



Tshelimnyama



INACCT

Resilience

*Designing Inclusive African
Coastal City Resilience*

Integrated climate change risk, resilience & disaster response profile – urban informal settlement



1. Settlement dashboard

Field	Information
Settlement name	Tshelimnyama
NUSP Category ^[1] (Durban)	Township and peri-urban area, not an informal settlement
Location (city, ward, GPS)	Durban, Ward 15 29° 49' 35.09" S; 30° 48' 24.79" E
Catchment	uMhlathuzana River Catchment CBFEWS being investigated in small sub-catchment of Tshelimnyama in close proximity to where houses were lost in 2022 floods.
Year established	Established in the late 1960s informally and in relation to Marianhill Monastery, as a result of people moving closer to urban nodes as part of efforts to challenge the spatial segregation of apartheid. Formal housing and township development was initiated in 2005.
Settlement type	Peri-urban, township and informal
Population estimate	Population of Tshelimnyama is 20 689 people in 6 1221 households. Settlement area for CBFEWS is approximately 3000 people.
Number of sections / zones	Different areas within Tshelimnyama related to type of housing and location on s.
Number of households	1000 households in CBFEWS sub-catchment.

Structure of households	Mix of housing types including township housing, modern housing, RDP housing and informal housing.
Layout and density	Medium density, planned layout initially but more recently organic layout as area has densified, rat and sand road access for majority of households. Do not follow township establishment layouts or municipal planning zones, follow roads and topography, with increasing density on marginal sites in wetlands, steeper slopes and adjacent to rivers.
Tenure status	Mixed with residents both owning and renting houses.
Main livelihoods	Informal and formal due to location in close proximity to Westmead and Pinetown.
Key physical features	Steep and undulating slopes, rivers and streams with extensive flood plains and wetlands, potential for localised landslides due geological structure, deeply incised terrain, and weathered ancient granites and gneisses, with clay rich soils, and cut and fill to build houses, without engineering oversight. Geological equilibrium is disrupted by heavy rainfall. Biodiversity and ecosystem services provide valuable ecological infrastructure but this is being degraded with rapid densification.

Access to services	Connected to municipal centralised sewerage network with flush toilets. Sewer system is under pressure and so non-sewered low flush toilets have been provided. Pit latrines are present in dense areas where households do not have access to municipal sanitation. Formal electrical connections in majority of settlement, community and state waste management system, not always well managed which leads to unmanaged waste sites which impact on river courses.
Main environmental and climate hazards	Localised thunderstorms, wind, cut-off low pressure systems with intense, prolonged rain, heat.
Main impacts of environmental and climate hazards	The northern side of the settlement is located on the floodplain of the uMhlatuzane River and is highly vulnerable to flood impacts as the river rises very quickly after heavy rain. Homes were lost in this area in the 2022 floods. The settlement is located on steep slopes in incised and undulating terrain. Under periods of prolonged and heavy rainfall, the soil is saturated and there is considerable surface water flow downslope, this can result in localised landslides given the geology of the area. Wind impacts on household structures. Heat is an increasing problem and degradation of the environment due to poor waste management which is disposed of through localised landfill sites in the river course.

Trend/pattern observed for climate hazards	Increasing frequency and severity of flood events (from rainfall). Increasing number of days experiencing intense heat.
Key vulnerabilities	Socio-economic gradient in settlement, however the majority of households can be considered lower to middle income. Densification of area without technical and engineering planning oversight produces risk, lack of adequate services to support growth and development in the area. Loss of environmental assets and hence ecosystem services, which undermines resilience. Pollution and health risk due to poor waste management by municipality. Rapid densification is increasing pressure on the ability of the landscape and the current services to manage risk. Physical: After prolonged and heavy rainfall surface water flow becomes a major risk. Drainage lines in the settlement are non-perennial and are evident after heavy rainfall. Political: Community with different coalitions and leadership in different forms, acting in different spaces across the settlement. Currently significant interest and duty of care shown by provincial official from social development. Environmental: Loss of trees and degradation of slopes leads to soil erosion. Forests are valuable

	in the community but are at risk to urban densification.
Key actors involved in the settlement	Ward councillor, provincial government Social Development Department, NGOs, and multiple civil society organisations.
Existing adaptation / DRR actions and level of development (e.g. active/ in progress)	Limited, other than household level investment in drainage systems, but this can re-direct or concentrate water flow which impacts on other households. Establishment of a simple CBFEWS through the R4I CLARE INACCT project.

2. Settlement risk analysis

The settlement risk analysis has been undertaken for individual households and for the sub-catchment demarcated for the CBFEWS.

