



Alto da Manga



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	Alto da Manga
NUSP Category (Durban)	
Location (city, ward, GPS)	Beira, PA Nº3 – Inhamítua, -19.8012, 34.8712
Year established	N/A (in the past 30 years)
Settlement type	(Informal, peri-urban, expansion zone, etc.) Informal settlement, peri-urban, expansion zone
Population estimate	22 438 hab
Number of sections / zones	2?
Number of households	N/A
Structure of households	(Basic materials, % brick, % double storey) Walls of adobe block, brick block, cement block, wood planks, or caniço/bamboo/palmeira; roofs of zinc/tin sheet, lusalite plate, concrete slab, clay tile, grass/culm/palmeira, or cardboard/bag/shell; floors of earth, cement screed, or tile.
Layout and density	(High density, narrow pathways, % road access) Medium-density neighbourhood (43 hab/ha; 22,438 inhabitants across 5.3 km ²), non-orthogonal irregular road mesh, predominantly earth and graded roads, poor infrastructure provision, and very few accessible pedestrian routes in its interior.
Tenure status	(Formal, customary, de facto, none) Limited formal land tenure coverage, land is generally occupied under customary or de facto arrangements (good faith occupation) and without formal registration (DUAT — Direito de Uso e Aproveitamento da Terra).

Main livelihoods	(e.g. informal/formal employment; food gardening etc). Small-scale farming, small-scale vending, family support, occasional temporary employment, small businesses.
Key physical features	(Low-lying, wetland, slope, river proximity, soil type). Low-lying area prone to flooding, mixed wetland area. Flat, low-lying alluvial plain at 3–6 m above sea level, underlain by thick unconsolidated fluvial and marine sediments of poor bearing capacity; seasonal watercourses within the Púnguè catchment cause periodic waterlogging, with patches of mixed wetland (freshwater swamps and reed beds) persisting between built-up areas.
Access to services	(Water, sanitation, electricity, waste, roads) Access to the municipal water supply and electricity grid is limited to a small portion of the neighbourhood. The remaining areas lack formal water connections, sewerage, or grid electricity. Most households rely on wells for water and pit latrines for sanitation.
Main environmental and climate hazards	(Cyclones, floods, heatwaves, landslides etc.) Cyclones, storms, floods, soil degradation, heatwaves.
Trend/pattern observed for climate hazards	(e.g. increasing in frequency/severity/impact) Flooding frequency, storm intensity and soil erosion are all increasing, with shorter recovery time between cyclone events, longer seasonal waterlogging, and projected quadrupling of extreme sea-level rise events.
Key vulnerabilities	(Social – e.g. poverty/crime/drugs; economic – e.g. income level; environmental – e.g. loss of trees, poor

	waste management; infrastructural – e.g. limited access to sanitation; physical – e.g. located in floodplain; etc). Informal low-income settlement on flood-prone wetland soils with no sewage, irregular waste collection, earth roads, limited water and electricity access, high exposure to cyclones, and rapidly expanding population outpacing infrastructure.
Key actors involved in the settlement	e.g. Municipal departments, ward councillor, universities, aid organisations, neighbours, NGOs etc. Beira City Municipal Council (CMB); Local Risk Management Committees (CLGR); National Institute for Disaster Risk Management (INGD); Administrative Post No.3 – Inhamítua (Alto da Manga); Neighbourhood Secretaries and Unit Chiefs; Post-Cyclone Reconstruction Office (GREPOC); Water and Sanitation Infrastructure Administration (AIAS); Water Supply Asset and Investment Fund (FIPAG); Beira Autonomous Sanitation Service (SASB); Electricity of Mozambique (EDM), and more.
Existing adaptation / DRR actions and level of development (e.g. active/ in progress)	(Evacuation routes, bank stabilisation, early warning system). Local Risk Management Committees (CLGR) - active and in re-capacitation Reorganisation of Administrative Posts and CLGR to provide services to Nharimue - in progress.

