unicef for every child

Child-centred risk assessment
and climate change vulnerability analysis

Child-centred risk assessment

and climate change vulnerabilty analysis

Prepared by Altai Consulting for UNICEF Mozambique

August 2024

In addition to this report, further data is available to interested parties upon request.
For more information, please contact UNICEF Mozambique directly at maputo@unicef.org

Published by UNICEF Mozambique

Cover picture: Children at Mapinhane Primary School in Inhambane, which was destroyed by Cyclone Freddy in February 2023
© UNICEF/UN0793767/Zuniga

Contents

Acronyms, figures and tables 4

1 Introduction 5

2 Approach and methodology 7

3 Child-centred risk 10

4 Exposure 12

5 Sensitivity 17

6 Adaptive capacity 20

7 Summary and recommendations 23

8 Annexes 26

Acronyms

CCRA	Child Centred Risk Assessment
CCVA	Climate Change Vulnerability Assessment
CCRI	Children's Climate Risk Index
DRR	Disaster Risk Reduction
GAM	Global Acute Malnutrition
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene

Figures

Figure 1.	Climate change vulnerability assessment framework	7
Figure 2.	Child-centred risk map including climate change projections	10
Figure 3.	Child-centred exposure	12
Figure 4.	Hazards included in the analysis	13
Figure 5.	Multi-hazard risk map	14
Figure 6.	Climate change map	15
Figure 7.	Child vulnerability map	17
Figure 8.	Capacity map	20

Tables

Table 1.	Child and girl population by age group	13
Table 2.	Climate change indicators	26
Table 3.	Capacity indicators	26
Table 4.	Hazard indicators	27
Table 5.	Vulnerability indicators	28
Table 6.	Districts with the highest population of children	29
Table 7.	Districts with the highest CCRA 'score'	29

1 Introduction

Mozambique is increasingly vulnerable to environmental and socio-economic hazards, the prevalence and intensity of which have increased over recent years.

In 2019, Cyclones Idai and Kenneth were some of the most devastating the country has ever seen, while the conflict in the north of the country has intensified since its beginning in October 2017. Other hazards present in Mozambique include droughts, floods, earthquakes and epidemics. These hazards only exacerbate the poor living conditions of vulnerable people, leading to a drop in food consumption and forcing households to cut back on basic non-food items and other household expenditures. Hazards can also have a direct impact on housing and access to services such as education, health, safe water and electricity.

Children are particularly vulnerable to these hazards. They are less able to control their exposure to hazards and less able to protect themselves from their direct impacts[1]. They are also more susceptible to ensuing environmental contamination and disease outbreaks. Women are also more vulnerable compared to men due to the nature of their household responsibilities and their negligible participation in decision-making[2]. As children's primary caregivers, women's vulnerability exacerbates that of children.

As hazards are expected to become even more prevalent in Mozambique, and as the country is suffering from the effects of climate change, the United Nations Children's Fund (UNICEF) decided to conduct a gender-responsive Child-Centred Risk Analysis (CCRA) with a Climate Change Vulnerability Assessment (CCVA), which aim to inform planning and programming in the country.

The objective of the assessment was to develop an inclusive analysis to illustrate the impact of climate-related shocks and stresses on children[3].

[1] UNICEF, 2021. The climate crisis is a child rights crisis.

[2] UN Women, 2009. Fact Sheet: Women, Gender Equality and Climate Change.

[3] In addition to this report, further data is available to interested parties upon request. For more information, please contact UNICEF Mozambique directly.

Quelimane, Mozambique, 2023

Celia Lacedo and her three children, Calimo (2), Susana (3), and Santos Jonito (5), had their house destroyed by Cyclone Freddy in the Icidua neighborhood of Quelimane. They are one of the families to whom UNICEF delivered sanitation and hygiene materials for water treatment to prevent cholera.

2 Approach and methodology

As seen in Figure 1, the CCRA is based on an integrated conceptual framework that relates risk and vulnerability, in view of the following elements:

- Hazard, unpacked by considering the interactions between climate change and other environmental and socio-economic hazards.
- Exposure, assessed as a function of demography and physical geography.
- Sensitivity (how a system reacts when exposed to hazards, itself a function of the broader social, economic, and environmental context) is articulated around six key thematic areas, critical to UNICEF: health, nutrition, education, WASH (water, sanitation, and hygiene promotion), child poverty, and child protection. Additionally, gender and disability are considered cross-cutting issues that affect sensitivity.
- Adaptive capacity (a system's ability to cope with the impacts of hazards) looks into the capacity to anticipate risk and the capacity to recover and change[4]. Drawing on USAID's framework, this is assessed through different forms of capital - human, social, natural, physical, and financial.