Hazard	Exposure	Main vulnerabilities	Estimated level of risk (<i>Risk is the product of the hazard, exposure & vulnerability</i>)
Floods	High: The settlement is located on steep slopes and within and adjacent to the flood plain of the uMhlathuzane River Impacted by thunderstorms and cut-off low pressure systems.	Located on steep and highly erodible slopes, some stormwater management systems, density is increasing as is building on unregulated cut and fill platforms, some protective infrastructure such as stormwater and drainage systems.	High
Heatwaves	Medium: Increasing heat stress during summer, spring and autumn.	Household structures not well adapted to increasing heat, windows that are not well positioned, and limited insulation. Do not reduce heat due to poor ventilation.	Medium

Drought	Medium: Lack of access to water services if water security in Durban is reduced due to a) droughts or b) water rationing due to a decrease in bulk water as a result of high levels of non-revenue water.	Unreliable water supply due to limited water infrastructure, water insecurity in the EMA, and lack of payment for water services. All these factors are exacerbated during drought periods. Dependence on municipality for free basic water for indigent households, new builds and modern houses are accessing water through free basic water system, capturing water from the municipal system that was not designed to provide for this level of densification.	Medium
Fire	Low: Lower density and less risk of fire spreading, other than high intensity fires during droughts or caused by technical issues in homesteads.	Household materials are less flammable, lack of water points to control fires, spatial densification is increasing neighbourhood risk.	Low

3a. Existing capacities and resilience actions

Hazard	Existing capacities / resilience actions	Critical gaps/ needs
Floods	• Limited adaptations. • Community risk mapping, CBFEWS and initial identification of evacuation sites. • Storage of critical documents in safe boxes that can be located and moved quickly. • Well-established settlement with strong leaders and community-based researchers with agency.	Updated community-based risk mapping; development of clear response plan, including evacuation routes; communication material/ visual materials to alert broader community to risks and appropriate responses. Need for larger community engagement.

Heatwaves	Protection trees to provide cooling in settlement.	Understanding how to reduce heat risk through modifications to household structures, use of materials, location of windows and door, maintain lower density of settlement, capacity building on how to deal with health impacts of heat waves. Protection and planting of trees for cooling.
Wind	Use of tyres, bricks and heavy materials to avoid roofs collapsing or being blown away.	Improvement of structures to reduce impact of wind. Management of trees and cutting of at risk branches.
Drought	Storage of water in containers within households.	Safety issues related to impact of droughts on health and hygiene.

Fire	Limited currently due to low risk.	Improved water hydrant systems that are functional adjacent to and within the settlement. Fire response training. Provision of hose pipes that can connect to fire hydrants to be used by community based first responders.
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3b. Additional scientific, technical and local information available for the settlement

- A community-based risk map which shows main environmental assets, water flow and risk in the settlement (R4I Project, CLARE INACCT, ICLEI Africa and UKZN).
- eThekweni Municipality has Corporate GIS shapefiles that provide information on local settlements.
- Stream gauges and rainfall gauge in area adjacent to the settlement.

4. Governance and community institutions supporting disaster preparedness and response

Institution / group	Role in disaster preparedness & response	Strengths	Challenges / gaps
City Disaster Management Centre	Lead coordination of emergency response, evacuation, and relief operations. Convene Joint Operations Centre for SAWS Level 4 warnings ^[2].	Strong links to provincial authorities; clear chain of command.	Limited staff; dependent on external resources for large-scale disasters; is not always able to get on-site as quickly as needed in affected areas.
Climate Change Adaptation Branch	Intermediary, has potential to co-produce knowledge with community-based researchers based on experience in Quarry Road West informal settlement. Supports the Transformative Riverine Management Programme (TRMP) in the eThekweni	Strong leadership in climate adaptation and disaster risk reduction. Develops policy and practice based on scientific and local knowledge in collaboration with multiple actors.	Increasing climate risks has made DRR responses, most particularly climate adaptation, and learning more urgent. Climate Change Branch has a critical co-ordinating role to play.

	Municipal Area's catchments.		
Coastal Stormwater and Catchment Management	Manages the FEWS which is integral to the CBFEWS and community level warnings.	Excellent and timely scientific and technical knowledge which supports the CBFEWS.	Challenges of producing the granular, real-time data (e.g. rain, stream flow and radar) required to scale up the CBFEWS across the city.

