will guide restoration design and monitoring. The SDF's biophysical framework also recognises Critical Biodiversity Areas, Ecological Support Areas, estuaries, threatened ecosystems and protected areas as important spatial-planning considerations.

5.2.4 Pathway 4: Risk reduction, preparedness and anticipatory action

Mandeni will shift from a mainly reactive disaster-response approach to a stronger risk-reduction and preparedness approach. This means identifying hazards and vulnerable areas before events occur, maintaining drainage and access routes, improving early warning, strengthening public awareness, mapping vulnerable households and facilities, and preparing for flooding, lightning, fire, hailstorms and strong winds.

The Disaster Risk Management Sector Plan identifies flooding, lightning, fire, hailstorms and strong winds as priority hazards, and includes vulnerability maps for these risks. The Disaster Risk Management Plan also states that Council should establish a mechanism for assessing all current and future development projects in terms of their disaster risk.

5.2.5 Pathway 5: Leading by example in municipal operations and public infrastructure

Mandeni will use its own buildings, facilities, public spaces, fleet, waste systems, stormwater systems, roads, depots, halls, parks, public lighting and procurement to demonstrate climate-responsive practice. This includes improving municipal energy and fuel data, reducing avoidable resource use, strengthening asset maintenance, screening capital projects for climate risk, and progressively upgrading public infrastructure to withstand climate hazards.

A georeferenced register will connect each flood, drainage, bridge and culvert concern to its location, affected asset, observed condition, incident history, responsible authority and

required follow-up. This will allow maintenance and capital proposals to be prioritised on a consistent basis. Every major capital project and land-use decision will also undergo climate-risk screening, with unresolved hazard or design questions referred for the necessary investigation.

5.2.6 Pathway 6: Water, sanitation and service-delivery resilience

Mandeni will work with iLembe District Municipality and relevant partners to strengthen resilience in water, sanitation and related services. Although water and sanitation functions are district responsibilities, Mandeni's climate resilience depends on reliable water access, protected watercourses, resilient sanitation infrastructure, pollution control and drought-readiness, especially in rural and traditional-authority areas.

Households and facilities using communal points, springs, streams, boreholes, tanks or tankered water need dependable supply and water-quality checks because drought can reduce availability and flooding can disrupt access or spread contamination. Sanitation failures and waste near drainage routes can compound these pressures. Rural service verification, emergency water planning and pollution control will therefore proceed together with protection of wetlands, rivers, dunes and estuaries, with priorities based on current reliability and exposure.

5.2.7 Pathway 7: Coastal, estuarine and marine ecosystem resilience

Mandeni will manage coastal and estuarine risk through coastal buffers, setback controls, estuary protection, dune restoration, public-access management, updated hazard information and avoidance of new permanent development in high-risk areas. Current and projected sea-level rise, storm surge, wave exposure and erosion must inform coastal screening over time horizons suited to the lifespan of proposed assets. As verified information becomes available, Planning will use the applicable SDF and LUMS review procedures to update risk overlays and development controls. Applications must address the relevant coastal and estuarine risks, including effects on neighbouring areas and natural buffers, before a development decision is made. These measures will recognise the connections between the uThukela River, its estuary and the uThukela Marine Protected Area, where catchment condition influences marine biodiversity and fisheries that support coastal livelihoods. Cooperation with conservation authorities, neighbouring municipalities, fishing communities and the uThukela MPA ecosystem-based adaptation partners will connect land-based pollution prevention and habitat restoration with coastal and marine resilience (Wildtrust, 2022).

Active beach-dune systems, estuarine functional zones, low-lying river-mouth areas and nearby assets need early site assessment because storm surge, high river flows, shoreline change and estuary-mouth movement can interact to affect flooding, erosion and access (Qpoint Group, 2026a). Site-specific assessment must determine the relevant hazards and residual risk. The response is to keep confirmed hazardous areas free of new permanent development, maintain space for coastal systems to move, restore natural buffers and assess adaptation or relocation of existing assets where risk becomes unacceptable.

5.2.8 Pathway 8: Inclusive green economy, livelihoods and local value chains

Mandeni will use climate action to support local livelihoods, job creation and economic resilience. This includes climate-smart agriculture, resilient tourism, waste recovery and recycling, alien invasive clearing, ecosystem restoration, green SMME opportunities, cleaner production, local maintenance work, public employment, skills development and support to vulnerable informal and small businesses.

The LED Strategy Review identifies manufacturing, tourism, commercial activity, agriculture, SMMEs, informal trading and the green economy as key economic sectors. Climate action must therefore be linked to Mandeni's economic strategy, rather than treated only as an environmental compliance issue.

5.2.9 Pathway 9: Emissions screening, cleaner production and resource efficiency

Mandeni will begin mitigation through a phased, practical emissions-screening approach. The municipality does not yet have a full greenhouse-gas inventory, and the vulnerability evidence confirms that the current evidence synthesis does not replace a greenhouse-gas inventory, so it must establish source coverage, activity data and calculation methods before adopting a quantified municipal emissions baseline or reduction target.

This pathway therefore starts with available and obtainable data: municipal electricity use, municipal fuel use, waste and wastewater data, transport and fleet information, industrial energy and emissions data where available, and agricultural or biomass-burning information. It also supports cleaner production in Isithebe, engagement with SAPPI and other major industries, municipal energy efficiency, waste diversion, air-quality integration and future preparation of a greenhouse-gas inventory.

5.2.10 Pathway 10: Climate-responsive choices, communication and public participation

Mandeni will promote climate-responsive behaviour by residents, businesses, schools, traditional authorities, councillors, ward committees, municipal staff and community organisations. This includes awareness on illegal dumping, waste burning, fire risk, lightning safety, flood preparedness, heat-health risks, water conservation, protection of wetlands and rivers, coastal safety and reporting of blocked drains or damaged infrastructure.

This pathway draws on the emphasis on climate-responsive individual and institutional choices in the City of Cape Town Climate Change Strategy (City of Cape Town, 2021). In Mandeni, municipal services and community participation must work together to reduce dumping, keep drainage clear, improve waste management, report hazards promptly and support safer settlement decisions. Municipal departments, households, businesses, schools and community organisations each have practical roles in reducing these risks, supported by accessible information and reliable services.

5.3 Mechanisms for action: Strategic focus areas and cross-cutting work areas

The pathways above will be implemented through Strategic Focus Areas and Cross-Cutting Work Areas. Strategic focus areas group the main adaptation and mitigation work, while cross-cutting work areas provide the enabling governance, finance, communication, knowledge and health systems needed for implementation.

For Mandeni, the Strategic Focus Areas respond to the local climate-risk profile. Areas 1–5 focus mainly on adaptation. Area 6 connects spatial inclusion with adaptation and mitigation; Area 7 links lower-carbon energy and industry with economic resilience; Area 8 combines asset resilience and resource efficiency; Area 9 connects reliable access with a lower-carbon transition; and Area 10 combines waste-related emissions reduction, adaptation and public health. These links are reflected in the overview in Section 6 and the action plan in Section 8.

5.3.1 Strategic focus areas

Table 16: Strategic focus areas

No.	Mandeni Strategic Focus Area	Main purpose
SFA 1	Heat, public health and climate-responsive settlements	Reduce heat, health and settlement vulnerability, especially in vulnerable communities, schools, clinics, informal/traditional dwellings and dense urban areas.
SFA 2	Water security and drought-readiness	Strengthen water resilience, rural water security, water conservation, source protection and coordination with iLembe District Municipality.
SFA 3	Flood-readiness, stormwater and resilient drainage	Reduce flooding through drainage maintenance, stormwater upgrades, floodline management, culvert/bridge mapping, road protection and waste control.
SFA 4	Coastal, estuarine and dune resilience	Protect Tugela Mouth, Dokodweni, Mbizimbelwe, aMatigulu/iNyoni, dunes, estuaries, coastal access and dynamic coastal systems.
SFA 5	Fire, lightning, wind and hail risk management	Strengthen preparedness for fire, lightning, strong winds and hail, especially in rural, agricultural, traditional-authority and exposed settlement areas.
SFA 6	Spatial and resource inclusivity	Ensure climate-safe land use, equitable service access, resilient human settlements, traditional-authority coordination and protection of vulnerable households.
SFA 7	Low-carbon energy, industry and green economic development	Support energy efficiency, cleaner production, emissions screening, industrial resilience, green SMMEs and local green jobs.
SFA 8	Climate-resilient municipal buildings, public facilities and infrastructure	Improve resilience of municipal buildings, halls, clinics, schools, roads, bridges, depots, public facilities and emergency-support infrastructure.
SFA 9	Mobility, access and livelihoods	Protect transport corridors, rural access roads, evacuation routes, bridges, public transport, logistics, tourism access and livelihood routes.
SFA 10	Circular waste economy and pollution reduction	Reduce illegal dumping, blocked drains, waste burning, organic waste, litter, polluted watercourses and emissions from poor waste management.

These focus areas connect the main pathways through which climate hazards can disrupt Mandeni's services and livelihoods: flooding and drainage failure, waste-related blockage and pollution, unreliable water and sanitation, damage to critical facilities, fire and severe-weather impacts, and coastal and ecosystem change. Mapping assets and incidents, maintaining services, applying lawful development controls, restoring appropriate habitats and screening industrial and capital-project risks translate those pathways into action.

5.3.2 Cross-cutting work areas

The cross-cutting work areas are the enabling systems that support all ten strategic focus areas.

Table 17: Cross-cutting work areas

No.	Mandeni Cross-Cutting Work Area	Main purpose
CCWA 1	Mainstreaming, governance, research and knowledge management	Embed climate change into municipal systems, improve data, maintain evidence registers, support GIS mapping and clarify institutional responsibilities.
CCWA 2	Economic impacts, livelihoods and green economy opportunities	Link climate action to jobs, livelihoods, SMMEs, agriculture, tourism, industry, informal trade and green-economy opportunities.

No.	Mandeni Cross-Cutting Work Area	Main purpose
CCWA 3	Business models, municipal finance and climate funding	Identify funding sources, budget entry points, grant opportunities, partnerships and cost-saving climate investments.
CCWA 4	Communication, collaboration, public participation and skills development	Support public awareness, ward-level engagement, traditional-authority engagement, municipal training and climate communication.
CCWA 5	Human health, ecosystem health and environmental justice	Link public health, pollution reduction, ecosystem restoration, vulnerable-group protection and environmental justice.

For Mandeni, these cross-cutting work areas are essential because climate action requires coordination across departments, spheres of government, traditional authorities, communities, business and civil society.

5.4 Framework for action

The framework for action defines how Mandeni will turn the pathways and work areas into implementable actions. It provides the bridge between this strategy and the Climate Change Action Plan in Section 8. This section defines the implementation logic, while Section 8 provides the detailed action table.

5.4.1 Action types

Each action in the Mandeni Climate Change Action Plan should be classified according to one or more of the following action types.

Table 18: Action types

Action type	Meaning for Mandeni	Examples
Governance and institutional action	Actions that clarify responsibility, coordination, reporting and accountability.	Climate steering committee, departmental climate roles, IDP/SDBIP reporting.
Policy, planning and regulatory action	Actions that change how land use, development, infrastructure and services are planned or approved.	Climate-risk screening for land-use applications, floodline controls, coastal buffer enforcement.
Data, mapping and decision-support action	Actions that improve evidence, GIS layers and risk registers.	Drainage register, flood-prone household register, coastal exposed-asset register, emissions-screening database.
Infrastructure and asset-resilience action	Actions that protect, upgrade, maintain or redesign infrastructure.	Culvert upgrades, road drainage, facility retrofits, resilient public buildings, stormwater maintenance.
Ecosystem-based adaptation action	Actions that use nature-based systems to reduce climate risk.	Wetland restoration, dune rehabilitation, river buffers, alien clearing, estuary protection.
Maintenance and service-delivery action	Actions that reduce climate risk through routine municipal service improvements.	Clearing drains, removing illegal dumps, maintaining skips, repairing roads, clearing blocked watercourses.
Communication and behaviour-change action	Actions that change public, institutional or business behaviour.	Waste awareness, flood warning messages, lightning safety campaigns, school climate education.

Action type	Meaning for Mandeni	Examples
Training and skills-development action	Actions that build capacity of officials, communities and partners.	Training planners on climate-risk screening, disaster volunteer training, green skills programmes.
Partnership and funding action	Actions that mobilise external support, finance or co-implementation.	Partnerships with iLembe, EDTEA, COGTA, traditional authorities, SAPPI, Isithebe, WILDTRUST and NGOs.
Economic and livelihood-support action	Actions that create green jobs, protect livelihoods or support climate-resilient enterprises.	Recycling cooperatives, restoration teams, climate-smart agriculture, green SMME support.
Preparedness, response and recovery action	Actions that improve disaster readiness and post-event recovery.	Early warning, emergency shelters, relief planning, evacuation routes, post-event damage assessment.

5.4.2 Action sequencing

Mandeni's climate actions should be sequenced into three implementation horizons.

Table 19: Action sequencing

Timeframe	Description	Priority action emphasis
Immediate: 0–2 years	No-regret and enabling actions that can begin using existing evidence and municipal systems.	Drainage and culvert mapping, waste hotspot response, early warning, climate-risk screening, vulnerable-household registers, awareness, departmental coordination and emissions data collection.
Medium term: 3–5 years	Actions requiring technical studies, budgeting, project design, partnerships or capital planning.	Stormwater upgrades, public-facility retrofits, ecological restoration projects, coastal hazard updates, floodline refinement, green-economy projects, industrial cleaner-production partnerships.
Long term: 5+ years	Structural and transformational actions requiring sustained investment, governance and behavioural change.	Settlement relocation or redesign where unavoidable, long-term coastal adaptation, climate-resilient infrastructure networks, low-carbon industrial transition, large-scale restoration and resource-efficient municipal systems.

Preparedness, routine maintenance and waste control should begin where the need, location and safe method are established. Technical studies will refine priorities, costs and designs, and must precede interventions whose effects on water flows, sediment, ecosystems or public safety remain uncertain, as set out in Section 4.2.8.

5.4.3 Institutional entry points

Climate action should be implemented through existing municipal and intergovernmental systems. The following entry points should be used:

Table 20: Institutional entry points

Entry point	Climate-change role
IDP	Include climate priorities, indicators and projects in the five-year municipal development agenda.
SDBIP and departmental plans	Convert strategy actions into annual departmental deliverables and performance indicators.
Budget and capital project pipeline	Screen capital projects for climate risk and identify funding for priority adaptation and mitigation actions.

Entry point	Climate-change role
SDF	Direct development away from high-risk and environmentally sensitive areas and protect ecological infrastructure.
LUMS	Apply enforceable development controls through overlays, buffers, floodline areas, coastal zones and environmental zones.
Disaster Risk Management Sector Plan	Integrate climate hazards into preparedness, early warning, response and risk-reduction planning.
IWMP	Link waste minimisation, illegal dumping control, recycling, waste burning prevention and pollution reduction to climate resilience.
Human Settlements Sector Plan	Ensure that housing projects, informal settlement upgrading and relocation decisions are climate-risk screened.
Coastal Management Programme and estuary management planning	Guide coastal protection, access, restoration and risk reduction through applicable controls. Use EMP technical information for screening and confirm its version and statutory approval before relying on proposed measures as binding controls.
LED Strategy	Link green economy, resilient livelihoods, cleaner production and climate-smart economic development.
Ward-Based Plans and ward committees	Localise climate risks, reporting, awareness and community-level implementation.

Each lead department will use these planning-cycle entry points to translate its climate priorities into annual budget proposals, SDBIP outputs and compliance reporting, with progress reviewed through the normal municipal performance process.

5.5 Summary of Mandeni's framework for action

Mandeni's Climate Change Strategy will be implemented through the following logic:

- Vision and principles define the municipality's long-term direction.
- Ten pathways describe the transition routes needed to achieve that direction.
- Ten strategic focus areas organise the main adaptation, mitigation, infrastructure, spatial, environmental, economic and service-delivery work.
- Five cross-cutting work areas provide the governance, finance, knowledge, communication, health and partnership systems needed to support implementation.
- The action plan in Section 8 translates the Strategy into actions, responsibilities, timeframes, indicators and budget links.

Mandeni's climate response prioritises adaptation to flooding, drought, heat, coastal and other extreme-weather hazards, while strengthening services, settlements and ecosystems. Emissions screening, energy efficiency, cleaner production, waste diversion and greenhouse-gas inventory preparation advance mitigation. Departments will integrate these priorities into the IDP, SDBIP, sector plans and municipal budgets through the entry points in Section 5.4.

6 Strategic Focus Areas and Goals

Mandeni's climate risk is produced by the interaction between climate hazards and pre-existing vulnerability, including poverty, unemployment, informal and traditional housing, weak water, sanitation and waste services, floodplain and wetland occupation, drainage and road constraints, ecosystem degradation, industrial and agricultural concentration and uneven institutional capacity.

The following Strategic Focus Areas provide the organising framework for Mandeni's climate response. The detailed projects, timeframes, responsibilities and indicators are set out in Section 8: Climate Change Action Plan.

Table 21: Strategic Focus Areas and indicative leads

SFA	Strategic Focus Area	Primary emphasis	Indicative lead
SFA 1	Heat, public health and climate-responsive settlements	Adaptation	Disaster Management, Community Services, Health partners, Environmental Management
SFA 2	Water security and drought-readiness	Adaptation	iLembe DM with Mandeni Planning, Environmental Management and Disaster Management
SFA 3	Flood-readiness, stormwater and resilient drainage	Adaptation	Technical Services with Disaster Management, Waste and Planning
SFA 4	Coastal, estuarine and dune resilience	Adaptation	Environmental Management and Planning with EDTEA/DFFE/EAF
SFA 5	Fire, lightning, wind and hail risk management	Adaptation	Disaster Management, Fire and Rescue, Technical Services
SFA 6	Spatial and resource inclusivity	Adaptation and mitigation	Planning and Human Settlements with traditional authorities
SFA 7	Low-carbon energy, industry and green economic development	Mitigation and resilience	LED, Environmental Management and Finance with industry partners
SFA 8	Climate-resilient municipal buildings, public facilities and infrastructure	Adaptation and mitigation	Technical Services and Community Services
SFA 9	Mobility, access and livelihoods	Adaptation and low-carbon transition	Technical Services, LED and Disaster Management
SFA 10	Circular waste economy and pollution reduction	Mitigation, adaptation and health	Waste Management, Environmental Management and Public Safety

6.1 Heat, public health and climate-responsive settlements

Extreme heat is a growing climate and public-health risk. The City of Cape Town strategy frames heat responsiveness around reducing immediate health risks during heat waves and reducing heat impacts through greening. For Mandeni, the same concern applies, but the response must be broadened beyond urban heat islands to include rural settlements, traditional dwellings, informal housing, schools, clinics, community halls, public spaces, workplaces and vulnerable households.

The municipal hazard profile identifies extreme temperatures as a preparedness concern. In GreenBook, a very hot day has a daily maximum above 35°C; a heatwave comprises at least three consecutive days at least 5°C above the local warmest-month average maximum. The related indicators count days per year, while temperatures and temperature changes use °C (Engelbrecht, 2019). A large day-count value must therefore not be interpreted as a local temperature. Heat warnings and support measures will follow current operational advice and the municipal heat-health protocol.

6.1.1 Goal 1: Reduce immediate health and safety risks during heat waves and high-heat days

Mandeni will strengthen its ability to protect residents, workers and public-facility users during high-heat events. This should include heat-health warnings, public messaging, school and clinic protocols, access to shaded public waiting areas, safe water access at public facilities, support to vulnerable households and coordination between Disaster Management, Community Services, Environmental Management, Health, Communications and ward structures.

6.1.2 Goal 2: Reduce heat exposure through settlement greening, shade and climate-responsive public spaces

Mandeni will use greening, shade, tree planting, public-space design and settlement upgrading to reduce heat stress. The Greening Plan should be used to prioritise areas where planting and beautification can also deliver climate benefits, including cooling, biodiversity, stormwater control, employment and improved public amenity.

Priority directions for this focus area include:

- Heat-health preparedness: Develop heat-wave protocols for schools, clinics, halls, outdoor workers, waste teams, traffic points and community events.
- Public warnings: Use ward committees, councillors, social media, radio, SMS and traditional-authority structures to issue heat warnings and safety messages.
- Greening for cooling: Prioritise tree planting and shade in Mandeni, Sundumbili, Manda Farm, Isithebe-linked settlements, taxi ranks, schools, clinics, halls and public waiting areas.
- Climate-responsive settlements: Encourage cool roofs, ventilation, shade, orientation, safe water access and improved drainage in housing and public-facility design.
- Vulnerable groups: Identify elderly residents, children, people with disabilities, outdoor workers and households in informal or traditional dwellings as priority groups.

6.2 Water security and drought-readiness

Water security is central to Mandeni’s climate resilience. Drought, heat, pollution, flood damage and uneven service access can affect households, agriculture, industry, schools, clinics, public facilities and livelihoods. Prolonged low flows, reduced groundwater availability and wetland drying can also weaken ecosystem functions, while lower flows can concentrate pollutants where contamination persists. Dry vegetation and invasive alien plants can compound fire and water-resource pressures, connecting drought preparedness with ecosystem restoration, fire management and tree-health surveillance. Mandeni’s response therefore combines demand management and reliable supply with rural water access, sanitation resilience, protection of rivers, wetlands and riparian areas, water-quality monitoring and coordination with iLembe District Municipality as the water-services authority.