Vulnerability, the propensity to experience adverse impacts when exposed to a hazard, is a function of exposure, sensitivity, and adaptive capacity. These broad elements of risk and vulnerability provide the structure for the report and are defined in greater detail in the relevant sections.

4 IPCC, 2007. Climate Change 2007 – Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC

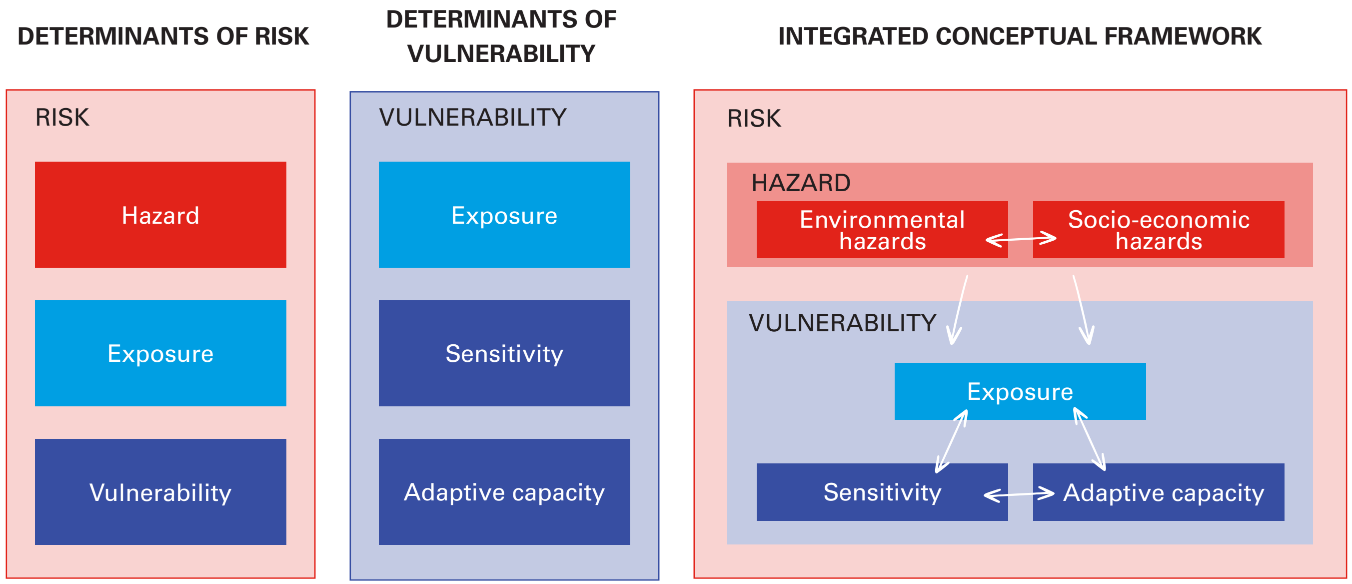


Figure 1.
Climate change vulnerability assessment framework

Methodology

The CCRA is based on complementary qualitative and quantitative methods. First, a quantitative risk and vulnerability assessment was conducted using available data at the district level. Based on a range of relevant indicators across key thematic areas, child-centred vulnerability and risk scores were computed for each district. This analysis was supported by qualitative research based on a document review of key secondary sources including academic studies, 'grey' literature, international organizations' country strategies, government policies and strategies, and key informant interviews with government representatives and members of the international community.

In Migrine, monitoring babies' weight is one of the activities performed by a mobile health team that provides essential medical care, including immunizations and malaria treatment.

Quantitative analysis

The development of this CCRA was strongly informed by previous CCRAs and UNICEF's global Child-Centred Risk Index, but was built to be contextually relevant to Mozambique. The index was calculated using the following model:

$$\text{Disaster Risk} = \frac{\text{Exposure} \times \text{Hazard} \times \text{Vulnerability} \times \text{Climate Change}}{\text{Capacity}}$$

UNICEF Mozambique selected the indicators to calculate each disaster risk component — exposure, hazard, vulnerability, climate change and capacity. The indicators were selected according to their relevance and the availability of the data at the district level.