2. Settlement risk analysis

Hazard	Exposure	Main vulnerabilities	Estimated level of risk (Risk is the product of the hazard, exposure & vulnerability)
Floods	The entire settlement is located on flat, low-lying alluvial wetland terrain with very limited drainage. Seasonal floodwater remains standing for months beyond the end of the rainy season.	Low-income households, women-headed households, orphans, elderly living alone, persons with disabilities, renters, daily-income workers (vendors, moto taxi drivers) dependent on mobility.	High
Heat-waves	Very few shade trees, large open areas exposed to direct sun, no shaded public space.	Outdoor workers, elderly, children, and residents walking long distances on exposed unshaded flooded paths to reach transport, markets or services.	Medium
Storm Surges	Exposed to high-velocity winds, zinc sheet roofs and weak structures offer no resistance, 80% of the neighbourhood destroyed by Cyclone Idai.	Low-income households in zinc/caniço structures, renters, orphans, elderly, persons with disabilities, trees, electricity poles and other infrastructure	High

		create heightened exposure.	
Drought	Crops in yards and peri-urban plots are more frequently destroyed by flooding than drought, shallow wells do not dry up but become saline and contaminated by seawater and latrines during flood events.	Households dependent on subsistence agriculture, households relying on shallow wells as primary water source, children and elderly most vulnerable to waterborne disease from contaminated wells.	Low

3a. Existing capacities and resilience actions

Hazard	Existing capacities / resilience actions	Critical gaps/ needs
Floods	SMS alerts from INGD; community sirens; CLGRD committees (18 gender-balanced volunteers per neighbourhood) coordinating evacuation and search and rescue; preparedness drills and evacuation route mapping; community-built drainage ditches (some cement-reinforced); regular drain cleaning (limpagem das drenagens); community-built wooden plank bridges and makeshift crossings reinforced with sandbags; use of tyres, stones and rubble to create walkways through flooded areas; land raising with fill material to protect foundations; canals constructed and widened by community; AVSI/UNICEF	Evacuation shelters insufficient or absent in parts of the neighbourhood; CLGRD equipment worn out or missing; community maps unable to keep pace with rapid settlement expansion into marshland; tertiary drainage frequently blocked by solid waste, improved waste collection and recycling urgently needed; primary

	Committee revitalisation programme; Associação FACE community resilience guide; school buildings and multi-storey structures used as informal evacuation shelters etc.	drainage valves closed during high tide causing backwater flooding in peripheral areas; security against gender-based violence in shelters insufficient; no detailed neighbourhood-level urban plans produced by the municipality for the neighbourhood.
Heat-waves	Use of limited available shade, school walls, isolated trees, construction sites, for community gatherings and rest.	No organised community or institutional response to heat specifically; no tree planting or shade infrastructure programme; near-total absence of covered public spaces for community gathering; limited awareness among residents and institutions of increasing heat risk and available adaptation measures; no heat-related health monitoring or early warning at neighbourhood level.
Storm Surges	INGD SMS early warning alerts and CLGRD in-neighbourhood mobilisation to assist most vulnerable; evacuation shelters available in most parts of the	Some families still in temporary shelters years after Cyclone Idai with relocation incomplete;

	neighbourhood; community use of sandbags, stones and tyres to weigh down zinc roofs before storms; evacuation to multi-storey buildings and schools; post-storm road clearance by municipality and INGD to restore access; temporary INGD tents provided to families whose homes are destroyed; municipality constructing new housing for post-Idai displaced families; UN-Habitat/GREPOC/AICS resilient housing reconstruction programme developing and piloting improved building standards.	zinc sheet roofing dominant across all three neighbourhoods offering minimal wind resistance — no systematic promotion of stronger roofing materials or standards at neighbourhood level; slow restoration of electricity and phone signal after major events limiting communication; fallen electricity poles and trees blocking evacuation routes post-storm; security against gender-based violence in shelters insufficient.
Drought	Household wells generally providing year-round water access; water storage in jerrycans common; basic water treatment practices used when well water is brackish; community-dug irrigation ditches supporting year-round cultivation in yards and peri-urban plots; humid climate and high-water table reduce drought severity	Well water becomes saline and contaminated during and after flood events, compromising the primary dry-season water source, no formal water treatment or distribution infrastructure as backup.