Table 22: Water and sanitation responsibility / drought trigger table

Trigger / responsibility area	Lead responsibility	Early-warning or service-disruption indicator
Water-services authority functions	iLembe District Municipality	Water-supply interruptions, tanker demand, reservoir/storage constraints, treatment capacity and sanitation failures
Local risk reporting and ward validation	Mandeni LM with ward committees and traditional authorities	Reports of dry communal points, unreliable supply, failed boreholes/springs, polluted streams or access problems
Drought warning and disaster coordination	Disaster Management with iLembe DM and SAWS inputs	SAWS drought advisories, rainfall deficits, extended heat periods and increasing relief requests
Sanitation risk and watercourse contamination	iLembe DM with Environmental Management	Sewage near streams, flooded sanitation systems, complaints, water-quality failures or field observations
Demand management and public communication	iLembe DM / Mandeni Communications	High consumption alerts, leak reports, facility water shortages and public water-saving messaging needs

Drought is a municipal preparedness concern across all wards. Its consequences can be greater where households and facilities have unreliable supply, depend on climate-sensitive or distant water sources, or lack resources for storage, alternative supply and recovery. Flooding and poor drainage can also damage sanitation systems or move contamination into water used by communities. Rural water and sanitation work will therefore prioritise verified service reliability, water quality, access and household circumstances, rather than traditional-authority tenure alone.

6.2.1 Goal 3: Protect water resources and reduce avoidable water stress

Mandeni will support demand management, water conservation, watercourse protection, pollution prevention and public awareness, working with iLembe District Municipality, DWS and environmental partners to track low-flow and water-quality concerns. Invasive alien plant management, riparian restoration and protection of wetlands will support drought resilience and maintain the ecological functions on which water users depend.

6.2.2 Goal 4: Strengthen drought-ready and climate-resilient water and sanitation systems through district coordination

Mandeni will work with iLembe District Municipality, provincial departments, traditional authorities and communities to identify water-vulnerable settlements, protect rural water sources, improve drought-response planning and reduce sanitation-related climate risks. Drought coordination should bring together available supply and water-quality information, ecological condition observations, fire preparedness, agricultural support and public-health communication so that emerging pressures trigger a coordinated response.

Priority directions for this focus area include:

- Rural water vulnerability register: Identify settlements and facilities with unreliable water access, dependence on communal points, tankers, springs, boreholes or climate-sensitive sources.
- Drought response planning: Align drought planning with disaster management, social relief, public facilities and water-services coordination.
- Watercourse protection: Reduce dumping, sewage contamination and erosion in rivers, wetlands and drainage lines.
- Public facilities: Improve water storage, rainwater harvesting where feasible, leak reporting and water-saving measures at municipal buildings, schools, clinics and halls.
- Sanitation resilience: Identify sanitation systems exposed to flooding, poor drainage or watercourse contamination and coordinate upgrades with iLembe District Municipality.

6.3 Flood-readiness, stormwater and resilient drainage

Flooding is one of Mandeni's most immediate and visible climate risks. Heavy rainfall can overwhelm stormwater systems, damage roads and bridges, flood homes, mobilise waste and sewage, erode riverbanks and disrupt access to schools, clinics, workplaces and emergency services.

Figure 7 shows the provincial 1-in-100-year floodline. Technical Services, Planning and Disaster Management will use it to identify candidate locations for drainage inspections, exposure checks and detailed flood studies. They will compare it with current settlement, asset and incident records and confirm the model resolution, assumptions, validation and any climate-change allowance. The mapped extent cannot establish parcel-level floodlines, water depths, safe evacuation routes or flood safety outside the shaded area; site decisions remain subject to the assessment requirements.

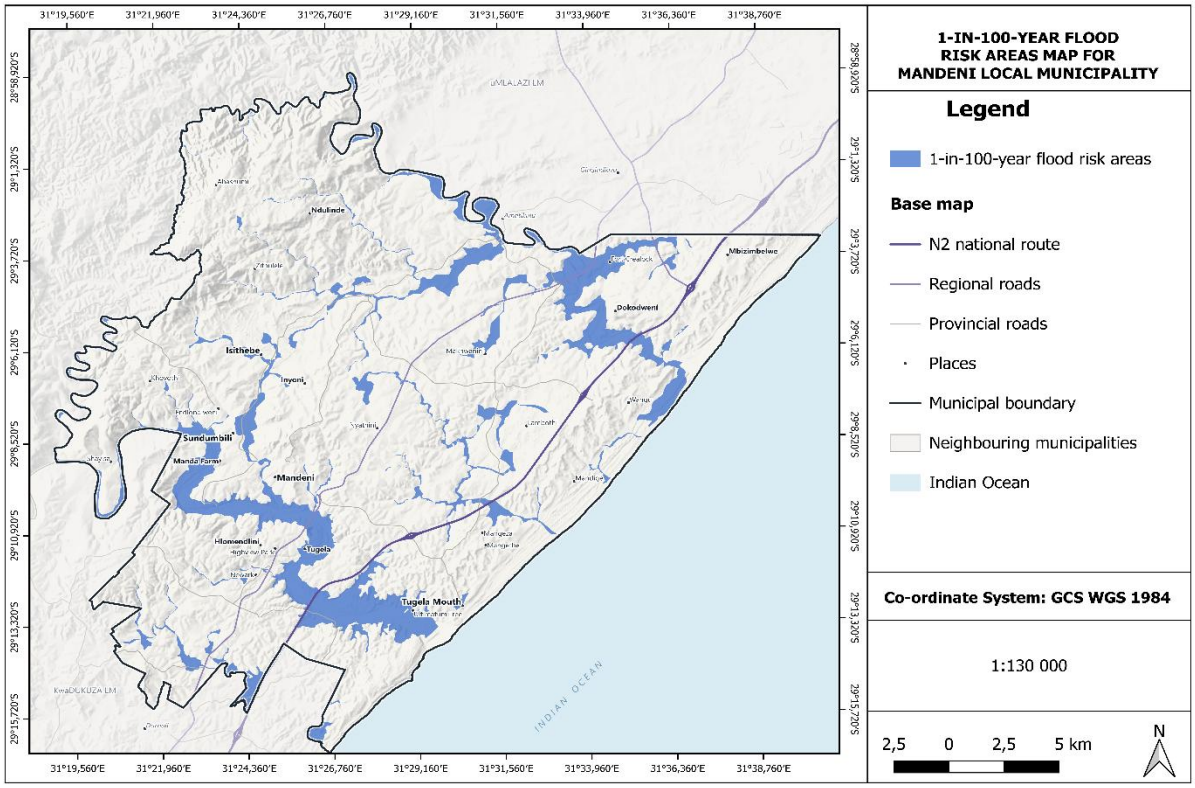

Figure 7: Modelled 1-in-100-year floodline

Heavy rain, flooding, severe weather and strong winds are municipal preparedness priorities, with heavy rain identified across all wards. Damage can be amplified where homes or facilities occupy exposed sites, structures are weak, drainage is obstructed or inadequate, and roads, bridges or utilities have limited capacity to withstand an event. Road or utility failures can then interrupt access and essential services. The georeferenced flood, drainage, bridge and culvert register will link these potential failure points to verified assets, condition inspections, incident records and responsible departments so that maintenance and design priorities can be established.

Table 23: Observed flood hotspot table

Ward / area	Asset or system affected	Suspected cause	Evidence source	Proposed action	Cost status	Responsible unit
Sundumbili / Mandeni urban area	Roads, stormwater drains and nearby settlement pockets	Poor drainage, blocked/undersized drains and localised flooding	April 2026 site evidence and municipal hazard profile	Drainage assessment, clearing schedule and prioritised stormwater upgrades	To be costed	Technical Services / Waste / Disaster Management
Manda Farm and peri-urban settlement pockets	Housing, access routes and drainage	Settlement density, drainage constraints and waste accumulation	CRVA and ward evidence	Household exposure mapping, drainage improvements and waste hotspot control	To be costed	Human Settlements / Technical Services / Waste
uThukela River corridor and floodplain areas	Floodline households, bridges, culverts and river margins	Floodplain exposure, erosion and watercourse disturbance	CRVA, floodline screening and ward validation	Floodline controls, vulnerable-household register and river-buffer protection	To be costed	Planning / Disaster Management / Environmental Management
Rural access routes and low-lying roads	Access to schools, clinics, emergency services and livelihoods	Undersized/blocked culverts and poor drainage	Ward evidence and infrastructure records	Route-risk map, culvert inspections and maintenance prioritisation	To be costed	Technical Services / Disaster Management
Waste-linked drainage hotspots	Stormwater channels, culverts and watercourses	Illegal dumping and litter blocking flows	IWMP and April 2026 site evidence	Hotspot map, enforcement, skips/drop-off review and pre-rainy-season clean-ups	Existing and additional budget required	Waste Management / Technical Services

6.3.1 Goal 5: Reduce flood damage through stormwater, drainage and infrastructure-risk management

Mandeni will reduce flood risk by identifying flood-prone roads, drains, culverts, bridges, households, public facilities and critical infrastructure, then prioritising maintenance, upgrades and capital projects based on risk.

6.3.2 Goal 6: Manage rivers, wetlands and drainage systems as flood-protection infrastructure

Mandeni will protect and restore rivers, wetlands, riparian buffers and natural drainage paths so that ecological infrastructure contributes to flood attenuation, erosion control and water-quality protection. In the uThukela River system, local maintenance and restoration will be coordinated with upstream catchment partners because rainfall, runoff, pollution and sediment movement beyond the municipal boundary can influence downstream flood conditions, riverbank stability and estuarine functioning. Shared warnings, water-quality information and restoration priorities will support this catchment approach.

Figure 8 places the river network, wetlands and estuary functional zones alongside the modelled flood extent. Read with Figure 7, it helps identify where watercourse protection, pollution investigation and appropriate wetland or riparian restoration can support flood and drought resilience. Environmental Management and Technical Services will verify present ecological condition, drainage connections and site boundaries before selecting works. Biodiversity corridors are considered separately in Figure 9.

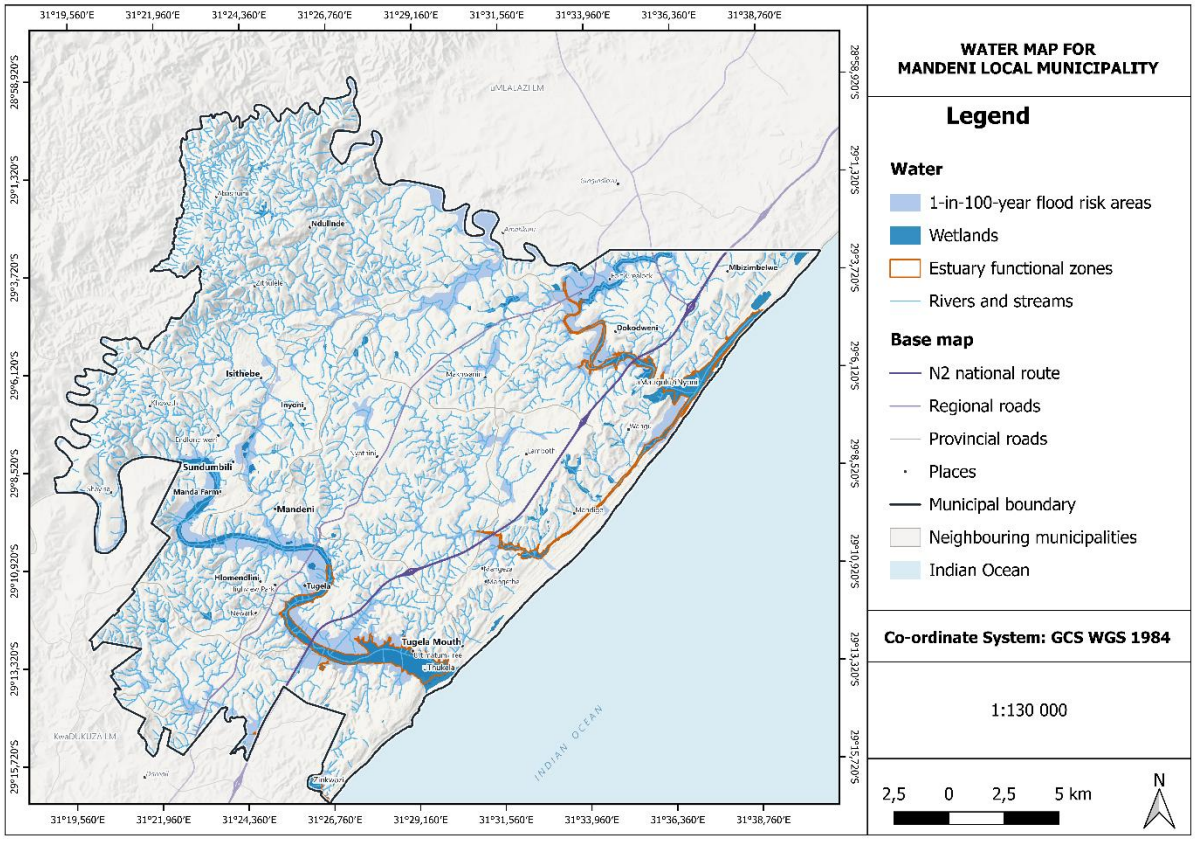

Figure 8: Rivers, wetlands and estuaries in Mandeni Municipality

Priority directions for this focus area include:

- Drainage and culvert register: Develop a georeferenced register of stormwater drains, culverts, bridges, flood-prone roads, blocked channels and vulnerable public facilities.
- Maintenance before rainy seasons: Clear drains, remove dumped waste, inspect culverts and repair damaged stormwater infrastructure before high-risk rainfall periods.
- Floodline and buffer enforcement: Strengthen the use of floodline information, wetland buffers, river reserves and land-use controls in development applications.
- Waste and drainage link: Treat illegal dumping and litter as flood-risk drivers because waste blocks drainage and contaminates floodwater.
- Community reporting: Establish simple reporting channels for blocked drains, damaged culverts, eroded roads, flooding hotspots and illegal dumping.

Field observations at Sundumbili recorded drainage constraints and waste near drainage systems, indicating potential pathways for local flooding and water pollution. These observations guide verification and maintenance priorities; municipal inspections and incident records must confirm the affected assets, event history and causes before site-specific designs are selected.

6.4 Coastal, estuarine and dune resilience

Mandeni's coastline, estuaries, dunes and river-mouth systems are important climate-risk areas as well as ecological and economic assets. Active beach-dune systems, estuarine functional zones, low-lying river-mouth areas and exposed coastal assets require site-specific assessment of flooding, erosion, storm surge and sea-level rise. Catchment runoff, water quality and sediment processes connect these areas with the uThukela Marine Protected Area. Ocean warming and changes in marine conditions can also affect biodiversity, fisheries and coastal livelihoods, reinforcing the need to coordinate terrestrial, estuarine and marine adaptation through the relevant authorities and partners (Wildtrust, 2022).

New permanent development must avoid confirmed hazardous coastal areas, while existing exposed assets require assessment of adaptation or relocation, space for coastal adjustment and restoration of natural buffers. The LUMS defines a 100 m coastal buffer measured from the high-water mark, with development subject to its coastal management and public-access provisions (Mandeni Local Municipality, 2022a, Sections 4.6.4 and 9.7). Planning must apply these provisions together with other applicable controls and require wider site assessment where estuarine, dune, wetland, flood or shoreline processes indicate additional exposure. The full climate-risk area cannot be inferred from a buffer distance alone.

6.4.1 Goal 7: Reduce coastal, estuarine and dune-related risk to people, infrastructure and development

Mandeni will protect and restore dunes, estuaries, wetlands, coastal vegetation and riparian areas as climate buffers and livelihood-supporting ecosystems. Partnerships with Ezemvelo KZN Wildlife, DFFE, WILDTRUST and affected communities will connect this work to the uThukela Marine Protected Area and support biodiversity, fisheries, coastal livelihoods and safe public access.

6.4.2 Goal 8: Restore and protect coastal and estuarine ecological buffers

Mandeni will protect and restore dunes, estuaries, wetlands, coastal vegetation and riparian areas as climate buffers and livelihood-supporting ecosystems. Partnerships with Ezemvelo KZN Wildlife, DFFE, WILDTRUST and affected communities will connect this work to the

uThukela Marine Protected Area and support biodiversity, fisheries, coastal livelihoods and safe public access.

Figure 9 brings together recorded nature reserves, irreplaceable Critical Biodiversity Areas, landscape corridors, critical linkages and protected-area expansion focus areas. It supports coordination of habitat protection, connectivity, restoration and stewardship along the coastal and river systems. These categories have different planning and protection roles: an expansion focus area or conservancy is not, by that label alone, a formally declared nature reserve. Environmental Management will confirm current conservation datasets and status with the relevant authorities and assess site condition before prioritising interventions.

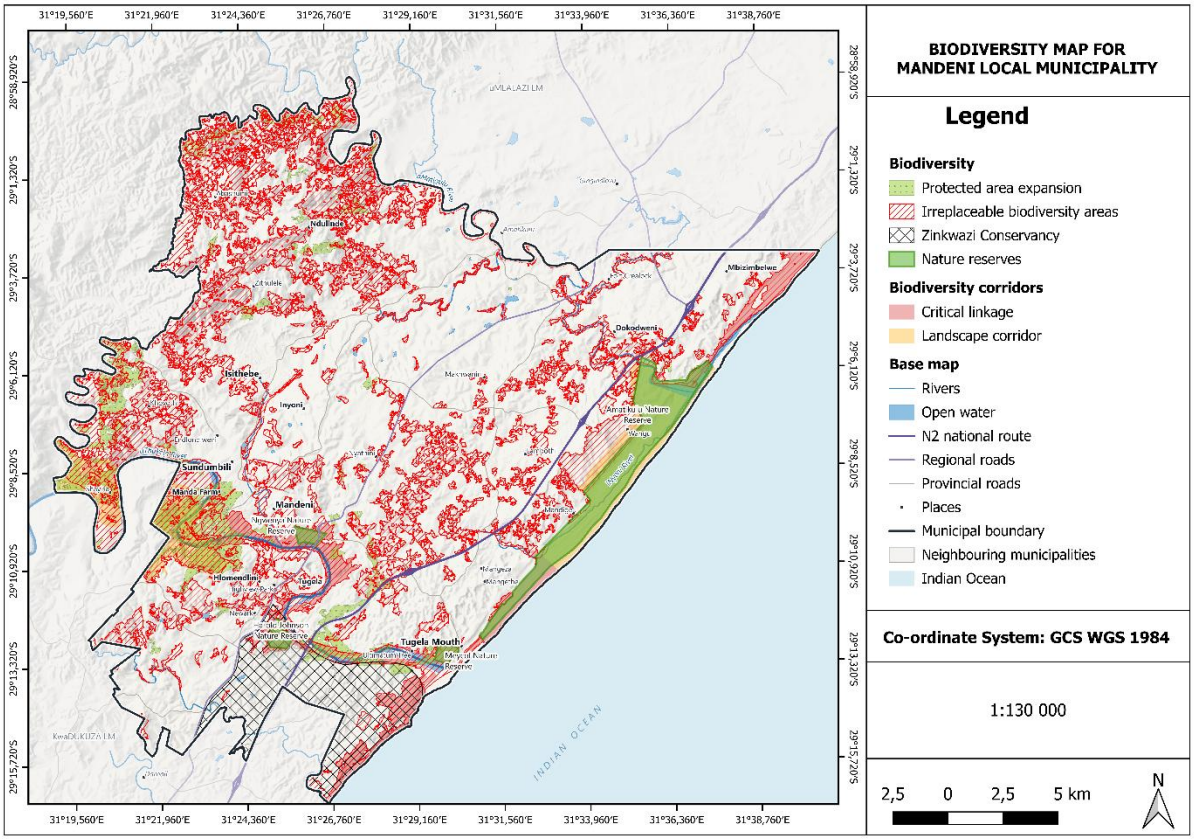

Figure 9: Biodiversity corridors and conservation planning

Priority directions for this focus area include:

- Coastal hazard update: Commission or obtain updated coastal hazard lines, coastal management lines, shoreline-change data and exposed-asset information.
- Risk-based development control: Avoid new permanent development in active dune, beach, estuarine functional zone, flood-prone and erosion-prone areas.
- Estuary management integration Confirm the aMatigulu/iNyoni Estuary Management Plan version, Council records and applicable statutory approval with the responsible authorities, and complete any outstanding approval steps. Use its technical information for screening pending confirmation, and incorporate approved, legally applicable measures into the SDF, LUMS, coastal decisions and municipal workplans through the required processes.
- Dune and estuary restoration: Prioritise restoration of dunes, estuarine vegetation, riparian buffers and degraded coastal habitats.

- Illegal sand mining and sediment control: Strengthen monitoring and enforcement against illegal sand mining or activities that alter sediment flows and increase erosion risk.
- Coastal public safety: Improve signage, access management, evacuation planning and awareness in coastal and river-mouth areas.

The aMatigulu/iNyoni Estuary Management Plan provides information on estuary boundaries, ecological functions and proposed management zones. Municipal IDPs report Council approval of the Nyoni plan, while the supplied review comments question the approval status of the version reviewed (Ezemvelo KZN Wildlife, 2014). Council endorsement must be distinguished from the applicable MEC or Minister approval required by Section 9.1 of the National Estuarine Management Protocol (Republic of South Africa, 2021). Environmental Management will reconcile the current version and Council records with EDTEA and the responsible authority and confirm statutory approval. Pending confirmation, the plan's technical information will inform screening while relevant legislation and adopted controls govern decisions; proposed buffers and management zones will not be assumed to be binding.