For this CCRA, the component indices were assigned different weights after guidance from UNICEF Mozambique: 20 per cent was assigned to exposure, 30 per cent to hazards, 30 per cent to vulnerability, 10 per cent to capacity, and 10 percent to climate change.

Details of each indicator and their sources can be found in Annex 1.[5]

[5] The weights assigned to each component depend on priorities and risks within the country of analysis. In the case of Myanmar, each component was given an equal weight. In Nepal, 10% was assigned to exposure, 40% to hazards, 30% to vulnerability, 10% to capacity and 10% to climate change.

Challenges and limitations

Several challenges and limitations should be considered in the interpretation of findings:

- **Quantitative data quality and availability:** The assessment used secondary quantitative sources that varied in granularity and time limitations, with some data only available at the provincial level and some dating back to 2014, potentially affecting the accuracy and current relevance.
- **Analysis and modelling:** The analysis assumed selected indicators that best represent their respective components in Mozambique, with equal weights given within components and indices created accordingly. For example, within the hazard component, equal weighting was given to all hazards, though, in reality, the risk posed by each hazard is not equal. However, the inclusion of key indicators across the dimensions of risk means that relative scores are still likely to provide useful data on the spatial distribution of risk.
- **Granularity of the qualitative data:** The assessment was conducted at the central level (government and international stakeholders). The assessment team was not able to conduct interviews at the provincial or district level, which would have provided further granular information.

Zambezia, Mozambique, 2024

The water point at Landinho Primary School in Zambezia was rebuilt after being destroyed by Cyclone Freddy in March 2023. The lack of onsite water and WASH facilities had a significant impact on girls, who were missing classes during menstruation.

3

Child-centred risk

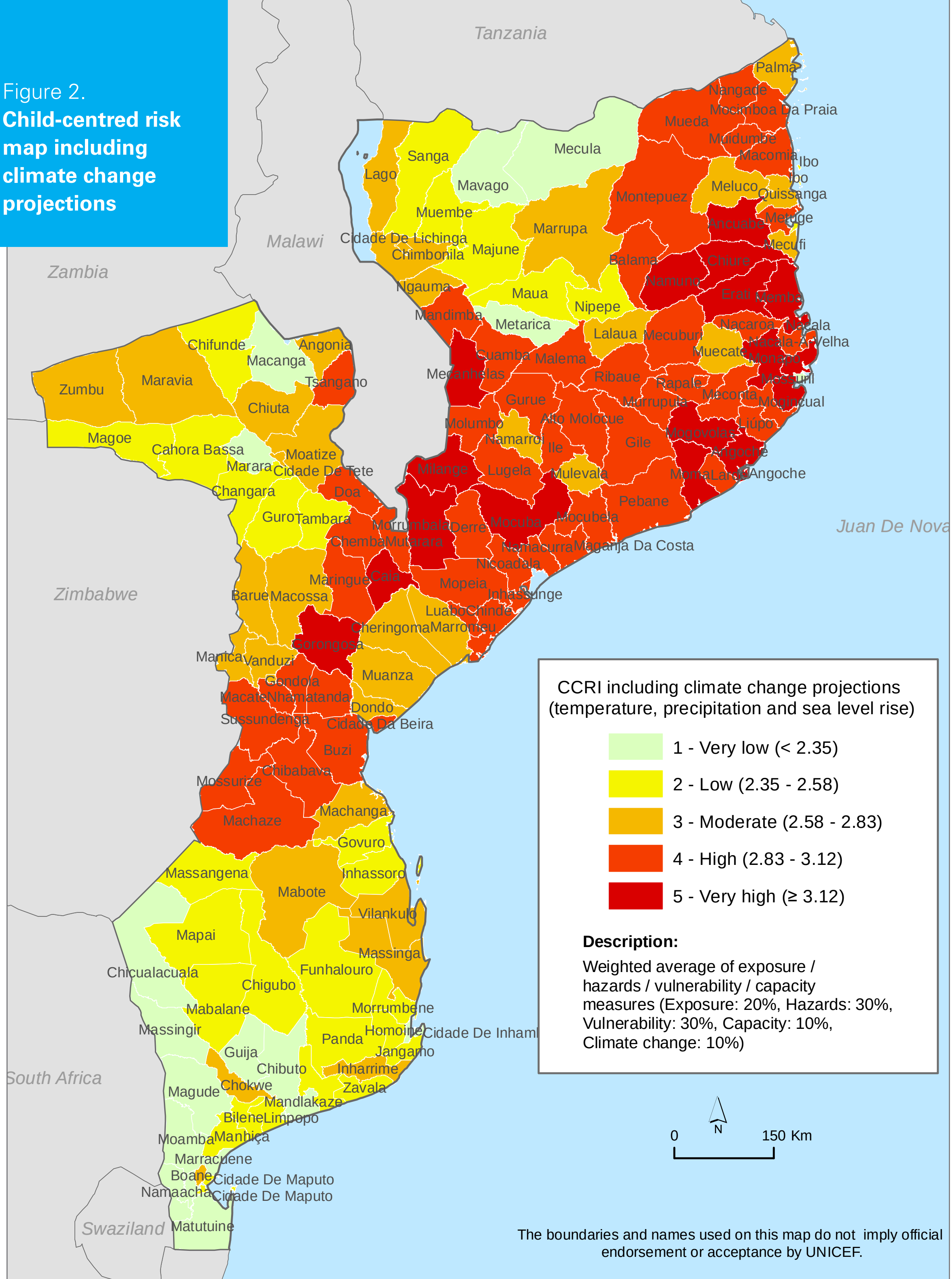
The assessment found that child-centred risk is greater in the coastal provinces of northern Mozambique.