University of KwaZulu-Natal	Intermediary – has initiated a relationship with Tshelimnyama. Facilitates communication on the CBFEWS whatsapp group between municipal officials and community residents.	Some relationships between civil society organisations and municipal officials from various departments through NGOs and community activists who have been involved in research projects.	Does not always have full sight of the requirements of the Disaster Management Centre, which is a critical partner for upscaling the CBFEWS. Need to sustain commitment to the community, as a result of the relationships that have been built which offers significant potential for transformative change, achieved through ongoing research funding, which has to be sustained.
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Neighbours	Some response from Giba Gorge Park and Giba Industrial Park.	Neighbourhood networks, relationships with community, community surveillance and monitoring.	Co-ordination is sometimes fragmented, but usually aware of community needs.
NGOs - e.g. Gift of the Givers, SA Red Cross	Support emergency response, evacuation, and relief operations.	Links with residents and intermediaries.	Co-ordination is sometimes fragmented. May overlap with or disrupt state responses. Politically may be perceived as being in competition to the state, this perception must be avoided, as all actors are required in disasters.
Community based researchers	Capacitated community members who engage in research and implementation of a wide range of resilience and sustainability projects.	Embedded researchers and resilience leaders within the community.	Require ongoing funding, need to negotiate conflicts and contestations with other members of the community who may undermine their work.

Civil society organisations	Provide wide range of support in local areas.	Local knowledge that supports citizen science through ongoing commitment.	Need to identify and connect different civil society organisations in the area, as well as state agencies that provide social support.
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5. Community risk narratives: Integration of critical local knowledge

Community risk narratives highlighted the foundational principle that resilience and sustainability initiatives require sustained commitment and collaboration amongst all relevant stakeholders. Partnerships which facilitate co-produced knowledge for resilience solutions improve their ability to be tailored to, as well as embedded within, unique contexts. In Tshelimnyama, examples of co-produced knowledge include:

- Mapping of flow of water in settlement and high-risk areas after flooding.
- Thresholds (in flooding context) still need to be established

6. Additional thematic detail

6.1 Service access & infrastructure

Service	Access Level	Condition	Notes
Water	Irregular and unreliable supply.	Fair	Access to municipal water, most households access free basic water and paid for water services, self-installed pipes and infrastructure on an already strained municipal infrastructure. Piped water connected into households. Low payment for water services.
Sanitation	Needs to be upgraded. Access to municipal sewerage system and low flush non-sewered sanitation services. Use of septic	Variable, mostly dependent on household income.	Problematic discharge of sanitation waste into rivers and the environment without monitoring and planning. Environment is currently treating some of the sanitation waste through a range of state and self-installed non-sewered sanitation systems.

	tanks and soakaways.		
Electricity	Medium	Residents apply for electrical connections and pay for electricity. Income impacts on access to electricity.	Legal connections.
Waste management	Low	Some state waste collection but this is not adequate and waste is disposed of into the natural environment.	Clearing and management of waste sites in settlement is essential, where illegal dumping takes place. This is predominantly in water courses.
Roads & access	Medium	Main roads are tarred but local roads are sand roads which vary in condition.	Community building road protection infrastructure, grading of road supports improved stormwater flow.
Drainage / stormwater	Low	Fair	Locally designed and managed storm water systems which reflect high levels of adaptation, but need further support

			due to high surface water flow risk.
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6.2 Key livelihoods & economy

Source of livelihood	Livelihood located in or outside the community	Impacts during a flood event
Formal and informal sector activities	Within and outside the community.	Severely disrupted but very quickly re-established. Forms part of the support for the provision of food for example post a flood.
Piecemeal work	Some within the community and surrounding area - e.g. short-term work from neighbouring community.	Some disruptions, residents are not able to work post a flood as they need to allocate all their time and labour to dealing with the water damage in the settlement and in their households and in restoring order.
Formal work	Outside the settlement.	Community members are engaged in a wide range of formal employment activities, with income differences across the settlement being significant. Most represent middle income households.

7. Disaster response

7.1 Early warning systems

A CBFEWS was piloted in 2025/2026 as part of CLARE INACCT R4I project. The system being established relies on scientific and technical information (e.g. from the South African Weather Service, the municipal Forecast Early Warning System and radar) and real-time community data, based on stream and rain gauge information. Communicate SAWS and municipal flood warnings and updates via WhatsApp group to community-based researchers in the settlement. Ongoing work to calibrate stream gauge and rain gauge data in the settlement with flood events, through efforts of UKZN/ICLEI Africa research and community-based researchers.

Alert type	Responsible agency	Communication channels	Target audience
Advisory	CBFEWS	WhatsApp group.	Community members in Tshelimnyama.
Warning	SAWS	Radio, city-wide SMS, social media.	Public.
Evacuation order	Municipality's Emergency Response Team. Building up experience on community-based advisories.	Radio, city-wide SMS, social media. WhatsApp groups.	Public. Community members in Tshelimnyama.