6.5 Fire, lightning, wind and hail risk management

Mandeni is exposed to multiple severe-weather and disaster hazards. The IDP and Disaster Management Sector Plan identify severe weather, lightning, strong winds, hail, heavy rain, extreme temperatures, drought, storm surges, structural and veld fires, motor-vehicle accidents and illegal electricity connections as priority risks. Several of these hazards are identified as affecting all wards, while storm surges are linked to the coast and motor-vehicle accidents are mostly associated with the N2, R102, P459 and P415.

For Mandeni, this focus area must include veld fires, structural fires, lightning, hail and strong winds because the municipal hazard profile shows that these risks are widespread.

6.5.1 Goal 9: Strengthen preparedness and response for fire, lightning, strong winds and hail

Mandeni will improve warning, preparedness, response capacity, public awareness, volunteer training and emergency coordination for fire, lightning, wind and hail events.

6.5.2 Goal 10: Reduce exposure and vulnerability through settlement safety, vegetation management and resilient infrastructure

Mandeni will reduce the underlying conditions that allow fires and severe-weather events to cause disaster, including poor access, unsafe electrical connections, vulnerable roofing, dense or informal settlement patterns, unmanaged vegetation and weak public awareness.

Priority directions for this focus area include:

- Fire-risk reduction: Maintain firebreaks, manage invasive alien plants, strengthen veld-fire awareness and coordinate with landowners, farmers and traditional authorities.
- Structural-fire risk: Target informal and traditional housing areas with fire-safety education, safe-energy messaging and access planning for emergency vehicles.
- Lightning safety: Include lightning safety in school, ward, sports-field, community-event and agricultural-worker awareness campaigns.
- Wind and hail resilience: Identify public facilities and vulnerable housing areas requiring roof, drainage, window, tree-management or structural improvements

- Fire and rescue capacity: Support the continued strengthening of Mandeni's Fire and Rescue Services, volunteers and equipment.
- Early warning: Link weather warnings to ward committees, volunteers, councillors, traditional leaders, schools, clinics and community halls.

Mandeni has already insourced Fire and Rescue Services and has disaster-management volunteers that include ward committee members, which provides an important platform for local preparedness and community-level risk communication.

6.6 Spatial and resource inclusivity

Spatial planning is one of Mandeni's most powerful climate-risk tools. The municipality can reduce future risk by guiding where development occurs, where it should not occur, and what conditions should apply to land-use applications, housing projects, infrastructure and public investment.

For Mandeni, this means using the SDF, LUMS, IDP, Human Settlements Sector Plan, Disaster Risk Management plans, Coastal Management Programme, Estuary Management Plan and capital project pipeline to avoid creating new exposure while improving access to services and opportunities.

The Land Use Management Scheme provides tools that are directly relevant to climate-risk screening, including management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, sea shore, dams, landfill sites, waterworks, sewerage works and traditional authority environmental areas.

6.6.1 Goal 11: Embed climate-risk screening into spatial planning, land-use management, housing and capital investment

The land use management scheme presented in Figure 10 below is included as a practical spatial-planning reference to support climate-risk screening, land-use decision-making and the protection of environmentally sensitive areas.

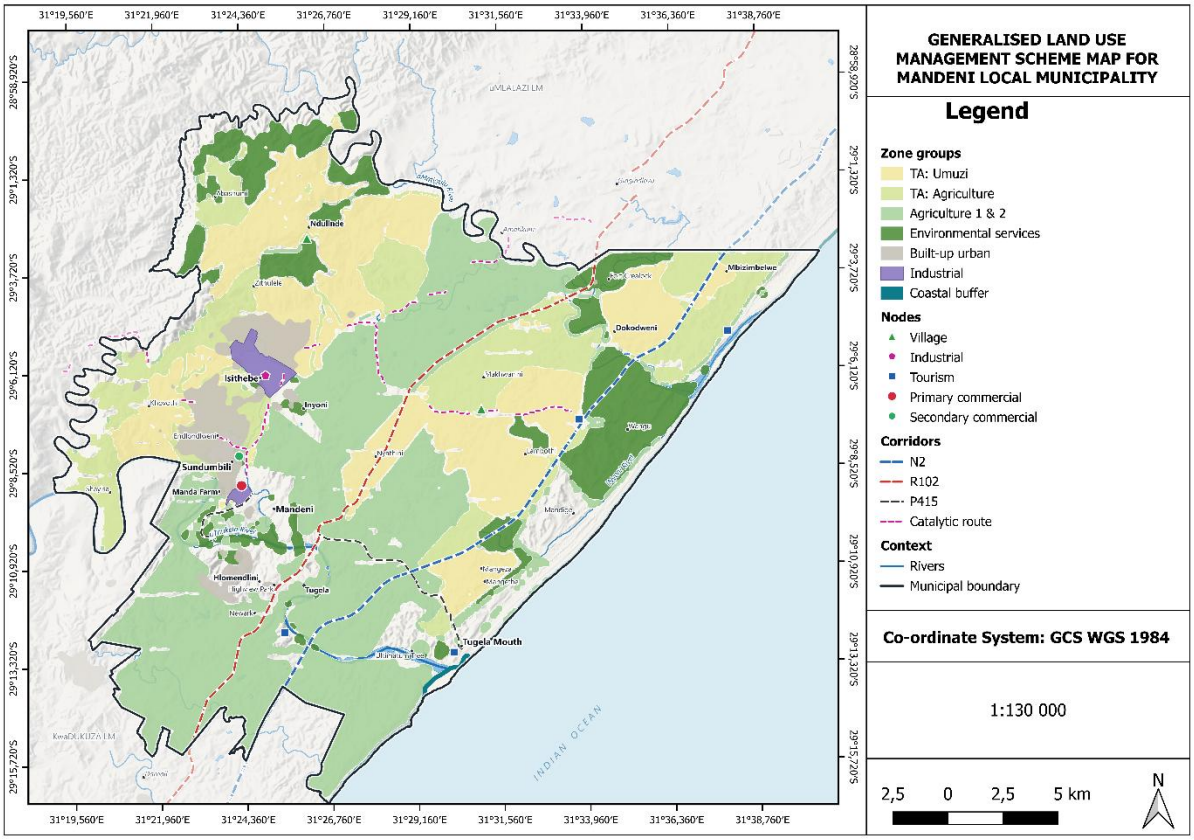

Figure 10: Mandeni land use management scheme

Mandeni will screen all major land-use applications, housing projects, infrastructure projects and capital investments against climate hazards, ecological sensitivity, service capacity and long-term maintenance risk using the formal tool described in Section 4.3.1. Planning will coordinate development-application screening, while each municipal project department will complete the project record with Environmental Management, Technical Services and Disaster Management input as relevant. The assessment must consider current and future conditions over the asset's lifespan and compare feasible options for cost, risk reduction, ecosystem effects and the potential to transfer risk elsewhere. A preliminary map-based screen will identify the need for site-specific flood, coastal, geotechnical, ecological or engineering investigations; it cannot replace those investigations or statutory approvals. The responsible decision-maker will record the selected route, conditions and reasons before approval.

6.6.2 Goal 12: Improve spatial and resource equity for vulnerable communities

Mandeni will prioritise climate action where verified exposure, unreliable services, poor access, unsafe housing or limited recovery capacity increase the consequences of climate hazards. Figure 9A shows the historical distribution of settlement types, recorded traditional-authority land, agricultural land, housing sites and the Extension 8 planning proposal. Planning and Human Settlements will use this context to coordinate upgrading and service assessments, then test current sites against the flood and environmental screening. A settlement category, tenure label or mapped proposal does not establish present vulnerability, current housing status, an approval or safe developable land.

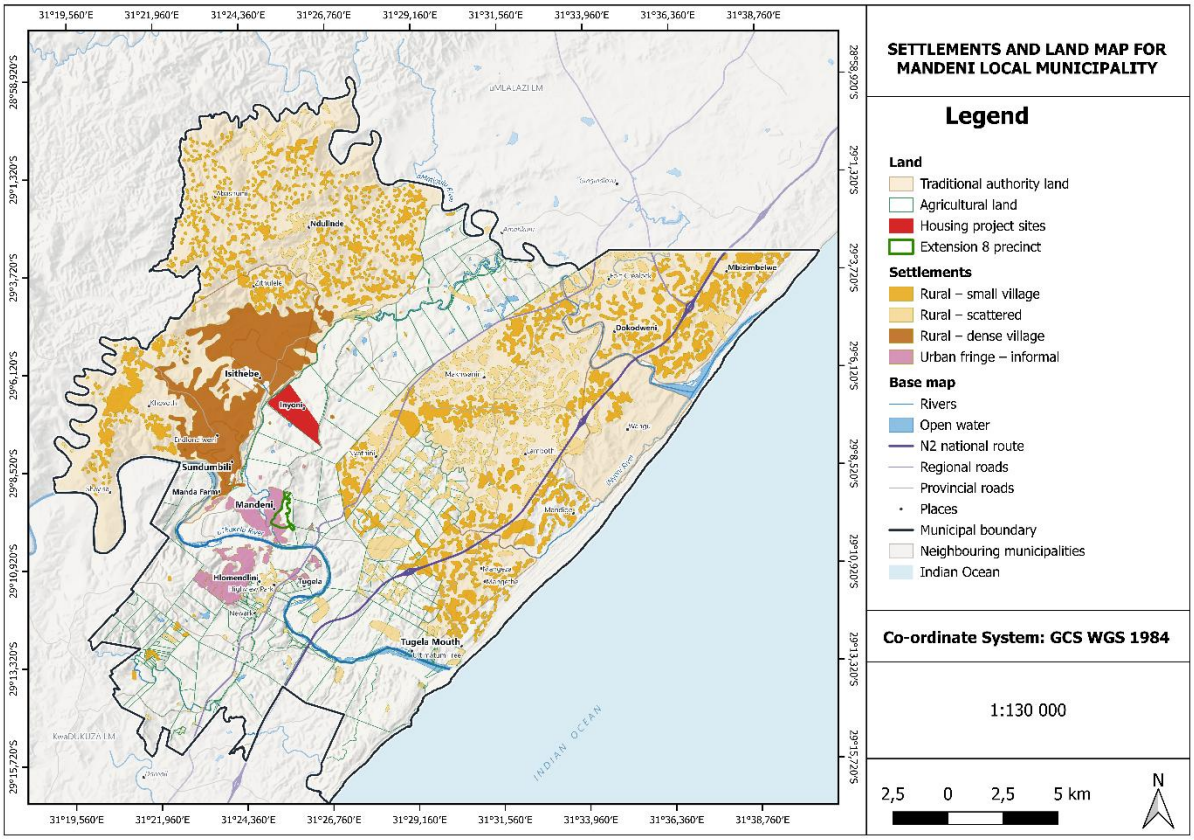

Figure 11: Historical settlements, land tenure and housing context

Priority directions for this focus area include:

- Climate-risk screening: Apply the approved tool to major land-use applications and capital projects, record present and future hazard exposure and residual risk, and require the studies and design changes needed before a decision.
- SDF and LUMS integration: Apply floodline, wetland, coastal and estuarine controls through the relevant planning instruments; update overlays through the required review procedures as verified hazard and climate-projection information becomes available.
- Human settlements: Ensure that housing projects, upgrading and relocation decisions avoid locking vulnerable households into future climate risk.
- Traditional-authority coordination: Work with the relevant traditional councils and leadership on land use, settlement, buffers, access, dumping and risk awareness, using the current names and areas confirmed through the reconciliation described in Section 2.1.3.
- Ward-based targeting: Use ward-based plans and hazard maps to identify vulnerable communities and priority local actions.
- Service equity: Prioritise waste, water, sanitation, drainage, access roads and early-warning improvements in high-vulnerability areas.

The Human Settlements Sector Plan is important for this focus area because it includes analysis of settlement demand, infrastructure constraints, land ownership, areas not suitable for human habitation, areas not recommended for housing projects and project evaluation for sustainable human settlements.

Table 24: Climate-risk screening decision tree for housing projects

Screening result	Decision route	Implementation implication
No significant hazard exposure and services are feasible	Proceed with standard climate-responsive design	Include drainage, shade, ventilation, safe access and resource-efficiency measures
Moderate hazard exposure that can be reduced	Upgrade or redesign	Improve drainage, access, buffers, green infrastructure, facility safety and preparedness
High flood, wetland, coastal, dune, estuary or slope risk	Avoid new development / redesign location	Reject or revise layout where required; apply relevant legislation and adopted planning and floodline controls; use EMP technical information for screening pending approval confirmation
Existing settlement with recurring but manageable risk	Protect and upgrade	Preparedness, early warning, drainage, access improvements, services and risk-informed upgrading
Existing settlement with unacceptable residual risk	Assess relocation or long-term redesign	Use social facilitation, engineering assessment, land availability, cost-benefit and Council-approved relocation process
Hazard extent, service capacity or residual risk remains uncertain	Obtain the required assessment before determination	Record the missing evidence, responsible specialist and decision conditions; revise the location or design where necessary

6.7 Low-carbon energy, industry and green economic development

Mandeni's mitigation pathway must be practical and phased. The municipality does not yet have a full municipal or community-scale greenhouse-gas inventory. Quantifying emissions requires a defined inventory boundary, source coverage, activity data, emission factors and quality checks; the identification of climate hazards and vulnerable places does not supply that baseline. The five-year roadmap below therefore begins with emissions screening and municipal data collection before a full inventory and quantified targets are considered.

The focus for Mandeni should therefore be on emissions screening, energy and fuel data collection, cleaner production, municipal efficiency, waste diversion, air-quality integration, industrial partnerships and green economic development. The local economy includes manufacturing, tourism, commercial activity, agriculture, SMMEs, informal trade and the green economy, while Isithebe Industrial Estate is a key economic hub.

Table 25: Five-year mitigation roadmap

Year	Mitigation milestone	Main output
Year 1	Adopt emissions-screening template	Data template for electricity, fuel, fleet, generators, public lighting, waste, wastewater, transport, industry and land-use screening
Year 2	Compile municipal operations baseline	First complete municipal electricity and fuel baseline and priority efficiency opportunities
Year 3	Prepare full GHG inventory terms of reference	Inventory scope, method, data owners, baseline year, budget and procurement requirements

Year	Mitigation milestone	Main output
Year 4	Undertake full GHG inventory if funded	Municipal operations inventory and staged community-scale screening / inventory
Year 5	Consider target-setting	Council considers realistic emissions-reduction or resource-efficiency targets once data quality is adequate

The KwaZulu-Natal Air Quality Management Plan identifies Mandeni as one of the areas with a high probability of exposure to multiple air-pollution sources. It also identifies industry, vehicles, biomass burning, mines and quarries, residential fuel burning, waste burning, agriculture, waste treatment and wastewater treatment as relevant air-quality and emissions sources.

6.7.1 Goal 13: Establish a phased emissions-screening and resource-efficiency programme

Mandeni will begin mitigation by collecting and organising data on municipal electricity use, fuel use, fleet, public lighting, waste, wastewater, transport, industrial energy use where available, biomass burning and land-use change.

6.7.2 Goal 14: Support climate-resilient industry, cleaner production and green jobs

Mandeni will work with industry, businesses, SMMEs, farmers and partners to support energy efficiency, cleaner production, water efficiency, waste reduction, business continuity, green skills and local green-economy opportunities.

Priority directions for this focus area include:

- Municipal emissions screening: Compile electricity, fuel, fleet, generator, streetlight, facility, waste and wastewater data.
- Industrial engagement: Engage Isithebe, SAPPI and other significant businesses on energy, water, waste, emissions, business continuity and cleaner production.
- Green SMMEs: Support recycling, restoration, alien clearing, sustainable agriculture, eco-tourism, maintenance and climate-service enterprises.
- Climate-smart agriculture: Link farmers, agricultural associations and extension services to climate-smart practices, water conservation and soil protection.
- Air-quality integration: Align emissions screening with the KZN and iLembe Air Quality Management Plans.
- Green skills: Use EPWP, youth programmes, ward projects and partnerships to build local skills in restoration, waste recovery, energy efficiency and maintenance.

The iLembe Air Quality Management Plan is also relevant because it includes greenhouse gases, industry, biomass burning, transport, domestic fuel burning, agriculture, waste treatment and disposal as important air-quality and emissions management areas.

6.8 Climate-resilient municipal buildings, public facilities and infrastructure

Municipal buildings, public facilities and infrastructure must be able to withstand climate shocks while also using energy, water and materials more efficiently. For Mandeni, this includes municipal offices, depots, community halls, libraries, clinics, schools, sports facilities, roads, bridges, parks, drainage systems, waste facilities, public lighting and emergency-support facilities.

Figure 12 below links housing projects and major water infrastructure to the settlement pattern and helps illustrate why climate-responsive siting, servicing and upgrading are central to resilience planning.

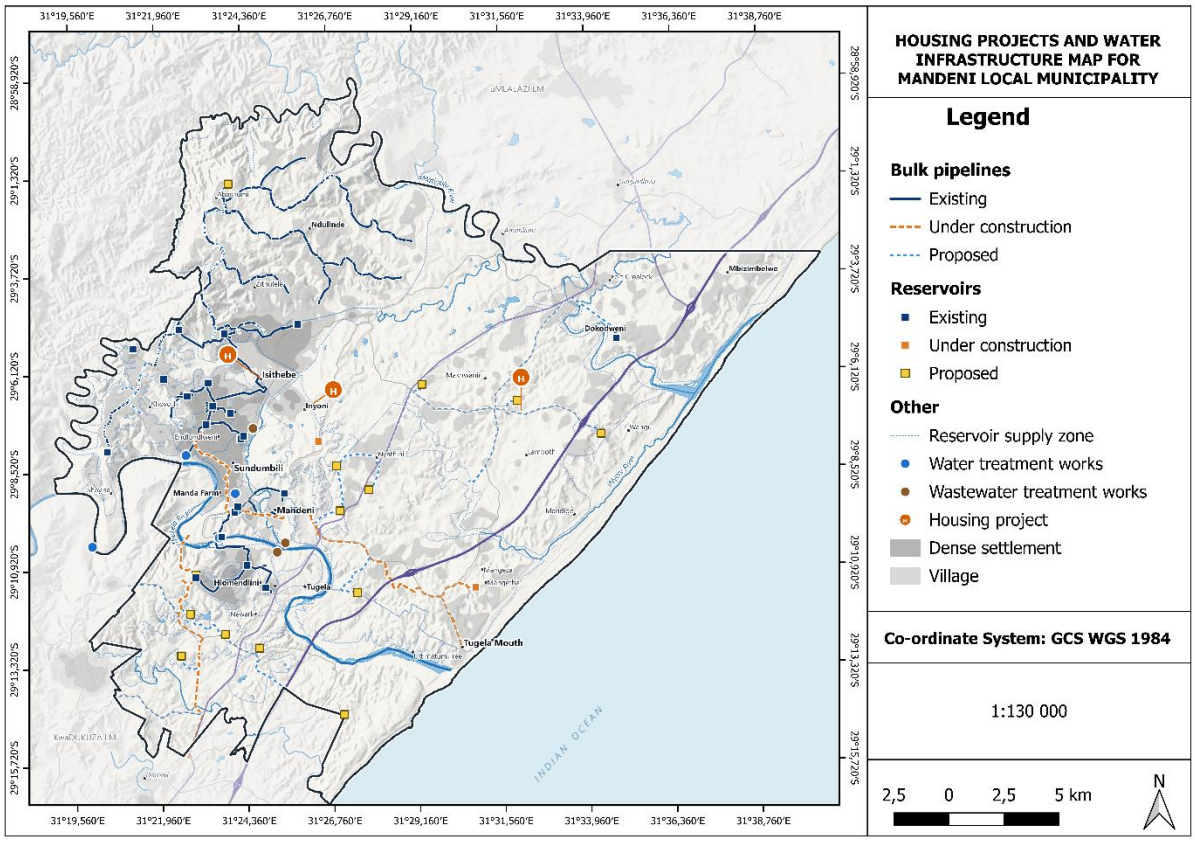

Figure 12: Housing projects and major water infrastructure in Mandeni Municipality

Major capital projects and critical facilities must therefore be screened for flooding, heat, coastal processes and severe-weather exposure over their design life. Investment priorities will take account of service continuity, safe access, the people served and feasible risk-reduction measures. Where information is incomplete, the project brief must provide for the site investigations needed before design or approval.

6.8.1 Goal 15: Climate-proof municipal and public facilities against priority hazards

Mandeni will progressively assess and improve municipal and public facilities to reduce exposure to flooding, heat, fire, lightning, strong winds, hail, water disruption and access constraints.

6.8.2 Goal 16: Improve resource efficiency and operational resilience in municipal assets

Mandeni will reduce avoidable energy, fuel and water use in municipal operations and improve the ability of facilities to function during climate-related disruptions.

Priority directions for this focus area include:

- Facility risk audit: Assess municipal buildings, halls, depots, public spaces and other facilities for flood, heat, fire, wind, hail, lightning and access risk.

- Emergency-use facilities: Identify halls, schools or other facilities that can support shelter, relief, cooling, water distribution or coordination during climate events.
- Building resilience: Improve roofs, gutters, drainage, shade, ventilation, water storage, access routes, backup power and safe electrical systems.
- Energy efficiency: Improve lighting, appliance efficiency, metering, maintenance and solar-readiness where feasible.
- Asset maintenance: Link climate risk to routine maintenance schedules, inspections, repairs and capital planning.
- Critical services: Prioritise facilities that support health, safety, disaster response, social relief, education and community coordination.