3b. Additional technical and local information available for the settlement

- Beira neighbourhood boundary maps, INGC/OCHA/HDX, 2019: <https://data.humdata.org/dataset/mozambique-admin-level-4-beira-and-dondo-neighbourhood-boundaries>
- Beira Flood Risk Map (.qgz), QGIS, neighbourhood-level flood risk
- JICA Flood Hazard and Risk Maps, 3 scenarios, 30m grid, 2022
- UNOSAT/REACH Alto da Manga satellite damage assessment, Cyclone Idai, 2019: <https://reliefweb.int/map/mozambique/mozambique-beira-city-alto-de-manga-neighbourhood-damage-assessment-26-march-2019>
- UNOSAT/REACH Mungassa satellite damage assessment, Cyclone Idai, 2019: <http://www.reachresourcecentre.info/mozambique/mozambique-cyclone-idai-beira-city-mungassa-neighbourhood-damage-assessment-26-march-2019>
- Comités Locais de Gestão de Risco de Desastres (CLGRD) community DRR participatory maps, flood zones and evacuation routes per bairro, held by INGD Sofala
- PEU Plano de Estrutura Urbana da Cidade da Beira, 5 volumes, 2021
- Beira Municipal Recovery and Resilience Plan, 2 volumes, 2019
- AIAS Environmental Impact Assessment, Beira Stormwater Drainage Rehabilitation, E2914 V3, 2014
- Urban Mobility Plan for Beira, in development as of 2021/2022, contact CMB for latest status
- Detailed Neighbourhood Plans (Planos de Pormenor), not yet produced for the neighbourhood
- ICLEI Africa, Living with Water, photovoice research, 2025: <https://africa.iclei.org/living-with-water-stories-of-resilience-from-beiras-informal-settlements/>
- HelpAge International, Rapid Needs Assessment of Older People, Sofala, post-Idai, 2019: <https://www.helpage.org/silo/files/rapid-needs-assessment-of-older-people-cyclone-idai-sofala-province.pdf>

4. Governance and community institutions supporting disaster preparedness and response

Institution / group	Role in disaster preparedness & response	Strengths	Challenges / gaps
Beira City Municipal Council - Disaster Risk Management Unit	Municipal coordination of emergency response, evacuation planning, liaison with INGD and international partners.	Direct link to municipal resources and provincial authorities; oversees Recovery and Resilience Plan implementation; Beira Masterplan 2035.	Limited resources and staff; partially dependent on external donors; plans not yet translated into neighbourhood-level action for informal areas.
Chefe do Posto Administrativo — PA Nº3 Inhamítua	Receives alerts from municipality/INGD; coordinates response across bairros within the posto; hosts CLGRD; liaises upward with both municipality and INGD.	Formal authority and local knowledge; key node in early warning system.	Limited capacity for disaster management or reporting local resilience gaps upwards.
Secretário de Bairro	Primary neighbourhood-level municipal representative; cascades alerts door-to-door; coordinates with CLGRD; oversees	Deep local knowledge; direct contact to residents and traditional or community leaders; first point of contact for all municipality-	Government appointee with no dedicated disaster management resources or ad-hoc DRR coordination with municipality;

	evacuation and damage reporting.	community interaction.	overwhelmed during major events.
Chefes de Quarteirão / Community Block Leaders	Block-level last mile of early warning system; door-to-door notification; assists vulnerable households during evacuation.	Immediate local knowledge; trusted by neighbours.	Volunteers with no resources or equipment; usually absent in informal and rapidly expanding peripheral areas.
Comité Local de Gestão de Risco de Desastres (CLGRD) / Committee Volunteer Group	Lead and coordinate community disaster preparedness and responses; roles: early warning radio monitoring, community communications and alert dissemination, evacuation coordination, search and rescue, shelter management, emergency kit management, damage and needs assessment; conduct preparedness drills; clearing up drainage; maintain community vulnerability and evacuation maps.	Gender-balanced; trained by INGD and AVSI/UNICEF; some level of community trust; first responders on the ground; motivated volunteers; good knowledge of the neighbourhood.	Equipment worn out or missing; reach limited in rapidly expanding areas; community maps cannot keep pace with settlement growth; unable to be present in all parts of the neighbourhood; sometimes the target of the residents' complaints.