Figure 2 shows the provinces home to the districts with the highest CCRA scores. Cabo Delgado, Nampula, and Zambezia show the largest overall risks. Areas of risk are also seen in Sofala and Manica and to a lesser extent in Tete and Niassa. However, the areas of highest risk within these provinces are not necessarily along the coast.

Quantitative findings suggest that risk is primarily driven by socio-economic factors rather than physical geography. While exposure to climate shocks is higher in central and southern areas, vulnerability across six socio-economic areas (health, nutrition, education, WASH, poverty, and child protection) is greater in northern Mozambique, where adaptive capacity is generally lower. This highlights that child-centred risk arises from the complex interplay of environmental, social, economic, and political factors, and underscores the importance of addressing children's needs across different levels and sectors to enhance resilience.

See in Annex 2 a list of the districts with the highest population of children and of the districts with the highest CCRA 'score'.

Figure 2.
Child-centred risk map including climate change projections



Quelimane, Mozambique, 2023

The first drone shots emerging from the city of Quelimane in Zambezia show the impact and devastation caused by Cyclone Freddy on homes, schools, and other infrastructure. Flooding is widespread within the city and surrounding areas.

4 Exposure

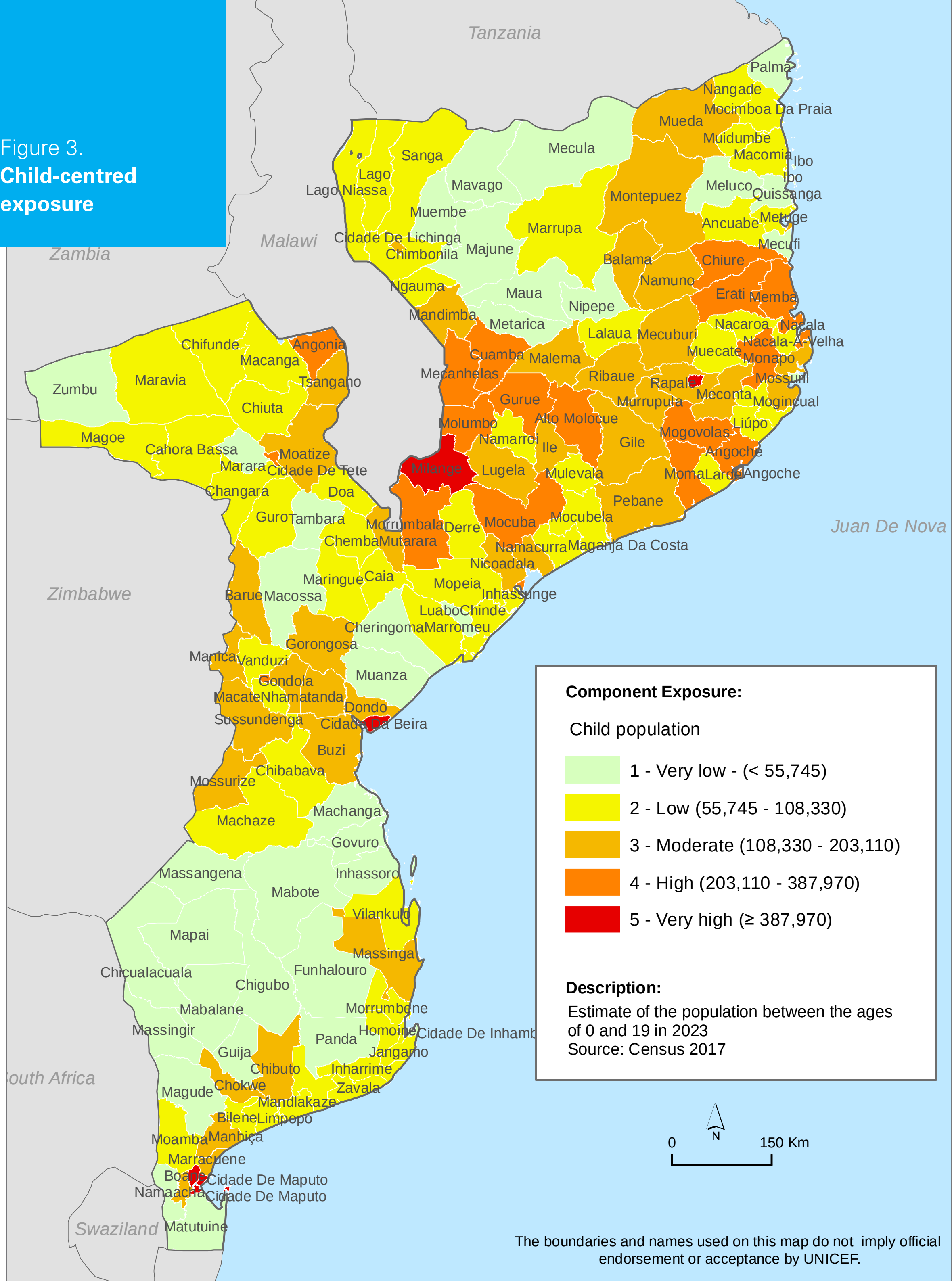
For there to be exposure to hazards, there must be both people living in that area and a probability of hazards occurring in that area.