The Emergency Relief Aid Policy confirms that disaster relief planning must consider food, water, health, clothing, shelter, sanitation, hygiene and transparent relief distribution, which makes public facilities and emergency-support infrastructure central to climate resilience.

6.9 Mobility, access and livelihoods

Transport and access are climate-resilience issues. Flooded roads, damaged bridges, blocked culverts, strong winds, storm surge, coastal erosion, fire, accidents and poor rural access can disrupt emergency response, school attendance, health access, work trips, freight, tourism and local livelihoods.

Figure 13 below identifies the key corridors, roads and access routes whose resilience is critical for mobility, freight continuity, evacuation and service access.

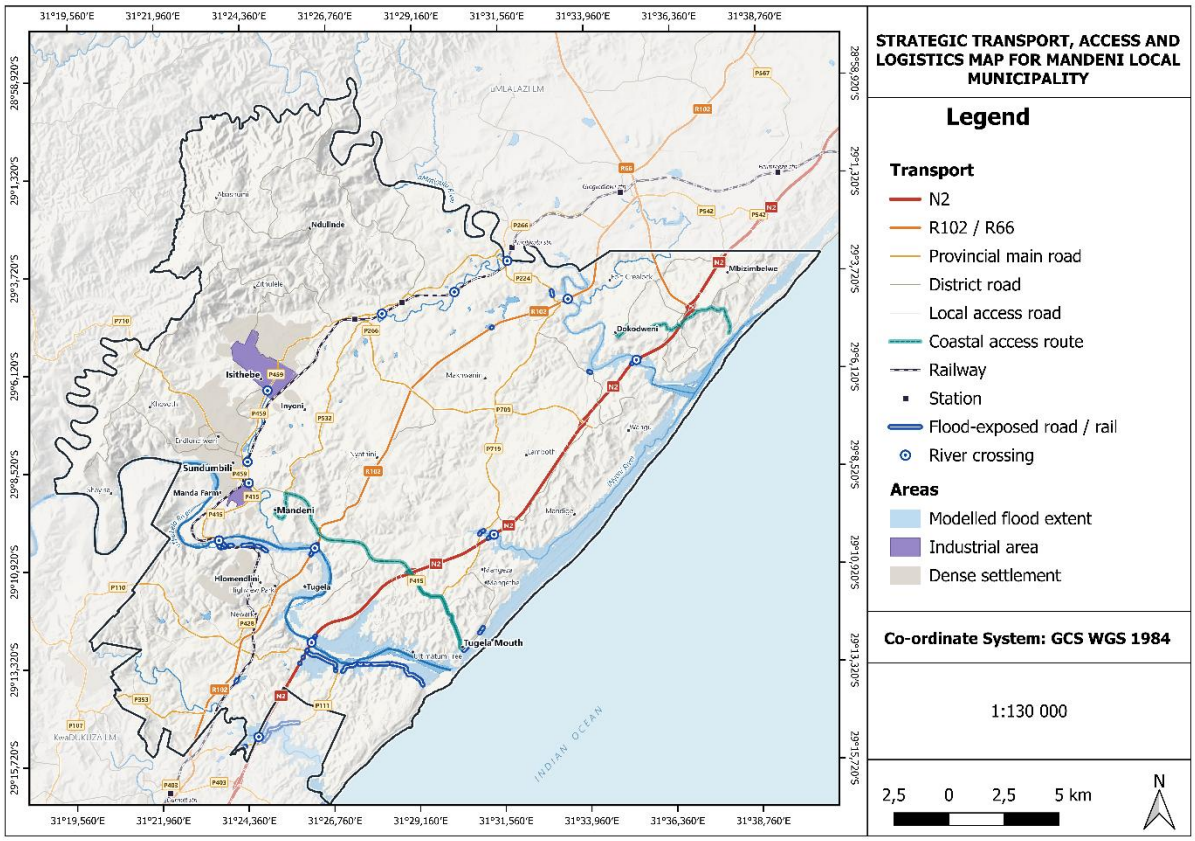

Figure 13: Strategic transport, access and logistics network in Mandeni Municipality

The IDP identifies motor-vehicle accidents mostly on the N2, R102, P459 and P415. Climate-related interruption of the N2–R102–rail logistics system can also delay workers, supplies and products serving Isithebe, SAPPI and other businesses. Road and access disruption can affect agricultural and forestry deliveries, daily trade, coastal tourism and fishing livelihoods. These wider consequences make continuity of access, alongside asset condition and safety, a central consideration in route planning.

6.9.1 Goal 17: Protect critical mobility, access and evacuation routes from climate disruption

Mandeni will identify and prioritise climate-exposed roads, bridges, culverts, access routes, public-transport points, evacuation routes, coastal access routes and logistics corridors.

6.9.2 Goal 18: Support inclusive and lower-carbon mobility over time

Mandeni will support mobility choices that improve access to livelihoods, reduce household vulnerability and progressively reduce transport-related emissions where feasible.

Priority directions for this focus area include:

- Climate-exposed route mapping: Map flood-prone, erosion-prone, fire-prone and access-constrained roads, bridges and culverts.
- Evacuation and emergency access: Identify routes needed for evacuation, fire response, ambulance access, relief distribution and coastal-risk response.
- Rural access: Prioritise rural and traditional-authority areas where poor access increases vulnerability during storms, floods or drought.
- Logistics continuity: Work with industry and relevant road authorities on continuity of the N2, R102, P459, P415, rail and key freight routes.
- Public transport nodes: Improve shade, drainage, safety and access at taxi ranks, bus stops and public waiting areas.
- Livelihood access: Protect routes that support farmers, SMMEs, informal traders, fishers, tourism operators and workers.

The SDF recognises roads, transport infrastructure, corridors and settlement linkages as key spatial structuring elements, making transport resilience an important spatial-planning and economic-development issue.

6.10 Circular waste economy and pollution reduction

Waste management supports both adaptation and mitigation. Litter and dumped material can obstruct stormwater systems and contaminate floodwater, while waste burning contributes to air pollution and some greenhouse-gas emissions. Managing organic waste can also reduce emissions from uncontrolled decomposition. These pathways require distinct indicators: drainage and pollution incidents for local resilience, and verified waste quantities and treatment routes for emissions screening.

Figure 14 below helps visualise the current communal-skip and collection-point model and the broad rural service gap that remains relevant to pollution, dumping and public-health risk.

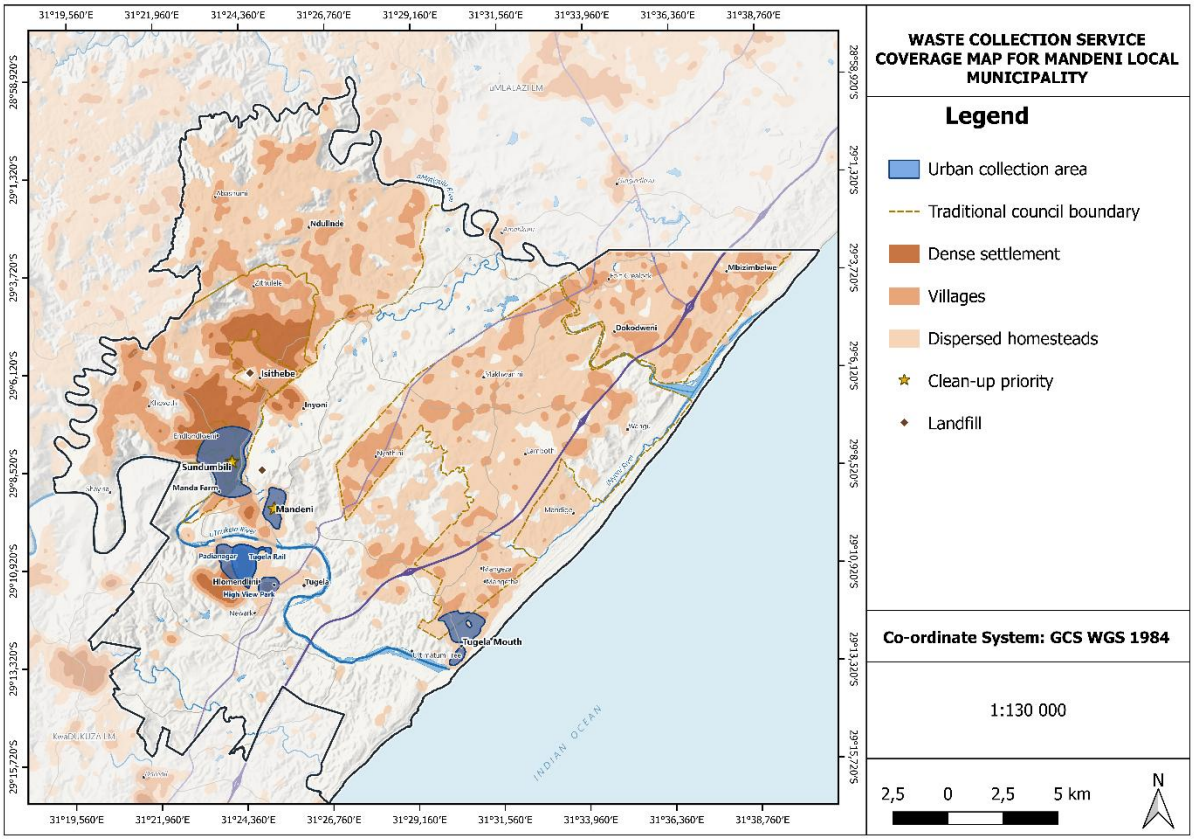

Figure 14: Existing communal-skip and collection-point coverage in Mandeni Municipality

Mandeni's IWMP identifies waste minimisation, recycling and reuse, collection, storage, disposal, awareness and compliance as linked objectives. Field observations recorded dumping, including tyres and rubble, and waste near drainage routes and watercourses. This material can obstruct flow or be carried downstream, so the affected sites require inspection, service review and appropriate clearing. Containers of uncertain contents require assessment and safe handling; visual observation alone does not establish hazardous-waste classification. Source separation and reliable collection must accompany education and enforcement so that households and businesses have practical alternatives to dumping or burning.

6.10.1 Goal 19: Reduce illegal dumping, waste burning and pollution in climate-risk hotspots

Mandeni will prioritise waste and pollution control in flood-prone, drainage-constrained, riparian, wetland, coastal, industrial and high-density settlement areas.

6.10.2 Goal 20: Build a circular waste economy that supports resilience, livelihoods and emissions reduction

Mandeni will develop waste recovery and source-reduction opportunities through the IWMP, linking recycling, organic-waste diversion, reliable collection and local enterprise support. Waste Management and Communications will work with shop owners, informal traders, market operators, taxi associations and business forums to agree practical separation, recycling and anti-burning measures in commercial areas and taxi ranks. Targeted workshops under Action 10.9 will reinforce these arrangements and use follow-up inspections and participation records to assess progress.

Priority directions for this focus area include:

- Waste hotspot register: Georeference illegal dumping sites, blocked drains, polluted watercourses, waste-burning areas and recurring clean-up locations.
- Drainage-linked waste control: Prioritise waste removal before rainy seasons in flood-prone roads, culverts, stormwater systems and river corridors.
- Enforcement and awareness: Link by-law enforcement, reporting and education to service improvements. Include shop owners, informal traders, market operators and taxi associations in source-separation, recycling and anti-burning workshops, with follow-up on agreed collection and disposal arrangements.
- Recycling and reuse: Support recycling cooperatives, buy-back links, business recycling, e-waste recovery and material recovery opportunities.
- Organic waste: Explore composting and organic-waste diversion linked to greening, agriculture and landfill reduction.
- Waste data: Improve waste-tonnage, collection, skip, transfer, illegal dumping and recycling data for planning and emissions screening.

The KwaZulu-Natal Air Quality Management Plan identifies waste burning as a significant source of air pollution and recommends waste-burning prevention strategies, waste minimisation, recycling and public awareness on the air-quality and health risks of uncontrolled burning.

6.11 Summary of Mandeni strategic goals

Table 26: Summary of Mandeni strategic goals

SFA	Goals
SFA 1: Heat, public health and climate-responsive settlements	Goal 1: Reduce immediate health and safety risks during heat waves and high-heat days. Goal 2: Reduce heat exposure through settlement greening, shade and climate-responsive public spaces.
SFA 2: Water security and drought-readiness	Goal 3: Protect water resources and reduce avoidable water stress. Goal 4: Strengthen drought-ready and climate-resilient water and sanitation systems through district coordination.
SFA 3: Flood-readiness, stormwater and resilient drainage	Goal 5: Reduce flood damage through stormwater, drainage and infrastructure-risk management. Goal 6: Manage rivers, wetlands and drainage systems as flood-protection infrastructure.
SFA 4: Coastal, estuarine and dune resilience	Goal 7: Reduce coastal, estuarine and dune-related risk to people, infrastructure and development. Goal 8: Restore and protect coastal and estuarine ecological buffers.
SFA 5: Fire, lightning, wind and hail risk management	Goal 9: Strengthen preparedness and response for fire, lightning, strong winds and hail. Goal 10: Reduce exposure and vulnerability through settlement safety, vegetation management and resilient infrastructure.
SFA 6: Spatial and resource inclusivity	Goal 11: Embed climate-risk screening into spatial planning, land-use management, housing and capital investment. Goal 12: Improve spatial and resource equity for vulnerable communities.
SFA 7: Low-carbon energy, industry and green economic development	Goal 13: Establish a phased emissions-screening and resource-efficiency programme. Goal 14: Support climate-resilient industry, cleaner production and green jobs.
SFA 8: Climate-resilient municipal buildings, public facilities and infrastructure	Goal 15: Climate-proof municipal and public facilities against priority hazards.

SFA	Goals
	Goal 16: Improve resource efficiency and operational resilience in municipal assets.
SFA 9: Mobility, access and livelihoods	Goal 17: Protect critical mobility, access and evacuation routes from climate disruption. Goal 18: Support inclusive and lower-carbon mobility over time.
SFA 10: Circular waste economy and pollution reduction	Goal 19: Reduce illegal dumping, waste burning and pollution in climate-risk hotspots. Goal 20: Build a circular waste economy that supports resilience, livelihoods and emissions reduction.

These strategic focus areas and goals provide the foundation for Section 7: Cross-cutting Work Areas and Goals, and later for the detailed Section 8: Climate Change Action Plan.

7 Cross-cutting Work Areas and Goals

This section sets out the cross-cutting work areas that enable implementation of Mandeni Local Municipality's strategic focus areas. The cross-cutting work areas are adapted to Mandeni's local institutional context, municipal mandate and vulnerability profile. Mandeni's climate risks cannot be addressed by one department alone. They cut across spatial planning, disaster management, environmental management, infrastructure, waste, human settlements, public safety, local economic development, finance, communications, traditional-authority land governance, district water and sanitation functions, provincial coastal and environmental mandates, and community-level preparedness.

Mandeni's coastal, industrial, agricultural, rural and urban systems are connected through roads, water, electricity, ecosystems and livelihoods. A flood can interrupt access and production while carrying waste into watercourses; drought or heat can affect household health, water demand and outdoor work; coastal change can disrupt settlements, tourism and fishing access. These linked impacts require the IDP, SDF, LUMS, SDBIP, Disaster Management Sector Plan, IWMP, Human Settlements Sector Plan, Coastal Management Programme, Estuary Management Plan and LED Strategy to coordinate spatial controls, maintenance, preparedness and investment within each authority's mandate.

The five cross-cutting work areas for Mandeni are:

- **Mainstreaming, governance, research and knowledge management** to ensure that climate change is embedded into municipal plans, systems, data, reporting and decision-making.
- **Economic impacts, livelihoods and green economy opportunities** to ensure that climate action supports jobs, livelihoods, SMMEs, agriculture, tourism, industry and the green economy.
- **Business models, municipal finance and climate funding** to ensure that climate action is funded, budgeted, costed and linked to municipal financial sustainability.
- **Communication, collaboration, public participation and skills development** to ensure that communities, officials, councillors, traditional authorities, businesses and partners understand and act on climate risks.
- **Human health, ecosystem health and environmental justice** to ensure that climate action protects vulnerable people, public health, ecological infrastructure and environmental quality.

7.1 Mainstreaming, governance, research and knowledge management

Mainstreaming is essential to ensure that climate change is not treated as the responsibility of one or two municipal departments only. The City of Cape Town strategy frames mainstreaming as a way to ensure that climate change becomes a shared responsibility across departments and is recognised as part of policies, strategies, plans and processes, supported by research, data and knowledge management.

For Mandeni, this work area is especially important because climate risk is already embedded in everyday municipal functions: land-use applications, housing projects, road and stormwater maintenance, waste management, public-facility planning, disaster relief, coastal management, estuary protection, traditional-authority engagement, LED planning and infrastructure prioritisation.

The Mandeni SDF already recognises that climate change, biodiversity loss, pollution, invasive alien species, sand mining, settlement expansion and wetland/estuary pressures require investment in ecological infrastructure and climate-responsive spatial planning. The LUMS also provides practical development-control tools that can support climate-risk mainstreaming, including management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, landfill sites, waterworks, sewerage works and traditional-authority environmental areas.

7.1.1 Goal 21: Mainstream climate change into municipal governance, planning, budgeting and decision-making

Mandeni will integrate climate change into municipal plans, policies, projects, budgets, reporting systems and decision-making processes. This includes the IDP, SDBIP, annual budget and Medium-Term Revenue and Expenditure Framework (MTREF), SDF, LUMS, Disaster Risk Management Sector Plan, IWMP, Human Settlements Sector Plan, LED Strategy, Coastal Management Programme, Estuary Management Plan and departmental workplans. Each lead department will link its priority actions to the relevant IDP objective, SDBIP output, implementation period and budget submission so that the Strategy can be implemented through normal municipal planning and performance processes.

7.1.2 Goal 22: Strengthen climate governance, institutional accountability and interdepartmental coordination

Mandeni will establish clear institutional arrangements for climate change implementation, including a Climate Change Steering Committee, departmental focal points, quarterly reporting, annual Council reporting and coordination with iLembe District Municipality and relevant provincial and national departments.

7.1.3 Goal 23: Build and maintain a climate evidence, research and knowledge-management system

Mandeni will develop and maintain a climate evidence register and GIS-based risk information system covering flood-prone areas, drainage and culvert risks, waste hotspots, coastal and estuarine risks, vulnerable settlements, critical facilities, ecological infrastructure, fire, lightning, wind and hail hazards, municipal emissions-screening data and implementation progress. Records will identify their source, date, location where verified, custodian and verification status, and distinguish observed incidents from reported concerns and modelled susceptibility. Environmental Management will link relevant complaints, inspections, authorisation or permit conditions, corrective actions and referrals to this evidence register so that recurring environmental risks can be tracked and reported alongside project delivery.

Priority directions for this work area include:

- Climate governance: Establish a Climate Change Steering Committee linked to MANCO, IDP, SDBIP and disaster-management reporting.
- Climate-risk screening: Apply climate-risk screening to land-use applications, housing projects, capital projects and public infrastructure.
- Evidence management: Maintain a climate evidence register and GIS climate-risk layer repository.
- Data improvement: Improve data on floodlines, stormwater, culverts, bridges, waste hotspots, vulnerable households, coastal assets and municipal emissions.

- Municipal reporting: Include climate progress in quarterly departmental reporting and annual IDP/SDBIP review.
- District alignment: Participate in iLembe district climate governance, water and sanitation coordination, air-quality planning and disaster-risk coordination.
- Traditional-authority coordination: Establish operating protocols for climate-risk decisions in traditional-authority areas, especially floodplains, wetlands, buffers and coastal-risk areas.

There is a need a for stronger integration with Disaster Management, Human Settlements, Waste Management and Technical Services to increase accountability and cohesion across contributing and affected departments.

7.2 Economic impacts, livelihoods and green economy opportunities

For Mandeni, this work area must focus on both physical climate risk and transition risk. Physical risk includes flood damage, water stress, heat, fire, coastal erosion, transport disruption and infrastructure damage. Transition risk includes changes in emissions reporting, procurement standards, carbon regulation, energy prices, resource-efficiency expectations and market competitiveness.

Mandeni's economic vulnerability is concentrated in Isithebe Industrial Estate, SAPPI Tugela Mill, sugarcane and forestry, the N2–R102–rail logistics system, informal businesses, and the coastal tourism and fishing economy. The 2025 LED Strategy Review identifies manufacturing, tourism, commercial activity, agriculture, SMMEs, informal trading and the green economy as key local economic sectors.

7.2.1 Goal 24: Reduce climate risks to Mandeni's local economy, livelihoods and key economic sectors

Mandeni will work with businesses, farmers, SMMEs, informal traders, industry, tourism operators, fishers and logistics stakeholders to reduce climate-related disruption to local livelihoods, production, transport, service delivery and investment.

7.2.2 Goal 25: Grow green economy opportunities that support jobs, resilience and resource efficiency

Mandeni will support green economy opportunities linked to recycling, alien invasive clearing, ecological restoration, greening, climate-smart agriculture, cleaner production, energy efficiency, water efficiency, waste reduction, eco-tourism, sustainable coastal livelihoods and public employment.