INGD (National Institute for Disaster Risk Management)	Coordinates disaster preparedness and response; issues SMS early warning alerts; provides training to CLGRDs; distributes emergency tents and relief materials post-disaster; establishing Beira delegation.	National authority with legal mandate; with organisational experience and well structured; improving capacity after Idai.	Beira delegation still largely understaffed; dependent on civil society partners for last-mile delivery.
Health centre (Centro de Saúde de Nhaconjo)	Provides emergency medical care; manage flood-related disease outbreaks (cholera, malaria, diarrhoea).	Centrally located in Alto da Manga.	Risk of overcrowding during disasters; medicine shortages during crises.
Schools	Shelter during disasters; some store medicine.	Easy for residents to locate during evacuations.	Not always officially recognised as shelters; irregular safety or hygiene standards; GBV risks in overcrowded conditions.

5. Community risk narratives: Integration of critical local knowledge

- See Photovoice Stories by residents: <https://africa.iclei.org/living-with-water-stories-of-resilience-from-beiras-informal-settlements/>
- Cyclone Idai destroyed 80% of the neighbourhood's buildings. Recovery was incomplete before Cyclone Eloise struck in January 2021.
- Stagnant water is a months-long reality, not just during the rainy season: a resident explained that "her house is precariously built with zinc sheets. It is located in a low-lying, poorly planned area where water remains stagnant in the yard for up to two months. Access paths are narrow and difficult to use."
- Blocked drainage is a sign of impending flooding, as reported by a resident with a "block house with damaged sheets caused by fallen trees during Cyclone Idai. Her land is below the level of the ditches. With an open street and damaged with large holes that do not allow cars and people to pass when it rains."
- Community-built drainage is perhaps the most common collective response: a "drainage ditch made of blocks was built by the community. Residents contributed collectively to its construction in response to frequent flooding."
- Roofs must be secured during storms: "This house is located in a low-lying area that receives all the runoff water from upstream. The roof is made of damaged metal sheets, and plastic was added as a temporary solution due to the lack of better materials."

6. Additional thematic detail

6.1 Service access & infrastructure

Service	Access level	Condition	Notes
Water	Partial	Moderate	3,446 domestic connections (FIPAG); wells used in unserved areas; distance from water mains reduces reliability and pressure; contaminated during floods.
Sanitation	Very limited	Poor	No sewage network; pit latrines dominant; latrine overflow during floods causes cholera risk; open defecation in some areas.
Electricity	Partial	Poor	Coverage unknown at neighbourhood level.
Waste management	Very limited	Poor	About 25% of city has no waste collection; occasional bulk waste containers in central locations in the neighbourhood; waste accumulates in drainage channels worsening floods; organic waste composting potential untapped.
Roads & access	Partial	Poor	Predominantly unpaved degraded earth tracks; some graded secondary roads; blocked drainage

			worsens road condition; municipal maintenance responsibility but underfunded.
Drainage / stormwater	Very limited	Poor	Limited formal drainage infrastructure (along the paved roads) despite a planned stormwater catchment system (Sistema 5) designed to drain the area toward the Rio Pungwe — never built due to funding and resettlement constraints; surface drainage only with ditches dug by the community and municipality; channels blocked by solid waste.

6.2 Key livelihoods & economy

Source of livelihood	Livelihood located in or outside the community	Impacts during a flood event
Small-scale farming	In community (yards and nearby plots).	Crops flooded, washed away and destroyed; soil waterlogged; loss of food security for farming households.
Informal vending	In community (often on road sides).	Loss of products and stock; destruction of seller stalls; reduced customer flow; women vendors most affected with no social protection.

Formal work	Outside community.	Road flooding prevents commuting; income loss during extended flood periods.
Domestic services	In and outside community.	Work interrupted; equipment damaged; considerable repair and reconstruction work; women most affected.