The most geographically exposed districts are those with the highest populations, including urban centres such as Maputo, Matola, Beira, Nampula, Quelimane, and Tete, and other populous districts in Zambezia (Milange, Morrumbala, Mocuba), Sofala (Nhamatanda, Buzi, and Caia), and Nampula (Mogovola, Erati, and Moma).

Exposed population

Demography is the second component of exposure. In this assessment, population exposure is defined as the total number of children aged 0-19 years old, because children and adolescents are defined by the Mozambican government as those younger than 20 years old. Data was sourced from the district-level projections for 2023, based on the 2017 Census conducted by the Mozambican government. Child-centred exposure is presented in Figure 3.

Figure 3.
Child-centred exposure



The projected Mozambique child population for 2023 is estimated at 18,060,844, which accounts for 55.7 per cent of the total projected population. The girl population for the same year is estimated at 9,013,767, which accounts for 27.8 per cent. A breakdown by age group can be found in Table 1. Variation in child and girl exposure by district is considerable, but both populations show similar patterns by district.

Though data on disability is largely unavailable, exposure based on gender can be assessed. The impact of disaster affects boys, girls, men, women, the elderly, and people with disabilities differently. As disability data is largely unavailable or underestimated depending on the province, the disability lens was not applied in the quantitative component of the CCRA. However, population data disaggregated by gender is available. Girl-centred exposure is defined as the total number of girls aged 0-19 years old, which shows similar trends as for overall child-centred exposure.