7.2 Preparedness measures in place

Activity	Summary description	Lead community group
First responders	Some residents monitor rain gauge levels. Others have basic emergency kit items to use during a disaster event to communicate with the broader community, and support basic response measures (e.g. possible landslide risk; evacuation etc).	Local residents group and civil society organisation.
Disaster Management Centre	Protocol in place to help by providing tents, sourcing alternate shelters, recording those requiring assistance, including the provision of materials, supports post disaster co-ordination in terms of external assistance and other aspects.	
SALGA	Protocols in place to provide social assistance, (e.g. support for replacing IDs). Also supports municipalities to conduct damage and loss assessments and integrate findings into municipal recovery plans and IDPs.	
Social Development Department	Assistance with clinic cards and lost documentation for social grants, IDs etc.	
Gift of the Givers, Red Cross	Protocols in place to provide food parcels, blankets.	

7.3 Critical access & transport routes

Route name	Status in flood / hazard	Alternate route	Notes
Range of access routes	Flood water and sediment damaged main access route and impacted on the bridges over the uMhlatuzane River: bridges were washed away in 2022 flood.	Limited alternate routes which is a major challenge.	More research on road access during floods required.
Sand road and smaller road access route to community	Flooding of roads and washaways from 2022 floods.	Limited alternate routes.	Evacuation usually takes place to homesteads that are perceived to be safe spaces as they are higher up the hill away from the river.

7.4 Vulnerable groups

Households impacted by landslides, all households impacted due to inundation and poor stormwater management. Households that are in poor quality with household members who are poor and marginalised. Households with foreigners who are not included in community networks. Households with children and the elderly. Enumerating

the number of people in each of the above categories is important for disaster risk reduction.

7.5 Post-event recovery priority tasks

a. Immediate to short term tasks:

Task	Lead actor	Timeframe
Document loss and damages	Disaster Management Centre.	Immediately
Restore water supply	eThekwini Water and Sanitation Unit.	2 days
Restore sanitation services	eThekwini Water and Sanitation Unit.	2 days
Ensure that electrical connections are safe	Municipal Electricity Department. Those who maintain illegal electricity connections.	2 days
Secure safe shelter, ideally with separate areas for men and women	Disaster Management Centre for the first 10 days.	Within first 24 hours
Provision of blankets and food parcels	Disaster Management Unit, Gift of the Givers, Red Cross, neighbours.	Within first 24 hours
Provide replacement documentation and provide social grant support	Social Development Department and SALGA.	2 days

Provide building materials for rebuilding of houses	Human Settlements Unit.	2 weeks
Rebuild homes	Community members.	From one day onwards
Psychological counselling	Ma'at Institute University of KwaZulu-Natal, which provides counselling support.	Within first week
Further improvement of CBFEWS through documentation of performance in the flood	CBFEWS team (municipal officials, researchers, community members).	2 days

2. Medium to longer term tasks:

Task	Lead actor	Timeframe
Replace and fix broken infrastructure	Relevant municipal departments.	> 3 months
Rehabilitate catchment and restore ecosystem services	TRMP in municipality.	> 3 months
Move community members out of temporary accommodation and	Relevant municipal departments.	1 month

relocate them to appropriate housing		
Psychological counselling	Ma'at Institute University of KwaZulu-Natal.	Six-month interval re-visit settlement
Further improvement of CBFWS	CBFEWS team (municipal officials, researchers, community members).	Ongoing

7.6 Key contacts

Role / function	Contact name	Contact number	Notes

8. Post-event review & lessons learned

This review and lessons learned should ideally capture lessons learned across stakeholder groups, including the Municipality, community residents/volunteers and others involved in the settlement during disaster events.

Date of event	Hazard	Key successes	Challenges faced	Actions to improve

9. Informing future interventions: Priority actions and research areas

Priority area	Specific action / research area	Lead actor	Potential partner/s	Time line	Status
Flood risk mapping	Lack of high-resolution flood hazard maps.	Local government (relevant department).	Local university GIS department ; Community members. Meteorolog		

			ical agency.		
Flood risk management	Revegetation of forest, riverine corridors and drainage lines.	Community	Local NGO and university.	Ongoing	Ongoing
Infrastructure resilience	Repair damaged road infrastructure.	City's Engineering Unit Roads Department.	University researcher s and community members.		
Infrastructure resilience	Repair damaged stormwater infrastructure and investment in ecosystem services.	Coastal Stormwater and Catchment Management.	University researcher s and community members.	Ongoing	Ongoing
Infrastructure resilience	Improvement of non- sewered sanitation systems.	eThekwini Water and Sanitation Unit.	Community with eThekwini Water and		