Priority directions for this work area include:

- Business continuity: Support business-continuity planning for Isithebe, SAPPI-linked activities, SMMEs, informal traders, tourism operators, farmers and logistics-dependent businesses.
- Cleaner production: Engage industry on energy efficiency, water efficiency, waste reduction, emissions screening and climate-risk disclosure.
- Climate-smart agriculture: Work with farmers and agricultural associations on drought-readiness, soil protection, water conservation, fire management and protection of high-value agricultural land.
- Green SMMEs: Support small businesses and cooperatives in recycling, composting, restoration, greening, maintenance and climate services.

- Coastal livelihoods: Support climate-resilient tourism, fishing and public access around Tugela Mouth, Dokodweni and coastal nodes.
- Green skills: Link EPWP, youth programmes and partner initiatives to restoration, alien clearing, recycling, maintenance and greening.
- Just transition: Ensure that climate-related economic change protects vulnerable workers, informal traders and low-income households.

The KZN implementation framework also identifies renewable energy, green economy investment, ecological infrastructure management, eco-tourism expansion, sustainable settlement planning and climate-resilient initiatives as interventions that can address environmental challenges while supporting investment, growth and employment.

7.3 Business models, municipal finance and climate funding

Climate response can be costly, especially where infrastructure must be installed, upgraded or replaced, and municipal budgets alone may be insufficient. In Mandeni, climate actions must be prioritised alongside existing service-delivery, maintenance and infrastructure needs. Project appraisal must therefore consider how an action reduces future losses, protects assets, avoids disaster-recovery costs and improves service reliability, together with its capital, operating and maintenance requirements. A staged, costed programme will help the municipality direct available resources to its highest priorities and prepare credible applications for additional funding.

7.3.1 Goal 26: Mobilise climate finance and package priority climate projects for funding

Mandeni will develop a climate-project pipeline and funding register to identify opportunities from municipal budgets, provincial and national grants, district partnerships, donor funding, private-sector partnerships, public employment programmes and environmental or climate-finance mechanisms.

7.3.2 Goal 27: Integrate climate risk, lifecycle costing and resilience benefits into municipal financial decisions

Mandeni will strengthen budgeting and project appraisal so that the cost of inaction, avoided damage, maintenance savings, ecosystem services, social benefits and long-term resilience are considered when prioritising projects.

Priority directions for this work area include:

- Climate project pipeline: Package priority projects for stormwater, drainage, coastal adaptation, ecological restoration, greening, waste diversion, public-facility upgrades and emissions screening.
- Climate budget tagging: Identify and tag climate-related budget items in the IDP, SDBIP and departmental budgets.
- Funding register: Maintain a register of climate funding opportunities, grant windows, provincial support programmes, donor programmes and private-sector partnership opportunities.
- Cost of inaction: Include avoided flood damage, reduced clean-up costs, health benefits, asset protection and reduced disaster-relief costs in project motivation.
- Nature-based solutions: Prioritise lower-cost ecosystem-based adaptation where appropriate, including wetlands, dunes, riparian buffers, alien clearing and urban greening.

- Procurement alignment: Include climate-risk and resource-efficiency criteria in procurement specifications where feasible.
- Asset resilience: Link climate finance to roads, stormwater, public buildings, parks, public lighting, coastal access, emergency facilities and waste infrastructure.

7.4 Communication, collaboration, public participation and skills development

Communication, education and training will support implementation by helping people understand local risks, use warnings, report problems and participate in decisions. The programme will combine accessible public information with targeted engagement of communities, municipal officials and the organisations responsible for services and land management.

Communication will use accessible isiZulu and English and formats suited to urban, rural and coastal communities, schools, clinics, businesses and traditional-authority areas. Materials will explain practical steps before, during and after the relevant hazard season or event, together with current reporting and emergency contacts. Ward committees, councillors, Amakhosi, Izinduna and traditional councils will help select locally effective channels, including meetings, radio, printed material and telephone or digital messaging. People with limited connectivity, disabilities or caregiving responsibilities must be able to participate and receive warnings.

The Disaster Risk Management Sector Plan provides a platform for this work because it includes disaster-risk assessment, priority hazards, vulnerability maps, institutional capacity, volunteers, fire and rescue services, risk reduction and public awareness. The Disaster Risk Management Plan also provides for institutional arrangements, stakeholder participation, community and ward participation, volunteers and integration with the IDP process.

7.4.1 Goal 28: Provide timely, accessible and locally relevant climate-risk communication

Mandeni will ensure that residents, businesses, schools, clinics, municipal staff, councillors, ward committees and traditional authorities receive clear and practical climate information, warnings and preparedness messages.

7.4.2 Goal 29: Build partnerships for climate implementation across government, communities, business and civil society

Mandeni will strengthen collaboration with iLembe District Municipality, provincial and national departments, traditional authorities, business, industry, farmers, NGOs, research institutions, schools, clinics, community organisations and neighbouring municipalities.

7.4.3 Goal 30: Strengthen climate skills, training and institutional capacity

Mandeni will build climate-change capacity among municipal officials, councillors, ward committees, traditional leaders, volunteers, community structures, businesses and implementing partners.

Priority directions for this work area include:

- Ward-based communication: Develop ward-specific climate messages for floods, heat, fire, lightning, wind, hail, drought, waste and coastal safety.

- Early warning: Strengthen warning dissemination through councillors, ward committees, traditional authorities, schools, clinics, community halls, WhatsApp groups, radio and social media.
- Public participation: Use IDP meetings, ward committees, traditional councils and stakeholder forums to identify hotspots and report climate risks.
- Municipal training: Train officials on climate-risk screening, floodlines, buffers, coastal controls, ecological infrastructure, emissions screening and project appraisal.
- Volunteer and community capacity: Strengthen disaster volunteers, community reporting, youth programmes, school awareness and local maintenance partnerships.
- Business collaboration: Create practical engagements with Isithebe, SAPPI, SMMEs, farmers, tourism operators and transport stakeholders.
- Visual communication: Use maps, posters, infographics and simplified ward overlays to communicate climate risks clearly.

7.5 Human health, ecosystem health and environmental justice

Human health and ecosystem health by recognising that ecosystems provide goods and services such as food, water, flood regulation, disease regulation, waste regulation, water-quality protection, recreation and other well-being benefits. It also identifies air and water pollution, food-system vulnerability and human health impacts as important climate-related risks.

For Mandeni, this work area is central to climate justice. The most vulnerable households are often those with the least ability to prepare for or recover from climate shocks. Rural and traditional-authority communities, informal and traditional dwellings, floodline households, poorly serviced settlements, children, older persons, people with disabilities, low-income households and households with weak water, sanitation or waste services require targeted climate support.

Mandeni's ecological systems are critical to public health and disaster-risk reduction. Coastal dunes, estuaries, wetlands, riparian areas, the uThukela River corridor and remaining threatened coastal grassland provide natural functions that support water quality, flood management, erosion control, thermal comfort and coastal resilience. Degradation can weaken those functions and increase pressures on communities and municipal services. Protecting ecosystem condition and connectivity therefore forms part of the same response as safeguarding vulnerable people, infrastructure and livelihoods.

7.5.1 Goal 31: Protect vulnerable people and public health from climate-related risks

Mandeni will reduce climate-related health and safety risks from heat, flooding, contaminated water, sewage exposure, waste burning, illegal dumping, fire, lightning, strong winds, hail, coastal hazards and air pollution.

7.5.2 Goal 32: Protect, restore and manage ecological infrastructure as a foundation for climate resilience

Mandeni will protect and restore rivers, wetlands, estuaries, dunes, grasslands, forests, biodiversity corridors, protected areas and riparian buffers as municipal climate-resilience infrastructure.

7.5.3 Goal 33: Advance environmental justice through targeted action in high-risk and underserved areas

Mandeni will prioritise climate interventions where environmental degradation, service backlogs, poverty, weak infrastructure and hazard exposure overlap.

Priority directions for this work area include:

- Vulnerable-group targeting: Identify households, schools, clinics, elderly residents, people with disabilities and low-income settlements requiring targeted climate support.
- Public-health integration: Link climate action to heat-health, water quality, sanitation, air quality, waste burning, illegal dumping and pollution control.
- Ecosystem restoration: Prioritise wetlands, rivers, estuaries, dunes, riparian buffers, grasslands, forests and biodiversity corridors for restoration and protection.
- Air-quality and emissions linkages: Use the KZN and iLembe AQMPs to support action on industry, vehicles, biomass burning, waste burning, domestic fuel use, agriculture and wastewater.
- Pollution hotspots: Track and respond to polluted streams, sewage near watercourses, illegal dumping, waste-burning sites and industrial pollution concerns.
- Food and livelihood resilience: Support climate-smart agriculture, community gardens, ecosystem-based livelihoods, coastal livelihoods and green jobs.
- Environmental compliance: Strengthen enforcement of buffers, waste by-laws, coastal controls, estuary protections and environmental conditions.

The iLembe Biodiversity Sector Plan identifies Critical Biodiversity Areas and Ecological Support Areas as biodiversity priority areas that should guide land-use planning, environmental assessment, authorisations and natural-resource management. Mandeni's coastal vulnerability assessment also confirms that active beach-dune systems, estuarine functional zones, low-lying river-mouth areas and exposed coastal assets are highly vulnerable, and that the most effective adaptation pathway is to avoid new permanent development in hazardous areas, maintain space for coastal systems to move and restore natural buffers.

The KZN Air Quality Management Plan identifies Mandeni as one of the municipalities with a high probability of exposure to multiple air-pollution sources, including industry, vehicles, biomass burning, waste burning, residential fuel burning, agriculture, mines and quarries, landfills and wastewater treatment. This makes air quality, waste burning and industrial emissions important public-health and climate-governance issues for Mandeni.

7.6 Summary of cross-cutting goals

Table 27: Summary of cross-cutting goals

CCWA	Goal number	Goal
CCWA 1: Mainstreaming, governance, research and knowledge management	Goal 21	Mainstream climate change into municipal governance, planning, budgeting and decision-making.
	Goal 22	Strengthen climate governance, institutional accountability and interdepartmental coordination.
	Goal 23	Build and maintain a climate evidence, research and knowledge-management system.

CCWA	Goal number	Goal
CCWA 2: Economic impacts, livelihoods and green economy opportunities	Goal 24	Reduce climate risks to Mandeni's local economy, livelihoods and key economic sectors.
	Goal 25	Grow green economy opportunities that support jobs, resilience and resource efficiency.
CCWA 3: Business models, municipal finance and climate funding	Goal 26	Mobilise climate finance and package priority climate projects for funding.
	Goal 27	Integrate climate risk, lifecycle costing and resilience benefits into municipal financial decisions.
CCWA 4: Communication, collaboration, public participation and skills development	Goal 28	Provide timely, accessible and locally relevant climate-risk communication.
	Goal 29	Build partnerships for climate implementation across government, communities, business and civil society.
	Goal 30	Strengthen climate skills, training and institutional capacity.
CCWA 5: Human health, ecosystem health and environmental justice	Goal 31	Protect vulnerable people and public health from climate-related risks.
	Goal 32	Protect, restore and manage ecological infrastructure as a foundation for climate resilience.
	Goal 33	Advance environmental justice through targeted action in high-risk and underserved areas.

7.7 Implementation implications

The cross-cutting work areas are not separate from the Strategic Focus Areas. They are the enabling conditions required for every Strategic Focus Area to succeed. For example,

- Flood-readiness requires GIS data, stormwater registers, ward reporting, funding, public awareness, land-use controls and maintenance accountability.
- Coastal resilience requires updated evidence, coastal governance, public communication, funding, ecological restoration and development-control enforcement.
- Fire, lightning, wind and hail preparedness requires early warning, volunteer training, public awareness, facility audits, community reporting and disaster-management coordination.
- Low-carbon industry and green economy requires business engagement, emissions screening, LED alignment, skills development, finance and industrial partnerships.
- Waste and pollution reduction requires enforcement, public behaviour change, waste data, hotspot mapping, health monitoring and green-enterprise opportunities.
- Ecosystem restoration requires biodiversity evidence, community participation, project funding, land-use controls, monitoring and green job creation.

The implication for Mandeni is clear: implementation of the climate strategy must be managed as an integrated municipal programme, not as a once-off environmental project. The cross-cutting work areas create the governance, funding, data, communication, partnership, health and justice systems required to deliver the action plan in Section 8.

8 Climate Change Action Plan

This Climate Change Action Plan translates the Mandeni Local Municipality Climate Change Strategy into practical actions. It is structured around the “Strategic Focus Areas” and **“**Cross-cutting Work Areas” set out in the strategy. The action plan is intended to guide implementation through the IDP, SDBIP, municipal budget, departmental plans, disaster management planning, land-use management, infrastructure planning, waste management, human settlements planning, local economic development, coastal management and partnerships.

The action plan addresses connected impacts: flooding and obstructed drainage can interrupt roads and essential services; waste can worsen blockages and pollution; heat, drought and severe weather can disrupt health, facilities and livelihoods; and coastal change can affect settlements and access. Immediate work therefore combines a georeferenced flood, drainage, bridge and culvert register with a waste and watercourse-pollution hotspot programme, rural water and sanitation verification, critical-facility and business-continuity planning, and fire, lightning, wind and hail preparedness. Applicable floodline and coastal controls, habitat protection and restoration, industrial air, water, energy and emissions screening, and climate-risk screening of major capital projects and land-use decisions will connect maintenance and preparedness to longer-term investment.

The action plan is also informed by the Mandeni IDP, which identifies priority hazards including severe weather, lightning, strong winds, hail, heavy rain, extreme temperatures, storm surges along the coast, structural and veld fires, drought, illegal electricity connections and motor-vehicle accidents, particularly on the N2, R102, P459 and P415.

8.1 Purpose of the action plan

The purpose of this action plan is to:

1. convert Mandeni’s climate vision, principles and strategic goals into implementable actions;
2. identify short-, medium- and long-term priorities;
3. assign lead departments, support departments and external partners;
4. provide indicators for monitoring and annual reporting;
5. support integration into the IDP, SDBIP, budget and departmental workplans;
6. identify actions that can begin immediately using existing evidence;
7. create a basis for future costing, funding applications and project packaging.

This is a strategy-level action plan. It does not replace detailed engineering design, environmental authorisation, disaster-response procedures, coastal-process modelling, floodline modelling, cadastral verification, procurement planning or a greenhouse-gas inventory. The vulnerability evidence synthesis itself notes that it is a screening and prioritisation report and does not replace those technical processes.

8.2 Implementation timeframes

The action plan uses three implementation horizons.

Table 28: Implementation timeframes

Timeframe	Meaning	Main implementation emphasis
Immediate: 0–2 years	Actions to begin in the first two financial years after adoption	No-regret actions, governance, registers, mapping, awareness, maintenance, screening tools and existing-budget alignment
Medium term: 3–5 years	Actions requiring technical work, partnerships, budgeting or project preparation	Infrastructure upgrades, restoration projects, facility retrofits, coastal hazard updates, cleaner-production partnerships and project packaging
Long term: 5+ years	Structural or transformational actions requiring sustained investment	Settlement redesign or relocation where unavoidable, long-term coastal adaptation, low-carbon transition, major infrastructure upgrades and scaled ecosystem restoration

8.3 Implementation responsibilities

The lead departments and partners listed below should be confirmed during internal municipal review.

Table 29: Implementation responsibilities

Institution / department	Indicative role in implementation
Office of the Municipal Manager	Overall coordination, Council reporting, interdepartmental accountability and integration with municipal performance systems
IDP and Planning	Integration into IDP, SDBIP, SDF, LUMS, ward-based planning and capital project screening
Economic Development, Planning and Human Settlements	Spatial planning, land-use management, human settlements, LED, business resilience and green economy
Community Services and Public Safety	Disaster management, fire and rescue, public safety, emergency relief, awareness and community mobilisation
Environmental Management	Biodiversity, coastal management, estuary management, environmental compliance, greening, ecosystem restoration and climate coordination
Waste Management / Cleansing Services	Illegal dumping, waste minimisation, recycling, skips, waste awareness, by-law enforcement and waste data
Technical Services / Infrastructure	Roads, stormwater, public facilities, drainage, culverts, bridges, public lighting and infrastructure maintenance
Finance / SCM	Budget alignment, funding applications, procurement support and climate finance tracking
Communications / Public Participation	Climate awareness, warnings, ward-level communication and public-facing materials
iLembe District Municipality	Water, sanitation, regional disaster coordination, air quality, district planning and district climate alignment
Traditional authorities	Land-use coordination, rural awareness, settlement risk reduction, dumping control and local implementation in traditional-authority areas
Provincial and national departments	Technical support, regulatory alignment, disaster support, coastal governance, funding and sector programmes
Business, industry and civil society	Cleaner production, business continuity, emissions data, green jobs, restoration, awareness and implementation partnerships

The IDP already records budgeted disaster-risk-reduction programmes for 2025/26, including awareness campaign materials, emergency relief aid, lightning conductors for vulnerable wards, schools and clinics, capacity building, temporary structures, PPE, volunteer training and fire-response equipment. These existing budget items provide immediate entry points for climate action.

8.4 Priority no-regret action programme

The following actions should be treated as the first implementation package because they respond to known risks and can be started before all technical studies are complete.

Table 30: Priority no-regret action programme

No.	Priority action	Lead	Key support	Timeframe	Indicator
1	Establish a Mandeni Climate Change Steering Committee linked to MANCO, IDP and disaster-management structures	Municipal Manager	All departments, iLembe DM	Immediate	Committee established; quarterly meetings held
2	Develop a climate-risk screening checklist for all major capital projects, land-use applications, housing projects and public facilities	Planning / Environmental Management	Technical Services, Human Settlements, Disaster Management	Immediate	Checklist approved and applied to new projects
3	Compile a georeferenced register of flood-prone roads, culverts, bridges, stormwater drains, public facilities and vulnerable households	Technical Services	Disaster Management, Planning, ward committees	Immediate	GIS register completed and updated annually
4	Establish a waste and watercourse-pollution hotspot programme	Waste Management / Environmental Management	Technical Services, ward committees, traditional authorities	Immediate	Hotspot register completed; clean-up and enforcement schedule adopted
5	Strengthen early-warning dissemination for floods, heat, fire, lightning, hail, wind and storm surge	Disaster Management	iLembe DM, SAWS, councillors, schools, clinics, traditional authorities	Immediate	Warning protocol approved; ward communication list updated
6	Review floodline, wetland, coastal and estuary buffer controls in the SDF and LUMS	Planning / Environmental Management	EDTEA, DFFE, iLembe DM	Immediate–medium	Screening layers incorporated into planning decisions
7	Prepare a municipal emissions-screening data template for electricity, fuel, fleet, generators, waste, wastewater, transport and major industrial engagement	Environmental Management / Finance	Technical Services, Waste, LED, industry	Immediate	Emissions-screening template adopted and populated annually
8	Identify priority ecological	Environmental Management	WILDTRUST, EDTEA, DFFE,	Immediate	Restoration priority list and

No.	Priority action	Lead	Key support	Timeframe	Indicator
	restoration sites: wetlands, rivers, dunes, estuaries, buffers, alien invasive areas and erosion hotspots		community groups		project pipeline developed
9	Prepare critical-facility climate-risk profiles for municipal buildings, halls, clinics, schools, depots and emergency-support facilities	Technical Services	Disaster Management, Health, Education, Planning	Immediate–medium	Facility risk profiles completed for priority facilities
10	Package climate actions for inclusion in the next IDP, SDBIP and budget review	IDP and Planning	Finance, all departments	Immediate	Climate action schedule included in IDP/SDBIP

These priority actions respond directly to the evidence finding that Mandeni should not wait for a perfect dataset before acting. Existing evidence is sufficient to justify drainage maintenance, waste control, buffer enforcement, early warning, ecosystem restoration, protection of critical services and prevention of new development in known hazard areas.

8.5 Climate Change Action Plan by Strategic Focus Area

8.5.1 Heat, public health and climate-responsive settlements

Table 31: Heat, public health and climate-responsive settlements

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
1.1	Develop a heat-health protocol for high-heat and heat-wave days, including guidance for schools, clinics, outdoor workers, municipal teams and public events	Disaster Management / Health, Communications, Community Services	All wards, with focus on dense urban areas and vulnerable rural settlements	Immediate	Heat-health protocol adopted
1.2	Include heat warnings in the municipal early-warning communication system	Disaster Management / Communications	All wards	Immediate	Heat warnings issued through approved channels
1.3	Identify public facilities that can function as cooling, relief or support points during extreme heat	Community Services / Technical Services	Halls, libraries, clinics, schools and municipal facilities	Immediate–medium	List of facilities completed and updated
1.4	Prioritise tree planting, shade and greening in heat-exposed public spaces, taxi ranks, schools, clinics, halls and settlement areas	Environmental Management / Parks, Greening Programme	Mandeni, Sundumbili, Manda Farm, Isithebe-linked settlements and public waiting areas	Medium	Number of priority sites greened
1.5	Promote climate-responsive settlement design, including shade, ventilation, cool roofs, safe water access and drainage in housing and public-facility projects	Human Settlements / Planning, Technical Services	New and upgraded housing projects	Medium–long	Climate-responsive design measures included in project briefs

The GreenBook defines very hot days as days where maximum temperature exceeds 35°C and heat-wave days as periods where maximum temperature exceeds the warmest-month average by 5°C for at least three consecutive days. The Mandeni Greening Plan also identifies greening as a way to create employment while maintaining environmental sustainability and addressing climate-change impacts.