7. Disaster response

7.1 Early warning systems

Additional information can be included in the table below:

Alert Type	Responsible agency	Communication channels	Target audience
Advisory			
Warning			
Evacuation order			

7.2 Preparedness measures in place

Activity	Description	Lead community group

7.3 Critical access & transport routes

Route name	Status in flood / hazard	Alternate route	Notes

7.4 Vulnerable groups

Area/ Household / person	Location	Special needs/ support required	Date verified

7.5 Post-event recovery priority tasks

a. Immediate to short term tasks:

Task	Lead actor	Timeframe

b. Medium to longer term tasks:

Task	Lead actor	Timeframe

7.6 Key contacts

Role / function	Contact name	Contact number	Notes
Disaster Risk Management Manager, Beira	José Henrique Jaime	+258 84 841 7286	Coordinates Municipality's work with CLGRs, INGD's local operations, administrative posts and ward councillors

City Municipal Council			
Chefe do Posto Administrativo/ Sub-district Chief - PA Nº3 Inhamítua			receives alerts from municipal/INGD, coordinates response across bairros within the posto, hosts the CLGRD and its kits, liaises upward with municipality and INGD.
Secretário de Bairro/ Neighbourhood Secretary - Alto da Manga			primary neighbourhood-level state representative, cascades alerts downward, coordinates with CLGRD Coordenador, oversees evacuation and damage reporting within the bairro.
Chefes de Quarteirão/ Community Block Leaders -			block-level last mile of alert chain, door-to-door notification, assists vulnerable households during evacuation, reports damage to Secretário de Bairro.
CLGR Coordinator & Deputy Coordinator			Other roles in the CLGR: -Coordenador — Coordinator (head) -Vice Coordenador — Deputy Coordinator (co-head) -Pessoa Responsável do Kit — Kit Manager -Membro Ouvinte de Rádio — Radio Listener/Monitor -Membro de Comunicação — Communications Member

			-Membro de Evacuação — Evacuation Member -Membro de Busca e Resgate — Search and Rescue Member -Gestor do Abrigo — Shelter Manager -Gestão da Informação e Avaliação de Danos e Necessidades — Information Management and Damage/Needs Assessment
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8. Post-event review & lessons learned

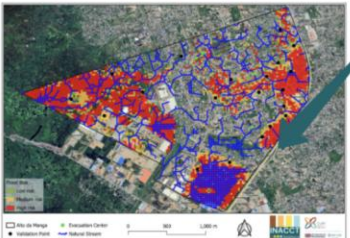
Date of event	Hazard	Key successes	Challenges faced	Actions to improve
March 2019	Cyclone Idai			
January 2021	Cyclone Eloise			
Every rainy season	Seasonal flooding			

9. Informing future interventions: Priority actions and research areas

Priority area	Specific action / research area	Lead actor	Potential partner/s	Time line	Status
Infrastructure resilience.	Paving and drainage of central avenues, including	CMB	World Bank/AFD NUCA; AIAS.		In progress

	roadside ditches. Emergency repair and reinforcement of collapsing culvert on main Alto da Manga artery (road along railway line south of Manga). Construction of formal drainage canals.				
Early warning system	Repair and expansion of automatic sirens network.	CMB/INGD	CLGRD	Before next rainy season	
Community preparedness	CLGRD kit renewal and revitalisation.	INGD		Before next rainy season	In progress
Urban planning	Detailed Neighbourhood Plans (Planos de Pormenor). Drainage maps and flood risk mapping at neighbourhood level.	CMB			
Waste management	Integrated waste collection.				

10. Additional information


4. Alto da Manga - collapsing and failing culvert

- Built infrastructure such as elevated paved roads often causes water to accumulate around them. In Alto da Manga, paved roads and culverts are elevated but poorly supported by insufficient and frequently clogged drainage systems, which leads to recurring flooding and increased risk for surrounding households.
- One particularly critical point is a culvert on the main road leading to the nearby hospital. Drainage works beneath it have formed a large, waste-filled stagnant water pool, which has significantly weakened the structure. A heavy truck previously fell onto the culvert, further damaging it and increasing the risk of structural failure.
- Residents report that the culvert is now at serious risk of collapse. This would not only flood and damage nearby homes but also cut off access in and out of the neighbourhood, blocking a key evacuation and emergency response route.
- Nearby residents say they are forced to remove solid waste daily to reduce immediate risks to their households. The stagnant water also promotes mosquito breeding, increasing exposure to malaria and other waterborne diseases, particularly affecting young children living in the area.



11. Updates to the risk and resilience profile:

This profile was last updated by:

Nicolas Gate (Name) 6 May 2026 (Date) _____

(Signed)

(Name) _____ (Date) _____

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(Name) _____ (Date) _____

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