Table 1. **Child and girl population by age group**

Age group	Child population	Girl population
0-4 years	5,156,592 (28.6%)	2,543,540 (28.2%)
5-9 years	4,539,358 (25.1%)	2,285,406 (25.4%)
10-14 years	4,693,982 (26.0%)	2,361,204 (26.2%)
15-19 years	3,670,912 (20.3%)	1,823,617 (20.2%)

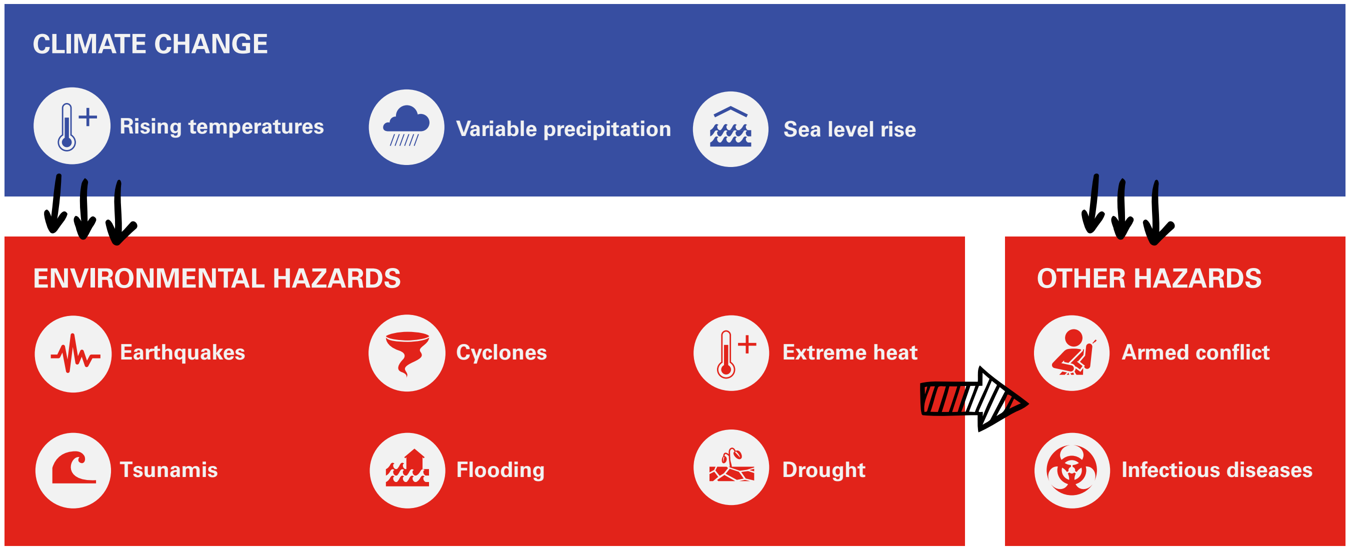
Geographic exposure

Mozambique is highly exposed to natural hazards due to it's low latitude, positioning on the southwestern coast of the Indian Ocean, seismic activity, and large rivers which drain through the country.

The assessment focuses on eight major hazards faced by children in Mozambique: flooding, cyclones, extreme heat, earthquakes, tsunamis, drought, conflict, and disease outbreaks.

Besides climate change impacts, Mozambique has faced economic shocks, annual epidemics, and armed conflict in the north since October 2017. While not all hazards are climate-related (e.g., earthquakes and tsunamis), climate change can exacerbate conflicts. Hazards analysed are shown in Figure 4.

Figure 4.
Hazards included in the analysis



Note: Climate change does not directly affect earthquakes and the link between climate change and conflict is complex