8.5.2 Water security and drought-readiness

Table 32: Water security and drought-readiness

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
2.1	Establish a joint water and sanitation climate-risk working arrangement with iLembe District Municipality	Municipal Manager / iLembe DM, Technical Services, Environmental Management	Municipal-wide	Immediate	Working arrangement established
2.2	Compile a rural water vulnerability register covering settlements, public facilities and communities dependent on communal points, springs, boreholes, tankers or unreliable supply	iLembe DM / Mandeni Planning, ward committees, traditional authorities	Rural and traditional-authority wards	Immediate	Register completed and updated annually
2.3	Identify sanitation systems and areas at risk from flooding, poor drainage or watercourse contamination	iLembe DM / Environmental Management, Disaster Management	Flood-prone settlements, river and wetland areas	Immediate–medium	Sanitation risk list completed
2.4	Promote water conservation and leak-reporting campaigns in public facilities and communities	iLembe DM / Communications, ward committees	All wards	Immediate	Awareness campaigns conducted
2.5	Protect watercourses from dumping, sewage, erosion and encroachment through enforcement, clean-ups and buffer management	Environmental Management / Waste, Technical Services, iLembe DM	uThukela River, Mandeni Stream, wetlands, estuaries and tributaries	Immediate–medium	Number of priority watercourse hotspots addressed

Ward-based evidence shows rural water vulnerability in several traditional-authority wards. For example, Ward 1 records households using communal water, springs, rivers/streams, rainwater tanks and other sources, indicating the need for water-security and drought-readiness actions.

8.5.3 Flood-readiness, stormwater and resilient drainage

Table 33: Flood-readiness, stormwater and resilient drainage

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
3.1	Develop and maintain a GIS-based stormwater, drainage, bridge and culvert risk register	Technical Services / Disaster Management, Planning	Sundumbili, Manda Farm, Mandeni, uThukela corridor, rural access routes	Immediate	Register completed and updated annually
3.2	Implement pre-rainy-season drain, culvert and watercourse clearing	Technical Services / Waste, Disaster Management	Known flood-prone roads and settlements	Immediate and ongoing	Maintenance schedule implemented
3.3	Map households, roads, public facilities and infrastructure located on or near known floodlines	Planning / Disaster Management, Human Settlements	Flood-prone areas and uThukela River corridor	Immediate–medium	Flood-exposure layer produced
3.4	Include flood-risk screening in all major land-use applications, housing projects and capital projects	Planning / Technical Services, Environmental Management	Municipal-wide	Immediate	Screening applied to new applications
3.5	Prioritise stormwater upgrades and road drainage improvements based on the risk register	Technical Services / Finance, Planning	Highest-risk roads, culverts and bridges	Medium–long	Number of priority upgrades implemented
3.6	Link illegal dumping enforcement to flood-risk reduction where waste blocks drains, culverts and channels	Waste Management / Technical Services, Environmental Management	Dumping and drainage hotspots	Immediate	Number of hotspots cleared and monitored

The site visit assessment recorded flooding in Sundumbili linked to poor drainage, damaged public infrastructure and dumping near flood-prone areas, confirming the need for drainage assessment, flood-prone road mapping and checks for blocked, damaged or undersized culverts, drains and stormwater channels.

8.5.4 Coastal, estuarine and dune resilience

Table 34: Coastal, estuarine and dune resilience

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
4.1	Update coastal hazard lines, coastal management line information, exposed coastal asset data and shoreline-change information	Environmental Management / Planning, EDTEA, DFFE	Tugela Mouth, Dokodweni, Mbizimbelwe, aMatigulu/iNyoni, coastal precincts	Medium	Updated coastal risk information obtained
4.2	Treat the LUMS 100 m coastal buffer as a minimum screening control and apply wider risk-based controls where estuarine functional zones, active dunes, wetlands, erosion-prone shoreline or flood-prone land are present	Planning / Environmental Management	Coastal influence zone	Immediate	Screening guidance adopted
4.3	Integrate the aMatigulu/iNyoni Estuary Management Plan into development control, awareness, restoration and monitoring	Environmental Management / Planning, Estuary Advisory Forum	aMatigulu/iNyoni estuary system	Immediate–medium	Estuary actions included in municipal workplans
4.4	Identify coastal public access, tourism and emergency-access routes exposed to erosion, flooding or storm surge	Planning / Technical Services, Disaster Management	Tugela Mouth, Dokodweni, coastal access points	Medium	Coastal access risk register developed
4.5	Implement dune, estuary, wetland and coastal vegetation restoration projects with partners	Environmental Management / WILDTRUST, EDTEA, DFFE, communities	Coastal dunes, estuaries, river mouths and wetlands	Medium–long	Hectares or sites restored
4.6	Strengthen monitoring and enforcement against illegal sand mining and activities that disrupt sediment flows or increase erosion risk	Environmental Management / EDTEA, DFFE, SAPS, traditional authorities	Rivers, estuaries, coastal sediment systems	Immediate–medium	Reported incidents investigated and tracked

The Climate Risk and Vulnerability Assessment Report finds that Mandeni has high to very high coastal vulnerability, especially in active beach-dune systems, estuarine functional zones, low-lying river-mouth areas and exposed coastal assets. It states that the most effective adaptation pathway is to keep hazardous areas free of new permanent development, maintain space for coastal systems to move, restore natural buffers and progressively adapt or relocate assets where risk becomes unacceptable.

8.5.5 Fire, lightning, wind and hail risk management

Table 35: Fire, lightning, wind and hail risk management

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
5.1	Update ward-level fire, lightning, wind and hail risk maps and use them in annual preparedness planning	Disaster Management / GIS, ward committees	All wards	Immediate	Annual hazard map review completed
5.2	Implement community awareness programmes on lightning safety, fire prevention, wind and hail preparedness	Disaster Management / Communications, schools, clinics, traditional authorities	All wards, with focus on high-risk rural and settlement areas	Immediate and ongoing	Awareness sessions held quarterly
5.3	Install or prioritise lightning protection at vulnerable schools, clinics, halls and public gathering points	Disaster Management / Technical Services, Education, Health	Vulnerable wards, schools and clinics	Immediate–medium	Number of lightning-protection sites installed or assessed
5.4	Maintain firebreaks and vegetation management in high-risk rural, agricultural and wildland-urban interface areas	Fire and Rescue / Environmental Management, farmers, traditional authorities	Rural and agricultural wards	Immediate and ongoing	Firebreak and vegetation-management programme implemented
5.5	Strengthen fire and rescue capacity, equipment, PPE and volunteer training	Community Services and Public Safety / Finance	Municipal-wide	Immediate–medium	Fire equipment, PPE and volunteer training delivered
5.6	Include roof, drainage, tree and structural-risk checks for public facilities exposed to strong winds and hail	Technical Services / Disaster Management	Public facilities and vulnerable settlements	Medium	Facility checks completed

The IDP records disaster-risk-reduction strategies for lightning, strong winds and illegal electricity connections, including lightning conductors, community awareness, early warning and partnerships. It also includes 2025/26 disaster-risk budgets for awareness materials, emergency relief, lightning conductors, capacity building, temporary structures, PPE, volunteer training and a fire engine.

8.5.6 Spatial and resource inclusivity

Table 36: Spatial and resource inclusivity

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
6.1	Adopt a climate-risk screening checklist for land-use applications, rezoning, subdivision, township establishment and building-control referrals	Planning / Environmental Management, Disaster Management	Municipal-wide	Immediate	Checklist adopted and applied
6.2	Strengthen use of SDF and LUMS controls for floodline areas, coastal management zones, river reserves, environmentally sensitive areas, unserviced areas and traditional-authority environmental areas	Planning / Environmental Management	Municipal-wide	Immediate	LUMS/SDF climate-screening guidance issued
6.3	Prepare a climate-risk review of housing projects and proposed settlement expansion areas	Human Settlements / Planning, Technical Services, Disaster Management	Existing and proposed housing projects	Immediate–medium	Housing climate-risk review completed
6.4	Establish a traditional-authority climate-risk engagement programme	Planning / Environmental Management, Disaster Management	Macambini, Mathonsi and Sikhonyane areas	Immediate	Engagement programme established
6.5	Identify households in known high-risk locations for social support, preparedness, upgrading, drainage improvement or longer-term relocation assessment	Human Settlements / Disaster Management, ward committees	Floodline households, informal settlements, traditional settlements, coastal-risk areas	Medium–long	Vulnerable household register developed
6.6	Integrate climate-risk priorities into ward-based plans	IDP and Planning / ward committees	All wards	Medium	Ward-based climate actions reflected in IDP inputs

The Land Use Management Scheme includes provisions relevant to climate-risk management, including management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, landfill sites, waterworks, sewerage works and traditional-authority environmental areas.

8.5.7 Low-carbon energy, industry and green economic development

Table 37: Low-carbon energy, industry and green economic development

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
7.1	Develop a municipal emissions-screening template for electricity, fuel, fleet, generators, waste, wastewater and public lighting	Environmental Management / Finance, Technical Services	Municipal operations	Immediate	Template completed and populated annually
7.2	Compile a municipal electricity and fuel-use baseline for key facilities, fleet and generators	Finance / Technical Services, Environmental Management	Municipal facilities and fleet	Immediate	Baseline completed
7.3	Establish an industrial climate and resource-efficiency engagement platform with Isithebe, SAPPI and other major businesses	LED / Environmental Management, iLembe DM, EDTEA	Isithebe, SAPPI Tugela Mill, industrial and commercial nodes	Immediate–medium	Engagement platform established
7.4	Support cleaner-production, energy-efficiency, water-efficiency and waste-reduction opportunities in industry and SMMEs	LED / industry partners, EDTEA	Isithebe, Mandeni CBD, Sundumbili, SMME clusters	Medium	Number of businesses participating
7.5	Package green economy projects linked to recycling, restoration, alien clearing, greening, eco-tourism, climate-smart agriculture and public employment	LED / Environmental Management, Waste, Agriculture, NGOs	Rural wards, coastal areas, CBD, Isithebe, Tugela Mouth	Medium	Green economy project pipeline developed
7.6	Prepare terms of reference for a full greenhouse-gas inventory when data and funding are available	Environmental Management / Finance, iLembe DM	Municipal-wide	Medium	GHG inventory ToR prepared

The iLembe Air Quality Management Plan includes emissions inventory work for industrial operations, mining and quarries, domestic fuel burning, vehicles, waste treatment and disposal, agriculture, biomass burning and greenhouse gases. The KwaZulu-Natal Air Quality Management Plan also identifies Mandeni as one of the areas with high probability of exposure to multiple air-pollution sources.

8.5.8 Climate-resilient municipal buildings, public facilities and infrastructure

Table 38: Climate-resilient municipal buildings, public facilities and infrastructure

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
8.1	Conduct a climate-risk audit of municipal buildings, halls, depots, parks, public spaces and emergency-use facilities	Technical Services / Disaster Management, Environmental Management	Municipal-owned facilities	Immediate–medium	Facility risk audit completed
8.2	Identify facilities suitable for emergency shelter, cooling, water distribution, relief storage or coordination during climate events	Disaster Management / Community Services, Technical Services	Halls, libraries, schools and other public facilities	Immediate	Emergency-support facility list completed
8.3	Prioritise climate-resilient upgrades such as roof repairs, gutters, drainage, ventilation, shade, backup power readiness and access improvements	Technical Services / Finance, Disaster Management	Highest-risk facilities	Medium–long	Number of facilities upgraded
8.4	Include climate-risk screening in all capital project briefs and procurement specifications	Technical Services / SCM, Planning, Environmental Management	All capital projects	Immediate	Screening included in project documentation
8.5	Improve municipal asset maintenance planning using climate-risk information	Technical Services / Finance	Roads, drainage, public buildings, parks and public lighting	Medium	Climate risks reflected in asset maintenance plans
8.6	Establish post-event damage assessment forms for municipal facilities and infrastructure	Disaster Management / Technical Services, Finance	All affected areas	Immediate	Damage assessment template adopted

The Disaster Management Emergency Relief Aid Policy identifies relief functions including food, water, health, clothing, shelter, sanitation, hygiene and relief-supply management, which makes climate-ready public facilities important for response and recovery.

8.5.9 Mobility, access and livelihoods

Table 39: Mobility, access and livelihoods

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
9.1	Map climate-exposed roads, bridges, culverts, evacuation routes and emergency-access routes	Technical Services / Disaster Management, GIS	N2, R102, P459, P415, rural access routes, coastal access routes	Immediate	Route-risk map completed
9.2	Prioritise flood-prone and erosion-prone roads and bridges for maintenance and upgrades	Technical Services / Finance	Rural wards, uThukela corridor, Mandeni-Sundumbili, coastal routes	Medium–long	Number of priority routes upgraded or maintained
9.3	Improve shade, drainage and safety at public transport waiting areas	Technical Services / Planning, Community Services	Taxi ranks, bus stops, public waiting points	Medium	Number of public transport points improved
9.4	Develop business-continuity guidance for SMMEs, informal traders, farmers and tourism operators exposed to floods, heat, storms, water stress and transport disruption	LED / Disaster Management, business forums	CBD, Sundumbili, Isithebe, agricultural areas, Tugela Mouth, Dokodweni	Medium	Business-continuity guidance issued
9.5	Engage road authorities and logistics stakeholders on climate risks to key corridors	Technical Services / LED, Province, SANRAL where applicable	N2, R102, P459, P415, rail and freight routes	Medium	Corridor-risk engagements held
9.6	Protect access routes to clinics, schools, emergency facilities, coastal areas and rural communities during extreme events	Technical Services / Disaster Management	All wards, priority rural and coastal areas	Immediate–medium	Priority access routes identified and maintained

The IDP identifies motor-vehicle accidents as mostly associated with the N2, R102, P459 and P415, while the vulnerability evidence identifies the N2–R102–rail logistics system, Isithebe, SAPPI, sugarcane, forestry, informal businesses and coastal tourism/fishing as economically exposed systems.

8.5.10 Circular waste economy and pollution reduction

Table 40: Circular waste economy and pollution reduction

Ref.	Action	Lead / support	Priority locations	Timeframe	Indicator
10.1	Prepare and update an annual illegal dumping hotspot map	Waste Management / Environmental Management, GIS, ward committees	All wards, especially dumping and drainage hotspots	Immediate	Hotspot map completed and updated
10.2	Prioritise clean-ups where waste blocks drains, culverts, watercourses, wetlands, flood-prone roads or coastal systems	Waste Management / Technical Services, Environmental Management	Sundumbili, CBD, Sappi dumping route, rivers, wetlands, estuaries, coastal areas	Immediate and ongoing	Number of climate-risk hotspots cleared
10.3	Develop a waste by-law enforcement plan and electronic enforcement record system	Waste Management / Public Safety, Legal, Peace Officers	Municipal-wide	Immediate	Enforcement plan adopted
10.4	Create or activate a Waste Ranger function to support anti-dumping enforcement	Waste Management / HR, Public Safety, Finance	Municipal-wide	Immediate–medium	Waste Ranger function established
10.5	Expand waste awareness campaigns in schools, communities, businesses and peri-urban areas	Waste Management / Communications, schools, ward committees	Illegal dumping hotspots and underserved areas	Immediate and ongoing	Minimum annual awareness programme implemented
10.6	Improve waste information systems, including tonnages, recycling data, complaints and hotspot clean-up data	Waste Management / Finance, Environmental Management	Municipal-wide	Medium	Waste information system operational
10.7	Support recycling, reuse, organic-waste diversion and waste cooperatives as green-economy opportunities	Waste Management / LED, cooperatives, private recyclers	CBD, Isithebe, schools, municipal offices, communities	Medium	Recycling and waste-minimisation projects implemented
10.8	Provide or improve communal skips, drop-off points and street-side bins where illegal dumping is severe and collection is limited	Waste Management / Finance, ward committees	Rural and peri-urban areas, commercial areas and hotspots	Medium–long	Number of skips/drop-off points improved

The IWMP identifies illegal dumping as linked to weaknesses in infrastructure, collection, public awareness and enforcement. It recommends annual dumping-hotspot assessments, mapping hotspots, clean-up campaigns, skip placement, waste collection services, “no dumping” signage and awareness campaigns. It also identifies gaps in by-law enforcement, peace-officer training, communal skips, plant, staffing and community education.

8.6 Cross-cutting implementation actions

These actions support all 10 Strategic Focus Areas and should be read together with Section 7.

Table 41: Cross-cutting implementation actions

CCWA	Action	Lead / support	Timeframe	Indicator
CCWA 1: Mainstreaming, governance, research and knowledge management	Establish a municipal climate evidence register and GIS climate-risk layer repository	Planning / Environmental Management, GIS, Disaster Management	Immediate	Evidence registers established
	Include climate-risk reporting in quarterly departmental reporting and annual IDP review	Municipal Manager / IDP, all departments	Immediate	Climate reporting included in municipal reporting
	Prepare annual climate-risk update notes using new disaster, waste, infrastructure, coastal and environmental data	Environmental Management / Disaster Management, Technical Services	Annual	Annual climate update produced
CCWA 2: Economic impacts, livelihoods and green economy opportunities	Develop a green-economy project pipeline linked to LED, EPWP, recycling, restoration, alien clearing, greening, tourism and climate-smart agriculture	LED / Environmental Management, Waste, Agriculture	Medium	Green-economy pipeline approved
	Engage business and industry on climate physical risks and transition risks	LED / Environmental Management, iLembe DM	Immediate–medium	Business engagement sessions held
CCWA 3: Business models, municipal finance and climate funding	Create a climate-project funding register covering grants, provincial support, national funds, donor funds and private partnerships	Finance / Environmental Management, LED	Immediate	Funding register created
	Package at least three priority climate projects for funding applications	Finance / Environmental Management, Technical Services	Medium	Number of funding applications submitted
	Tag climate-related budget items in the IDP/SDBIP where possible	Finance / IDP, all departments	Medium	Climate budget tagging approach piloted
CCWA 4: Communication, collaboration, public participation and skills development	Prepare a ward-based climate communication plan for floods, heat, fire, lightning, waste, drought and coastal safety	Communications / Disaster Management, ward committees	Immediate	Communication plan approved
	Develop climate awareness materials in accessible language for schools, clinics, halls, traditional-authority areas and businesses	Communications / Environmental Management, Disaster Management, Waste	Immediate–medium	Awareness materials produced

CCWA	Action	Lead / support	Timeframe	Indicator
	Train municipal officials on climate-risk screening, buffers, floodlines, coastal controls and project appraisal	Planning / Environmental Management	Medium	Number of officials trained
CCWA 5: Human health, ecosystem health and environmental justice	Identify vulnerable groups and facilities needing targeted climate support	Disaster Management / Health, Social Development, ward committees	Immediate	Vulnerable-group register developed
	Implement ecosystem restoration as a public-health, flood-risk and livelihood-support measure	Environmental Management / WILDTRUST, EDTEA, communities	Medium–long	Restoration projects implemented
	Track pollution, waste, heat, air-quality and water-quality complaints in a climate-risk complaints register	Environmental Management / Waste, Disaster Management	Medium	Complaints register operational

8.7 Indicative implementation sequencing

8.7.1 Immediate actions: 0 – 2 years

Table 42: Immediate actions

Priority	Action package
Governance	Establish the Climate Change Steering Committee; assign departmental leads; create quarterly reporting format
Planning	Adopt climate-risk screening checklist for land-use and capital projects
Disaster risk	Strengthen early warning; update vulnerable-area and priority-hazard communication lists
Flooding	Start GIS flood, drainage, culvert and bridge register
Waste	Start illegal dumping and watercourse-pollution hotspot programme
Coastal	Apply existing coastal, estuary, floodline and buffer controls as screening tools
Ecosystems	Identify priority wetland, river, dune and estuary restoration sites
Water and sanitation	Establish district coordination on rural water and sanitation resilience
Facilities	Identify public facilities for relief, cooling, shelter and emergency coordination
Emissions	Start municipal electricity, fuel, fleet, generator and waste data collection
Public awareness	Implement ward-based awareness on floods, heat, fire, lightning, dumping, water conservation and coastal safety

8.7.2 Medium-term actions: 3 – 5 years

Table 43: Medium-term actions

Priority	Action package
Infrastructure	Prioritise drainage, road, bridge, culvert and public-facility upgrades using risk registers
Coastal	Obtain updated coastal hazard lines, exposed-asset information and coastal management line data
Settlements	Review climate exposure of housing projects and informal/traditional settlements
Waste	Improve waste information systems, enforcement, recycling, skips and drop-off facilities
Economy	Launch business-continuity, cleaner-production and green-economy partnerships
Ecosystems	Implement priority restoration and alien-clearing projects
Air and emissions	Strengthen industry engagement and prepare terms of reference for a GHG inventory
Finance	Package climate projects for grants, provincial support and partner funding

8.7.3 Long-term actions: 5+ years

Table 44: Long-term actions

Priority	Action package
Coastal adaptation	Progressive adaptation or relocation of assets where risk becomes unacceptable
Settlement transformation	Long-term upgrading or relocation of households in persistent high-risk areas
Infrastructure resilience	Climate-resilient redesign of key roads, bridges, stormwater systems and public facilities
Low-carbon transition	Expanded municipal energy efficiency, renewable-readiness and cleaner-production partnerships
Circular economy	Scaled waste diversion, recycling, organic-waste recovery and green jobs
Ecological infrastructure	Large-scale restoration and protection of wetlands, rivers, dunes, estuaries, forests and biodiversity corridors

8.8 Action plan review

This action plan should be reviewed annually through the IDP and SDBIP review process and should be fully reviewed every five years, or earlier if major new climate data, disaster events, legislation, funding opportunities or municipal restructuring require amendment.