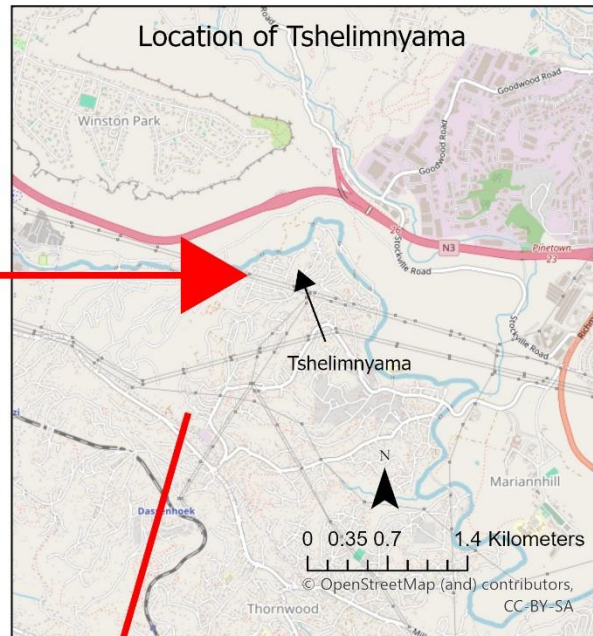
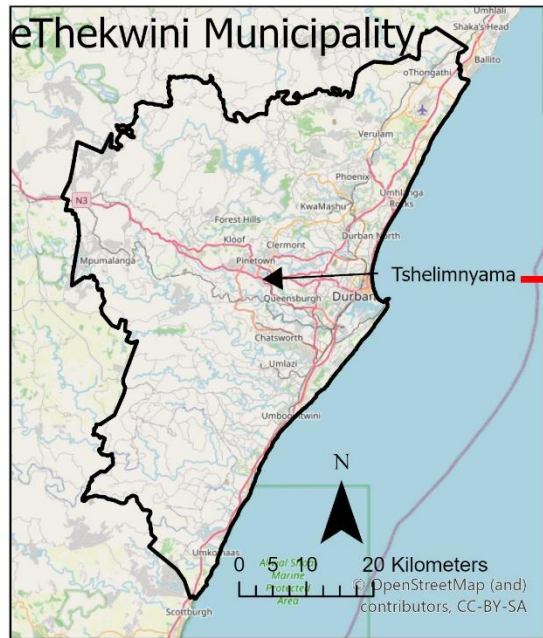
			Sanitation Unit.		
Volunteer kits	First aid kits and food kits needed by community volunteers.	Local NGO/ Aid organisation. University researchers.	Municipality's Disaster Management Centre, university researchers and ICLEI Africa (R4I project).	By May 2026	Emergency food parcel protocol completed

10. Additional information

Recommendations for integrating and actioning risk profile insights

The climate risk profiles are designed to be updated to ensure relevance, accuracy, and uptake by local stakeholders. Part of ensuring the continued use and maximum impact of this profile is exploring recommendations for embedding it within the appropriate municipal workflows as well as encouraging engagement and inputs from relevant stakeholders that have not yet been consulted. Recommendations suggested to date include:

- Aligning post-event priority recovery tasks [see section 7.5] with eThekweni municipality's Disaster Management Centre's (DMC) institutional framework. For example, establishing how it relates to the Level 2 Disaster Management Risk and Response Management Plan, as well as how it will be implemented by the Directorate when undertaking activities such as upscaling the CBFEWS to additional sites in Durban.
- Working with DMC to develop a set list of characteristics for Section 6. Additional thematic detail, to minimise subjective interpretations and ensure consistency across profiles.
- Utilising corporate GIS for improved spatial data insights.



11. Updates to the risk and resilience profile:

This profile was last updated by:

_____ (Name) _____ (Date) _____
_____ (Signed)

_____ (Name) _____ (Date) _____
_____ (Signed)

_____ (Name) _____ (Date) _____
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_____ (Name) _____ (Date) _____
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Timelines immediate short term longer term

[1] The National Upgrading Support Programme (NUSP) in South Africa categorises informal settlements into four main types (A, B1, B2, and C) based on their feasibility for in-situ upgrading or the need for relocation.

[2] Level 4 warnings issued by the South African Weather Service (SAWS) indicate a lower likelihood event with significant impacts.