The action plan should be treated as a living implementation tool. Actions may be refined, costed, reprioritised or consolidated as technical studies, budget information, ward data, GIS layers, coastal hazard information, emissions data and project funding become available. The priority, however, remains clear: Mandeni must start with no-regret actions that reduce risk now while building the technical and financial basis for longer-term climate resilience.

9 Strategy and Policy Linkages

The Mandeni Local Municipality Climate Change Strategy is not intended to replace existing municipal plans. Instead, it provides a climate-change lens and implementation framework to strengthen the IDP, SDF, LUMS, Disaster Risk Management planning, IWMP, Human Settlements planning, LED planning, Coastal Management Programme, Estuary Management Plan, Greening Plan, air-quality planning, biodiversity planning and ward-based planning.

Climate actions should be integrated into the IDP, SDF, LUMS, SDBIP, Disaster Management Sector Plan, IWMP, Human Settlements Sector Plan, Coastal Management Programme, Estuary Management Plan and LED Strategy. It also identifies the need for climate-risk screening for every major capital project and land-use decision.

This section therefore identifies the main policy and planning linkages that must guide implementation.

9.1 Mandeni municipal strategies, policies and plans

The following municipal instruments are the primary entry points for implementing the Mandeni Climate Change Strategy.

Table 45: Mandeni municipal strategies, policies and plans

Municipal instrument	Climate-change linkage	Required strategy alignment
Integrated Development Plan 2025/26 Review	The IDP is the municipality's main strategic planning and budget alignment tool. It guides municipal budgets, land-use management, local economic development and institutional transformation.	Climate actions must be included in IDP priorities, SDBIP targets, departmental plans, performance reporting and budget review processes.
Spatial Development Framework 2025/26 Review	The SDF includes biophysical analysis, climate change, disaster management, coastal management, agriculture, infrastructure, human settlements and capital investment considerations.	Climate-risk layers must inform spatial proposals, settlement expansion, coastal development, agricultural land protection, ecological infrastructure and infrastructure investment.
Spatial Development Plan 2025	The SDP guides land use, infrastructure development and urban management over a five-year period and includes climate change as a spatial development consideration.	Climate resilience must be reflected in the composite spatial framework, capital investment framework and local area priorities.
Land Use Management Scheme 2022	The LUMS gives effect to land-use controls and includes management overlays, coastal management zones, floodline areas, unserviced areas, environmentally sensitive areas, river reserves, sea shore, landfill sites, waterworks, sewerage works and traditional-authority environmental areas.	Climate-risk screening must be incorporated into rezoning, subdivision, consent-use, township establishment, building-control referrals and development-condition decisions.
Disaster Risk Management Sector Plan 2025/26	The sector plan identifies priority hazards and includes flooding, lightning, fire, hailstorm and strong-wind vulnerability mapping.	Climate hazards, early warning, risk reduction, volunteer training, emergency access, relief planning and ward-based preparedness must be

Municipal instrument	Climate-change linkage	Required strategy alignment
		implemented through the disaster-management system.
Disaster Risk Management Plan and Policy Framework	These instruments provide the institutional, assessment, risk-reduction, response and recovery framework for disaster risk management.	The Climate Change Strategy must support the shift from reactive disaster response to proactive risk reduction and preparedness.
Emergency Relief Aid Policy	The policy guides food, water, health, clothing, shelter, sanitation, hygiene and relief-supply arrangements after incidents.	Relief planning must account for climate-driven floods, storms, heat, fires, lightning, wind, hail and coastal events.
Summer Contingency Plan 2024/25	The plan provides seasonal arrangements for institutional coordination, risk assessment, risk reduction, response, information management, awareness and funding.	Seasonal contingency planning should be updated annually with climate-risk information and linked to early-warning protocols.
Integrated Waste Management Plan 2021	The IWMP includes waste minimisation, recycling and reuse, collection and storage, transfer and disposal, awareness, by-law compliance and illegal dumping objectives.	Waste actions must be treated as climate-risk-reduction actions, especially where illegal dumping blocks drains, pollutes rivers or contributes to waste burning.
Human Settlements Sector Plan	The plan includes areas not suitable for human habitation, areas not recommended for housing projects, existing and proposed housing projects, infrastructure constraints and sustainable human-settlement evaluation.	Housing projects, upgrading and relocation decisions must be screened for flood, coastal, wetland, slope, access, water and sanitation risks.
LED Strategy Review 2025 and LED Implementation Plan	The LED Strategy covers manufacturing, tourism, agriculture, SMMEs, informal trading and the green economy; the implementation plan includes agriculture coordination, manufacturing SMME support and business-retention actions.	Climate action must support resilient livelihoods, cleaner production, green jobs, climate-smart agriculture, tourism resilience, SMME continuity and industrial transition readiness.
Coastal Management Programme	The programme provides Mandeni's coastal-management framework and identifies coastal management focus areas.	Coastal adaptation, access management, dune protection, development control and risk-based planning must be aligned with the CMP.
aMatigulu/iNyoni Estuary Management Plan	The Estuary Management Plan includes estuary boundaries, conservation/protection zones, development/control buffer zones, coastal protection zone considerations, estuarine functional zone controls, 32 m river and wetland buffers, 100 m high-water-mark controls, coastal management lines and monitoring.	Estuary buffers, land-use controls, restoration, monitoring and public awareness must be incorporated into SDF, LUMS, coastal and disaster-risk decisions.
Greening Plan 2024–2027	The Greening Plan links green spaces, employment creation, environmental sustainability and climate-change impacts.	Greening should be targeted to heat reduction, shade, public-space resilience, biodiversity corridors, erosion control and local green jobs.
Draft Integrated Environmental	The draft IEP addresses environmental baseline, climate risks, ecosystem	The Climate Change Strategy should absorb and

Municipal instrument	Climate-change linkage	Required strategy alignment
Programme and Climate Change Sector Plan 2025	protection, wetland and floodline buffers, adaptation and mitigation, waste and pollution, governance and green livelihoods.	strengthen the IEP's climate-related programme areas, while avoiding duplication.
Ward-Based Plans and ward risk maps	Ward plans identify settlement types, service conditions, social vulnerability and environmental assets; hazard maps identify ward-level flooding, fire, hail, lightning and wind risk.	Ward-based climate actions must inform IDP community priorities, ward committees, early warning, awareness, maintenance requests and local implementation.

The practical implication is that the Climate Change Strategy must become an implementation connector across municipal plans. Each municipal plan should not contain a separate and unrelated climate programme; instead, the same climate-risk evidence, priorities and indicators should be used across planning, budgeting, land-use decisions and service delivery.

9.2 District and regional strategies, policies and plans

Mandeni's climate response must also align with iLembe District Municipality because several key functions and risks are district-wide or shared across municipal boundaries. These include water and sanitation, air quality, disaster management coordination, economic corridors, catchments (i.e. areas of land from which rainfall flows into a river, wetland, estuary, dam or drainage system), coastal systems, biodiversity corridors and the District Development Model.

Table 46: District and regional strategies, policies and plans

District or regional instrument	Climate-change linkage	Required Mandeni alignment
iLembe Comprehensive One Plan 2022–2050	The One Plan is a long-term District Development Model plan intended to align planning, budgets and implementation across spheres of government. It sets a district vision of becoming a sustainable, diverse and growing economic hub providing social well-being and equity of access.	Mandeni's climate actions should support district-wide sustainable development, responsible infrastructure, renewable energy opportunities, green initiatives, social well-being and equity of access.
iLembe Air Quality Management Plan 2022	The AQMP includes industrial operations, mining and quarries, domestic fuel burning, vehicle emissions, waste treatment and disposal, agriculture, biomass burning and greenhouse gases.	Mandeni should use the AQMP to support emissions screening, air-quality complaints tracking, industrial engagement, waste-burning prevention and integration with public-health actions.
iLembe Biodiversity Sector Plan	The BSP provides biodiversity priorities, Critical Biodiversity Areas, Ecological Support Areas, land-use planning guidance, natural-resource management guidance and biodiversity decision-support information.	CBAs, ESAs, wetlands, rivers, forests, grasslands, dunes and ecological corridors must inform land-use decisions, restoration, alien-clearing priorities and environmental authorisations.
District climate governance under the Climate Change Act	The Climate Change Act provides that every district intergovernmental forum also serves as a Municipal Forum on Climate Change.	Mandeni must participate in the iLembe district climate forum, provide local evidence and report local actions within its operational control.

District or regional instrument	Climate-change linkage	Required Mandeni alignment
District water and sanitation functions	The vulnerability evidence identifies rural water and sanitation resilience as an immediate no-regret priority, while recognising iLembe District's role in water and sanitation.	Mandeni must coordinate drought-readiness, sanitation-risk mapping, watercourse protection and rural service-resilience actions with iLembe District Municipality.

For implementation purposes, Mandeni Local Municipality is responsible for local evidence, IDP/SDF/LUMS integration, land-use control, local roads and stormwater, waste, local disaster management, environmental management, municipal facilities, LED and project implementation, while iLembe District Municipality is responsible for the district climate forum, future district assessment and plan, water and sanitation, district air quality and technical or funding coordination.

9.3 Provincial strategies, policies and plans

Provincial policy alignment is important because climate adaptation and mitigation are linked to provincial priorities for growth, poverty reduction, infrastructure, spatial planning, air quality, disaster management, environmental governance, housing, agriculture, roads, health and education.

Table 47: Provincial strategies, policies and plans

Provincial instrument	Climate-change linkage	Required Mandeni alignment
KwaZulu-Natal Medium-Term Development Plan Implementation Framework 2024–2029	The KZN MTDP is aligned with the NDP and national MTDP and is structured around three priorities: inclusive growth and job creation; reducing poverty and the cost of living; and building a capable, ethical and developmental state.	Mandeni's climate actions must support jobs, poverty reduction, service delivery, resilient infrastructure, informal-settlement upgrading, green economy opportunities and municipal capability.
KwaZulu-Natal Air Quality Management Plan 2024	The KZN AQMP identifies Mandeni as one of the municipalities with a high probability of exposure to multiple air-pollution sources. It identifies industries, vehicles, biomass burning, mines and quarries, waste burning, residential fuel burning, agriculture, landfills and wastewater treatment as important sources.	Mandeni should align air-quality, waste-burning, industrial engagement, biomass burning, cleaner-production and public-health actions with the provincial AQMP.
Provincial Spatial Development Framework and provincial spatial planning priorities	The KZN MTDP includes a Provincial Spatial Development Framework chapter, while Mandeni's SDF aligns to provincial spatial and development principles.	Mandeni should use climate-risk evidence to support compact, safe, serviced, environmentally responsible and economically resilient spatial development.
Provincial climate governance under the Climate Change Act	The Act provides that every Premier's intergovernmental forum also serves as a Provincial Forum on Climate Change, with responsibilities for coordinating provincial climate response actions and reporting climate considerations.	Mandeni must align reporting and implementation with provincial climate priorities through iLembe District and relevant provincial departments.
Provincial coastal, environmental, disaster, housing,	The Climate Change Act readiness assessment identifies KwaZulu-Natal Province as responsible for alignment on	Mandeni's action plan must identify where provincial departments are required as

Provincial instrument	Climate-change linkage	Required Mandeni alignment
agriculture, health and education mandates	coastal, environmental, disaster, housing, roads, agriculture, health and education matters.	implementation partners, especially for coastal risk, disaster response, schools, clinics, housing, agriculture and roads.

Provincial alignment is especially important for Mandeni because many of its climate risks are cross-sectoral. Coastal erosion, floodline occupation, school and clinic vulnerability, rural road access, agricultural resilience, air pollution, disaster relief and ecosystem restoration all require support beyond the local municipality's own mandate.

9.4 National policies and legislation

The Climate Change Strategy must be aligned with national legislation and policy. The most important national instrument is the Climate Change Act, 2024, but several environmental, planning, disaster-management and municipal-governance laws also shape implementation.

Table 48: National policies and legislation

National instrument	Climate-change relevance for Mandeni
Climate Change Act, 2024	Establishes the national framework for an effective climate change response and a long-term just transition to a low-carbon and climate-resilient economy and society. It also requires organs of state to review, revise, coordinate and harmonise policies, laws, measures, programmes and decisions so that climate risks and vulnerabilities are taken into account.
Climate Change Act – Municipal Forum on Climate Change	Requires every district intergovernmental forum to also serve as a Municipal Forum on Climate Change, responsible for coordinating climate change response actions within municipal operational control and reporting to the provincial forum.
National Environmental Management Act	The Climate Change Act must be read, interpreted and applied with NEMA and is treated as a specific environmental management Act.
Spatial Planning and Land Use Management Act	The Mandeni LUMS is prepared in terms of SPLUMA and is the key land-use tool for applying climate-risk controls through zoning, overlays, development conditions and land-use decisions.
Disaster Management Act and Disaster Management Amendment Act	These underpin Mandeni's Disaster Risk Management Plan, Policy Framework and Sector Plan, and provide the basis for prevention, mitigation, preparedness, response and recovery.
National Environmental Management: Waste Act	The IWMP identifies waste legislation and waste-management objectives, including waste minimisation, recycling, collection, transfer, disposal, by-law compliance and illegal dumping.
National Environmental Management: Air Quality Act	The KZN AQMP and iLembe AQMP provide the air-quality management framework for emissions sources such as industry, vehicles, biomass burning, waste burning, domestic fuel burning, agriculture and wastewater.
Integrated Coastal Management Act and coastal planning instruments	The Coastal Management Programme and Estuary Management Plan provide the coastal and estuarine management framework for buffers, coastal protection, estuarine functional zones, coastal setback lines and erosion lines.
National Environmental Management: Biodiversity Act and Protected Areas Act	These support the Biodiversity Sector Plan, Critical Biodiversity Areas, Ecological Support Areas, protected areas, stewardship, protected-area expansion and land-use guidance.

National instrument	Climate-change relevance for Mandeni
Municipal Systems Act	The IDP is prepared as a legislative requirement under the Municipal Systems Act and is the municipality's core strategic plan for development and budgeting.

For Mandeni, national policy alignment should be implemented practically through climate-risk screening, land-use controls, disaster-risk reduction, emissions screening, environmental compliance, coastal and estuary buffers, biodiversity protection, waste and air-quality management, public participation and annual IDP/SDBIP reporting.

9.5 Climate-risk linkage matrix

The following table maps climate risks, affected municipal sectors, existing municipal instruments and recommended adaptation responses for the strategy.

Table 49: Climate-risk linkage matrix

Climate risk or theme	Main affected sectors	Key instruments	Strategy response
Flooding, stormwater and drainage	Technical Services, Disaster Management, Planning, Human Settlements, Waste, Roads	IDP, SDF, LUMS, Disaster Risk Management Sector Plan, IWMP, Human Settlements Sector Plan	GIS flood/drainage/culvert register; pre-rainy-season maintenance; floodline controls; stormwater upgrades; waste removal from drainage systems.
Drought, water security and sanitation resilience	iLembe District, Technical Services, Disaster Management, Environmental Management, Human Settlements	IDP, iLembe water-services planning, Disaster Risk Management Plan, SDF, Human Settlements Sector Plan	Rural water vulnerability register; sanitation risk mapping; watercourse protection; drought response coordination with iLembe District.
Coastal erosion, storm surge, sea-level rise and estuary-mouth movement	Planning, Environmental Management, Disaster Management, Tourism, Human Settlements, Roads	SDF, LUMS, Coastal Management Programme, aMatigulu/iNyoni Estuary Management Plan, Disaster Risk Management Sector Plan	Risk-based coastal controls; updated coastal hazard lines; estuary buffer enforcement; dune and estuary restoration; public access and evacuation planning.
Heat and public health	Disaster Management, Health, Community Services, Human Settlements, Parks, Communications	IDP, Disaster Risk Management Sector Plan, Greening Plan, Human Settlements Sector Plan, SDBIP	Heat-health protocol; greening and shade; cooling support facilities; public warnings; climate-responsive settlement design.
Fire, lightning, strong winds and hail	Disaster Management, Fire and Rescue, Technical Services, Human Settlements, Education, Health, Traditional Authorities	Disaster Risk Management Sector Plan, Disaster Management Plan, Summer Contingency Plan, Emergency Relief Aid Policy, IDP	Early warnings; firebreaks; lightning protection; facility risk audits; volunteer training; ward awareness; emergency access planning.
Waste, illegal dumping, pollution and waste burning	Waste Management, Environmental Management, Technical Services, Public Safety, Health, Communications	IWMP, LUMS, KZN AQMP, iLembe AQMP, IDP, by-laws	Waste hotspot mapping; enforcement; skip/drop-off optimisation; clean-ups in flood-prone areas; recycling and waste-diversion projects; waste-burning awareness.

Climate risk or theme	Main affected sectors	Key instruments	Strategy response
Ecosystem degradation and biodiversity loss	Environmental Management, Planning, Disaster Management, LED, Agriculture, Traditional Authorities	Biodiversity Sector Plan, SDF, LUMS, Greening Plan, Estuary Management Plan, Coastal Management Programme	Wetland, river, dune and estuary restoration; CBA/ESA protection; alien invasive clearing; ecological infrastructure in capital planning.
Industrial emissions, air quality and transition risk	LED, Environmental Management, iLembe District, Industry, Finance, Disaster Management	LED Strategy, iLembe AQMP, KZN AQMP, Climate Change Act, IDP	Municipal emissions screening; industrial engagement; cleaner production; energy and water efficiency; business-continuity planning.
Climate-vulnerable human settlements	Human Settlements, Planning, Disaster Management, Technical Services, Traditional Authorities	Human Settlements Sector Plan, SDF, LUMS, IDP, Ward-Based Plans	Climate-risk screening of housing projects; upgrading support; floodline household register; traditional-authority engagement; relocation assessment where risk is unacceptable.
Mobility, access and economic disruption	Technical Services, LED, Disaster Management, Planning, Roads Authorities, Industry	SDF, SDP, LED Strategy, Disaster Risk Management Sector Plan, IDP	Climate-exposed route mapping; bridge and culvert prioritisation; emergency access routes; logistics continuity; livelihood access protection.
Monitoring, reporting and governance	Municipal Manager, IDP, Finance, Environmental Management, Disaster Management, all departments	IDP, SDBIP, Climate Change Act, iLembe district climate forum, vulnerability evidence register	Climate steering committee; annual climate action report; SDBIP indicators; evidence register; quarterly reporting to district climate forum.

9.6 Practical implementation linkages

To make the strategy implementable, Mandeni should use the following planning and reporting entry points:

Table 50: Practical implementation linkages

Municipal cycle or process	How climate change should be integrated
Annual IDP review	Include priority climate actions, ward-based risks, project pipeline updates and climate indicators.
SDBIP preparation	Translate priority actions into annual departmental deliverables and measurable outputs.
Budget review	Tag climate-related maintenance, disaster, waste, stormwater, greening, restoration, facility and planning items.
Capital project planning	Apply climate-risk screening to all major projects before approval, design and procurement.
Land-use application processing	Screen against floodlines, wetlands, buffers, coastal-risk zones, estuary functional zones, unserviced areas and environmental sensitivity.
Disaster preparedness cycle	Update seasonal contingency plans, early warning contacts, safe shelters, vulnerable groups and hazard maps annually.
Ward-based planning	Use ward committees and traditional authorities to identify local hotspots, vulnerable households, dumping sites, blocked drains, access constraints and awareness needs.

Municipal cycle or process	How climate change should be integrated
Performance reporting	Report progress quarterly through departmental reporting and annually through IDP/SDBIP review.
District climate forum participation	Submit Mandeni's climate action register, evidence updates, data gaps and support requests to the iLembe forum.
Five-year strategy review	Review the strategy every five years, or earlier after major climate events, new legislation, new hazard data or major institutional changes.

The Climate Change Act readiness assessment for Mandeni identifies specific readiness gaps that this section must help address: no single annually updated climate-action and evidence register, incomplete floodline and stormwater datasets, no comprehensive greenhouse-gas inventory, fragmented waste/air/water/incident information systems, and no formal operating protocol for municipal and traditional-authority decisions in floodplains, wetlands, buffers and coastal zones.

9.7 Summary of policy alignment

The Mandeni Climate Change Strategy is aligned to the municipality's own planning system, the iLembe district planning and service-delivery context, provincial development and environmental priorities, and national climate-change legislation.

Its implementation must therefore proceed through five alignment commitments:

1. **Mainstream climate risk into municipal planning and budgeting** through the IDP, SDBIP, budget, SDF, LUMS and capital project pipeline.
2. **Use existing sector plans as implementation platforms**, especially the Disaster Risk Management Sector Plan, IWMP, Human Settlements Sector Plan, LED Strategy, Coastal Management Programme, Estuary Management Plan, Greening Plan and Draft IEP.
3. **Coordinate with iLembe District Municipality** on water and sanitation, air quality, district climate governance, disaster coordination and climate-related funding or technical support.
4. **Align with provincial priorities** for inclusive growth, poverty reduction, capable local government, air quality, coastal management, housing, agriculture, roads, health and education.
5. **Comply progressively with the Climate Change Act** by harmonising policies and programmes, participating in the district climate forum, preparing local evidence for future district assessments, and reporting climate actions through municipal and intergovernmental systems.

The key message of Section 9 is that the Climate Change Strategy must not sit outside Mandeni's existing governance system. It must become a practical tool for improving how existing plans, budgets, projects and land-use decisions respond to climate risk.

10 Monitoring and Evaluation

Monitoring, evaluation and learning are essential to ensure that the Mandeni Local Municipality Climate Change Strategy does not remain a stand-alone document, but becomes an active implementation tool. This section follows the City of Cape Town Climate Change Strategy approach, which states that a monitoring, evaluation and learning plan should be developed to track implementation of the strategy and action plan, assess progress regularly, and feed lessons back into the implementation cycle.

For Mandeni, monitoring, evaluation and learning must be practical and integrated into existing municipal systems. The strategy should be monitored through the IDP review, SDBIP, departmental reporting, budget review, disaster management reporting, land-use decision-making, waste reporting, environmental monitoring, ward-based planning and district climate governance processes.

The Climate Risk and Vulnerability Assessment Report already identifies the need for climate actions to be integrated into the IDP, SDF, LUMS, SDBIP, Disaster Management Sector Plan, IWMP, Human Settlements Sector Plan, Coastal Management Programme, Estuary Management Plan and LED Strategy. It also identifies immediate no-regret priorities, including drainage and culvert registers, waste and pollution hotspot tracking, floodline and coastal controls, restoration of wetlands, rivers, dunes and estuaries, rural water and sanitation resilience, critical-facility planning, emissions screening and climate-risk screening for major projects and land-use decisions.

10.1 Purpose of the monitoring, evaluation and learning framework

The purpose of this monitoring, evaluation and learning framework is to:

1. track whether the strategy and action plan are being implemented;
2. assess whether actions are reducing climate risk and improving resilience;
3. identify implementation delays, funding gaps and institutional constraints;
4. improve the quality of climate-risk data over time;
5. support annual IDP, SDBIP and budget reviews;
6. support reporting to Council, MANCO, portfolio committees, ward structures and the iLembe district climate governance system;
7. strengthen accountability across departments and partners;
8. ensure that lessons from disasters, community experience, field evidence and technical studies are used to adjust actions;
9. support future compliance with national climate-change planning and reporting requirements;
10. provide a basis for the five-year review of the strategy.

The Climate Change Act provides a national framework for a just transition to a low-carbon and climate-resilient economy and society. Although section 17 was not commenced by Proclamation Notice 251 of 2025, its planning logic remains useful for Mandeni because it requires climate needs and response assessments, spatial identification of vulnerable communities and ecosystems, adaptation and mitigation measures, integration with municipal planning, and five-year review. Mandeni will therefore use this Strategy as its local operational contribution to district climate governance and future statutory planning.

10.2 Monitoring approach

Mandeni will use a three-level monitoring approach.

Table 51: Monitoring approach

Monitoring level	Main question	Main reporting tool
Implementation monitoring	Are the actions being carried out?	Quarterly departmental reports, SDBIP reports and action-plan tracker
Outcome monitoring	Are the actions reducing vulnerability, exposure or emissions risk?	Annual Climate Change Implementation Report and IDP review
Learning and adaptive management	What needs to change based on new evidence, events, funding, community feedback or technical studies?	Annual learning review, post-event reviews and five-year strategy review

Implementation monitoring will focus on whether actions have started, whether responsible departments are reporting, whether budgets or partners have been secured, and whether outputs have been delivered.

Outcome monitoring will focus on whether risk is being reduced. For example, it should assess whether blocked-drain incidents are declining, whether waste hotspots are being addressed, whether flood-prone roads are being prioritised, whether wetland or dune restoration is improving ecological condition, whether early warnings reach vulnerable communities, and whether municipal energy and fuel data are improving.

Learning will focus on improvement. The municipality should use flood events, fire incidents, storm damage, drought stress, public complaints, field inspections, ward feedback and technical studies to update actions, maps, priorities and budgets.

10.3 Institutional arrangements for monitoring and reporting

Monitoring and evaluation must be assigned to existing municipal structures rather than creating a parallel system.

Table 52: Institutional arrangements for monitoring and reporting

Structure / institution	Monitoring and reporting role
Council	Approves the strategy, receives annual progress reports and supports budget alignment.
Executive Committee / relevant portfolio committees	Review implementation progress, unblock institutional issues and provide political oversight.
Municipal Manager / MANCO	Ensures interdepartmental accountability and integration into municipal performance systems.
Climate Change Steering Committee	Coordinates strategy implementation, maintains the action tracker and prepares progress reports.
Environmental Management	Acts as technical coordination point for climate reporting, environmental indicators, ecological infrastructure and evidence updates.
IDP and Planning	Integrates climate actions into the IDP, SDBIP, SDF, LUMS and capital project screening.
Disaster Management	Reports on hazards, early warnings, incidents, awareness, relief, volunteers and post-event learning.
Technical Services	Reports on stormwater, roads, bridges, culverts, public buildings, drainage and infrastructure-risk actions.

Structure / institution	Monitoring and reporting role
Waste Management	Reports on illegal dumping, waste hotspots, skips, recycling, waste burning, enforcement and waste data.
Human Settlements	Reports on climate-risk screening of housing projects, vulnerable households and settlement upgrading.
LED	Reports on green-economy projects, business continuity, cleaner production and livelihood resilience.
Finance / SCM	Tracks budget allocations, funding applications and climate-related procurement requirements.
iLembe District Municipality	Supports water, sanitation, air quality, district climate coordination and district reporting.
Traditional authorities and ward structures	Support local monitoring of hazards, dumping, settlement risks, communication gaps and community-level implementation.

The Disaster Management Sector Plan already provides a useful institutional platform because it includes disaster risk assessment, risk reduction, information management, early warning, public awareness, funding arrangements and climate-change programmes. The IDP also notes that the Disaster Management Unit receives early weather warnings from SAWS and disseminates them to ward-based disaster representatives through telephone and social media groups, while disaster records such as damage assessments, beneficiary lists and monthly, quarterly and annual reports are stored for follow-up and intervention planning.

10.4 Reporting cycle

The Climate Change Strategy should be reported through the following cycle.

Table 53: Reporting cycle

Reporting period	Main activities	Output
Quarterly	Departments update the action-plan tracker; report incidents, progress, delays and budget issues.	Quarterly climate action progress update to MANCO / portfolio committee
Biannually	Review progress against priority actions; update risk registers and data gaps; identify corrective actions.	Mid-year implementation review
Annually	Consolidate all departmental inputs; update indicators; align next-year actions with IDP, SDBIP and budget review.	Annual Mandeni Climate Change Implementation Report
After major climate events	Conduct post-event review after major floods, droughts, fires, hailstorms, windstorms, lightning incidents, heat events or coastal storms.	Post-event learning note and action-plan update
Every five years	Review the strategy, evidence base, action plan, indicators and institutional arrangements.	Updated Climate Change Strategy and Action Plan

The Draft Integrated Environmental Programme and Climate Change Sector Plan already proposes that a Municipal Environment and Climate Report be submitted annually and included in the IDP review, with indicators linked to ecosystem health, climate resilience, waste management, green jobs and governance.

10.5 Core monitoring indicators

The following indicators provide the minimum monitoring framework for the strategy. These should be refined during internal review and aligned with the SDBIP, departmental plans and budget.

10.5.1 Overall strategy implementation indicators

Table 54: Overall strategy implementation indicators

Indicator	Data source	Frequency	Lead
Climate Change Steering Committee established and meeting	Committee records	Quarterly	Municipal Manager / Environmental Management
Climate action tracker updated	Departmental reports	Quarterly	Environmental Management / IDP
Annual Climate Change Implementation Report prepared	Consolidated departmental reports	Annual	Environmental Management
Climate actions included in IDP and SDBIP	IDP and SDBIP	Annual	IDP and Planning
Climate-related budget items identified or tagged	Budget and departmental plans	Annual	Finance / IDP
Number of departments reporting climate actions	Departmental reports	Quarterly / annual	Municipal Manager
Number of climate actions completed, underway, delayed or unfunded	Action-plan tracker	Quarterly / annual	Climate Change Steering Committee
Number of post-event reviews completed after major climate-related incidents	Disaster Management records	After events	Disaster Management

10.5.2 Strategic focus area indicators

Table 55: Strategic focus area indicators

Strategic Focus Area	Core indicator	Data source	Frequency
SFA 1: Heat, public health and climate-responsive settlements	Heat-health protocol adopted; number of heat warnings issued; number of public facilities identified for heat relief; number of shade or greening sites implemented	Disaster Management, Health, Parks, Community Services	Annual / seasonal
SFA 2: Water security and drought-readiness	Rural water vulnerability register completed; number of water-stressed settlements or facilities identified; number of watercourse pollution hotspots addressed	iLembe District, Environmental Management, ward reports	Annual
SFA 3: Flood-readiness, stormwater and resilient drainage	GIS flood, drainage, bridge and culvert register completed and updated; number of priority drains or culverts maintained before rainy season; number of flood-prone roads mapped	Technical Services, Disaster Management, GIS	Quarterly / annual
SFA 4: Coastal, estuarine and dune resilience	Coastal exposed-asset register completed; updated coastal hazard or management line data obtained; number of dune, estuary or coastal vegetation restoration sites implemented	Environmental Management, Planning, coastal partners	Annual and after major events
SFA 5: Fire, lightning, wind and hail risk management	Number of ward awareness sessions; number of lightning-protection sites assessed or installed; number of firebreak or vegetation-management actions implemented	Disaster Management, Fire and Rescue, Technical Services	Annual / seasonal
SFA 6: Spatial and resource inclusivity	Climate-risk screening checklist adopted; number of land-use	Planning, Human Settlements,	Quarterly / annual

Strategic Focus Area	Core indicator	Data source	Frequency
	applications, housing projects and capital projects screened; number of high-risk households or settlements identified	Disaster Management	
SFA 7: Low-carbon energy, industry and green economic development	Municipal electricity and fuel baseline completed; emissions-screening template populated; number of industry or business climate engagements held; number of green-economy projects packaged	Environmental Management, Finance, LED	Annual
SFA 8: Climate-resilient municipal buildings, public facilities and infrastructure	Number of municipal facilities climate-risk audited; number of facilities identified for emergency use; number of climate-resilient upgrades completed	Technical Services, Disaster Management, Community Services	Annual
SFA 9: Mobility, access and livelihoods	Climate-exposed route map completed; number of priority access routes, bridges or culverts assessed; number of SMME, agriculture or tourism continuity actions supported	Technical Services, LED, Disaster Management	Annual
SFA 10: Circular waste economy and pollution reduction	Illegal dumping hotspot map updated; number of hotspots cleared and monitored; number of enforcement actions; recycling or waste-diversion data improved	Waste Management, Environmental Management	Quarterly / annual

The Climate Risk and Vulnerability Assessment Report recommends a single georeferenced asset and hotspot register covering drains, culverts, bridges, roads, flood-prone houses, schools, clinics, halls, electricity assets, water and sanitation facilities, waste sites and coastal access points, with condition, ownership, incident history, photographs, responsible unit, maintenance date and capital status recorded.

10.6 Cross-cutting monitoring indicators

Table 56: Cross-cutting monitoring indicators

Cross-cutting work area	Indicator	Data source	Frequency
CCWA 1: Mainstreaming, governance, research and knowledge management	Climate evidence register established; GIS climate-risk layers updated; number of officials trained in climate-risk screening	Environmental Management, GIS, Planning	Annual
CCWA 2: Economic impacts, livelihoods and green economy opportunities	Number of green-economy projects identified, funded or implemented; number of SMMEs, farmers or businesses supported with climate-resilience information	LED, Environmental Management, partners	Annual
CCWA 3: Business models, municipal finance and climate funding	Number and value of climate funding applications submitted; number of climate projects included in budget or grant proposals	Finance, IDP, Environmental Management	Annual

Cross-cutting work area	Indicator	Data source	Frequency
CCWA 4: Communication, collaboration, public participation and skills development	Number of ward-based awareness sessions; number of schools, clinics, traditional-authority structures or businesses reached; warning communication lists updated	Communications, Disaster Management, ward structures	Quarterly / annual
CCWA 5: Human health, ecosystem health and environmental justice	Vulnerable-group register developed; number of ecosystem restoration projects implemented; number of pollutions, heat, air-quality or water-quality complaints tracked	Disaster Management, Environmental Management, Health, Waste	Annual

10.7 Data improvement plan

The current evidence base is strong enough to begin implementation, but several data gaps must be addressed over time. The monitoring framework must therefore include a data improvement plan.

Table 57: Data improvement plan

Data gap	Importance	Responsible lead	Timeframe
No single climate action and evidence register	Makes it difficult to track implementation and evidence updates	Environmental Management / IDP	Immediate
Incomplete floodline, stormwater, culvert and bridge data	Limits flood-risk prioritisation and maintenance planning	Technical Services / Disaster Management	Immediate–medium
Incomplete coastal hazard lines and exposed coastal asset data	Limits coastal adaptation, setback enforcement and public safety planning	Environmental Management / Planning	Medium
No full municipal greenhouse-gas inventory	Limits mitigation planning and climate-finance readiness	Environmental Management / Finance	Medium
Incomplete municipal electricity and fuel baseline	Limits energy-efficiency and emissions-screening work	Finance / Technical Services	Immediate
Fragmented waste, dumping, recycling and enforcement data	Limits waste-risk management and circular economy planning	Waste Management	Immediate–medium
Fragmented air-quality, water-quality and pollution incident data	Limits public-health, ecosystem and enforcement responses	Environmental Management / iLembe DM	Medium
No fully verified vulnerable-household and critical-facility register	Limits targeted early warning, evacuation, relief and adaptation	Disaster Management / Human Settlements	Immediate–medium
Incomplete ward-level socio-economic data	Limits targeting of climate justice and vulnerable groups	IDP / ward committees	Medium
Limited formal protocol for traditional-authority land-use decisions in hazard areas	Limits risk avoidance in floodplains, wetlands, buffers and coastal zones	Planning / Traditional authorities	Immediate–medium

The Climate Risk and Vulnerability Assessment Report identifies readiness gaps including the absence of a single annually updated climate-action and evidence register linked to IDP and SDBIP reporting, incomplete floodline and stormwater datasets, no comprehensive municipal or community greenhouse-gas inventory, fragmented waste, air-quality, water-quality and

incident information systems, and no formal operating protocol for municipal and traditional-authority decisions in floodplains, wetlands, buffers and coastal zones.

10.8 Environmental and ecosystem monitoring

Because Mandeni's resilience depends heavily on ecological infrastructure, monitoring must track both ecosystem condition and the climate-risk-reduction services provided by ecosystems.

Table 58: Environmental and ecosystem monitoring

Theme	Core indicator	Data source	Frequency
Biodiversity priority areas	Annual loss or rehabilitation of CBA, ESA, protected-area buffers and corridor land	Municipal GIS and development-control records	Annual
Wetlands and rivers	Wetland condition, riparian cover, water quality, flow, erosion and pollution incidents	Field surveys, DWS data and municipal monitoring	Seasonal / annual
Coast and estuaries	Shoreline position, dune condition, estuary-mouth state, salinity, flood and erosion hotspots	Coastal monitoring, aerial imagery and field surveys	Annual and after major events
Grassland and woodland	Natural cover, fire frequency, grazing pressure, alien cover and corridor continuity	Remote sensing and field condition assessments	Annual / biennial
Forest refugia	Canopy condition, edge drying, fire damage, invasive plants, harvesting and regeneration	Permanent plots and community monitoring	Biennial
Urban green infrastructure	Tree canopy, permeable surface, green stormwater assets, open-space connectivity and heat hotspots	Municipal asset register, remote sensing and temperature monitoring	Annual / biennial
Functional indicator groups	Presence, occupancy or trend for selected wetland, fish, pollinator, forest and medicinal-plant indicators	Specialist and citizen-science monitoring	Seasonal / biennial

Environmental monitoring is recommended to be reviewed at least every five years, or sooner after major floods, droughts, fires or coastal storms, and that monitoring track both ecosystem condition and climate-risk-reduction services.

10.9 Evaluation questions

The annual evaluation should answer the following questions:

Table 59: Evaluation questions

Evaluation question	Importance
Are the highest-priority no-regret actions being implemented?	Confirms whether the municipality is reducing known risks without waiting for perfect data.
Are vulnerable communities being reached?	Ensures climate justice and supports targeted early warning, relief and recovery.
Are climate risks being integrated into land-use and capital-project decisions?	Prevents new development from being locked into hazard areas.
Are flood, drainage, waste and pollution hotspots being reduced?	Tracks progress on the most immediate municipal climate-risk multipliers.

Evaluation question	Importance
Are ecological infrastructure projects improving resilience?	Tests whether restoration is reducing flood, erosion, water-quality, heat and coastal risks.
Are municipal data systems improving?	Builds the evidence base needed for better planning, funding and reporting.
Are departments and partners fulfilling their assigned roles?	Strengthens accountability and coordination.
Are budget allocations aligned with climate priorities?	Determines whether implementation is financially supported.
Are communities, traditional authorities and businesses participating?	Tests whether implementation is locally owned and practical.
Are new hazards, incidents or evidence changing priorities?	Ensures the strategy remains adaptive and current.

10.10 Learning and adaptive management

The strategy must be treated as a living framework. Mandeni will use learning from implementation, field evidence, ward feedback, disaster incidents, technical studies and budget performance to revise actions and priorities.

Learning should take place through:

1. Post-event reviews after floods, fires, windstorms, hailstorms, lightning incidents, heat events, droughts or coastal storms;
2. Annual implementation reviews before the IDP and budget review cycle;
3. Ward-based feedback through councillors, ward committees, traditional-authority structures and community meetings;
4. Departmental reflection sessions to identify implementation barriers and corrective actions;
5. Technical reviews when new floodline, coastal, emissions, biodiversity, air-quality, water-quality or infrastructure data becomes available;
6. Partnership reviews with iLembe District Municipality, EDTEA, DFFE, COGTA, traditional authorities, business and civil society partners;
7. Five-year strategy review to update the evidence base, strategic focus areas, action plan and monitoring indicators.

Learning should result in practical decisions. For example, if a road repeatedly floods despite maintenance, it should be escalated for design review and budget prioritisation. If illegal dumping continues despite signage, enforcement, skip placement, awareness and service design should be reviewed together. If early warnings do not reach vulnerable households, communication channels must be revised. If coastal erosion accelerates, coastal controls and access management must be strengthened.

10.11 Annual Climate Change Implementation Report

Mandeni should prepare an annual Climate Change Implementation Report. The report should be concise, evidence-based and linked to the IDP review.

Table 60: Annual report template and publication route

Report element	Specification
Template owner	Environmental Management with IDP and Climate Change Steering Committee support
Approval route	Departmental inputs → Climate Change Steering Committee → MANCO → portfolio committee → Council noting/adoption as required

Report element	Specification
Publication timing	Annually before or during the IDP/SDBIP review cycle, with dates confirmed in the municipal performance calendar
Primary audience	Council, MANCO, departments, iLembe District Municipality, provincial/national partners, traditional authorities, communities, business and civil society
Public dashboard	Short public-facing summary with status of priority actions, hotspots, warnings, restoration, funding and next-year priorities
Technical annex	Detailed action tracker, indicator tables, GIS/data updates, evidence limitations, funding register and post-event learning notes

The report should include:

1. Executive summary: Overall progress, key risks, achievements and implementation challenges.
2. Action-plan progress: Status of each action: not started, underway, completed, delayed or unfunded.
3. Indicator dashboard: Summary of core indicators across all SFAs and CCWAs.
4. Ward and hotspot updates: New or changed flood, waste, fire, lightning, coastal, water or settlement hotspots.
5. Disaster and post-event learning: Summary of major events, impacts, response and lessons.
6. Budget and funding: Climate-related budget items, funding applications and unfunded priorities.
7. Partnerships: Progress with iLembe District, traditional authorities, industry, NGOs and provincial or national departments.
8. Data gaps: Updated list of evidence gaps and data-improvement actions.
9. Corrective actions: Actions to be revised, accelerated, consolidated or deferred.
10. Next-year priorities: Actions to be included in the next IDP, SDBIP and budget cycle.

10.12 Review of the strategy

The Climate Change Strategy should be reviewed every five years, aligned to the municipal planning cycle and national climate-change planning requirements. It should be reviewed earlier if:

1. a major disaster changes the municipal risk profile;
2. new floodline or coastal hazard data becomes available;
3. new greenhouse-gas or emissions data becomes available;
4. national or provincial climate legislation or reporting requirements change;
5. major municipal restructuring affects implementation responsibilities;
6. new funding opportunities require revised project packaging;
7. the IDP, SDF or LUMS is substantially reviewed;
8. the action plan is no longer aligned with current risks or municipal priorities.

10.13 Summary of the monitoring, evaluation and learning framework

Mandeni's monitoring, evaluation and learning system will be based on five commitments:

1. **Track implementation:** Maintain a live action tracker linked to departments, timeframes, budgets and indicators.

2. **Measure risk reduction:** Monitor whether climate actions reduce vulnerability, exposure, damage, disruption and emissions-related risk.
3. **Improve evidence:** Build GIS layers, registers, baselines and datasets needed for better planning and funding.
4. **Report transparently:** Report annually through the IDP/SDBIP system, Council structures and district climate governance.
5. **Learn and adapt:** Use new evidence, events, community feedback and technical studies to update actions and priorities.

The key message of Section 10 is that monitoring is not an administrative add-on. It is the mechanism that will keep the Climate Change Strategy alive, accountable and responsive to changing risk. It will allow Mandeni to start with immediate no-regret actions while progressively improving the evidence, funding, coordination and institutional capacity needed for long-term climate resilience.

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