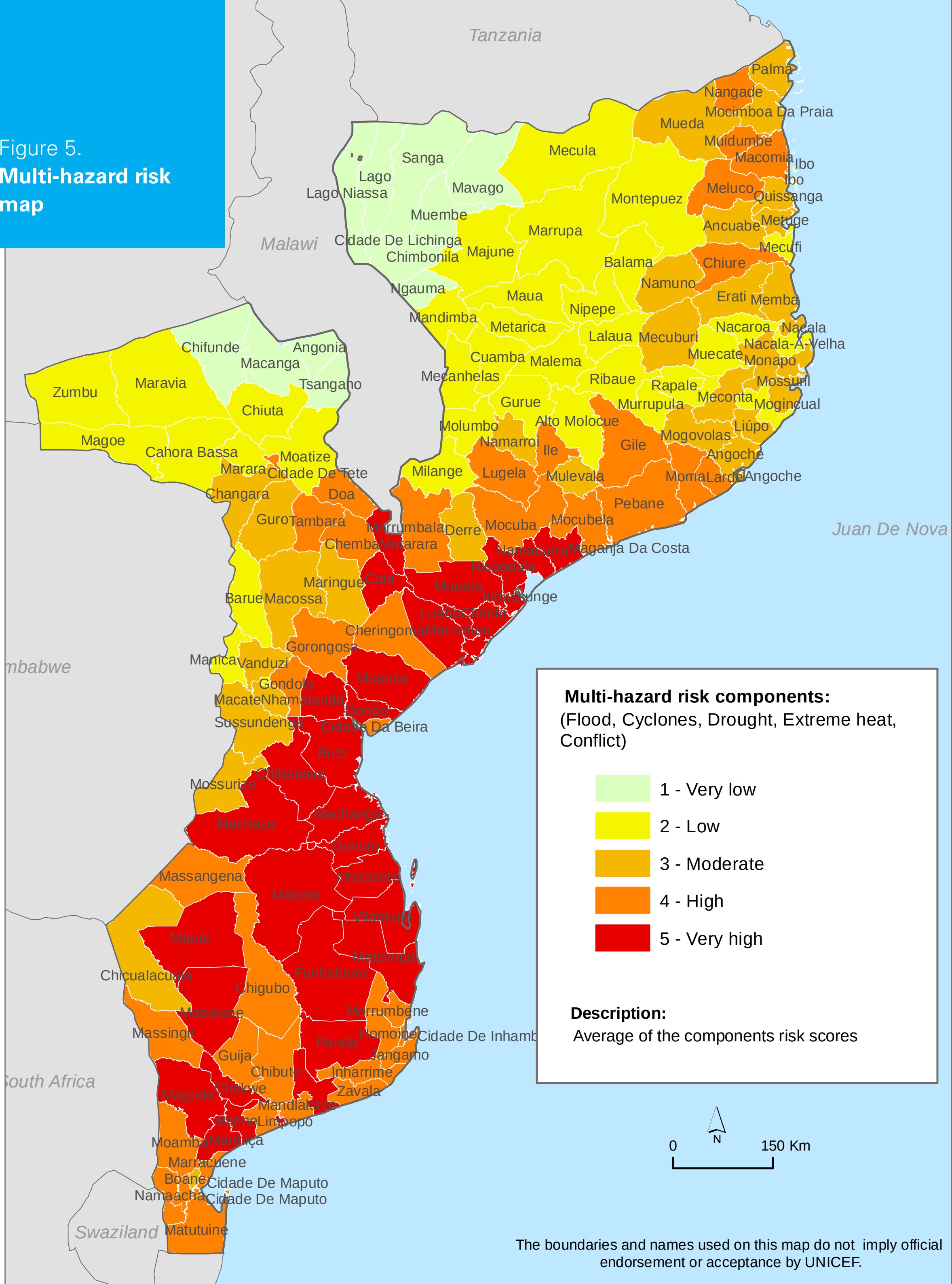
Exposure to hazards also varies geographically within Mozambique and was analysed using a multi-hazard risk index.

The spatial variance in exposure to risk was assessed using a multi-hazard risk index based on equal weighting of the eight hazards. As seen in the Multi-Hazard Risk Map presented in Figure 5, exposure to hazards is highest in central and southern Mozambique, specifically Sofala, Inhambane, Gaza, and Maputo. Exposure to hazards is generally lowest in Niassa, Nampula, Tete, and Cabo Delgado provinces. The 17 most hazard-prone districts are spread across the six provinces shown below.

Floods and cyclones are currently the most prominent meteorological hazards in the country. Flood risk is moderate to high throughout most of the districts across the country, while cyclone risk is most severe across the coastal districts. With climate change, cyclones in southern Africa are expected to become less frequent but more intense[6]. An expected increase in the intensity of rainfall events is likely to lead to more flooding during rainy seasons[7].

Extreme heat and droughts affect similar areas. Both affect the southern areas of the country more intensely.

Figure 5. **Multi-hazard risk map**



[6] CDKN and ACDI, 2022. Impacts, adaptation options and investment areas for a climate-resilient southern Africa. Retrieved from: https://cdkn.org/sites/default/files/2022-03/IPCC%20 Regional%20Factsheet_Southern%20Africa_Web.pdf

[7] USAID, 2018. Climate Risk Profile – Mozambique.

Temperature and sea level rises are expected to be significant across the country. Changes in temperature are expected to be more extreme in the southern and central provinces. The sea level is expected to rise significantly in all coastal districts, apart from one (Mandlakazi in Gaza).

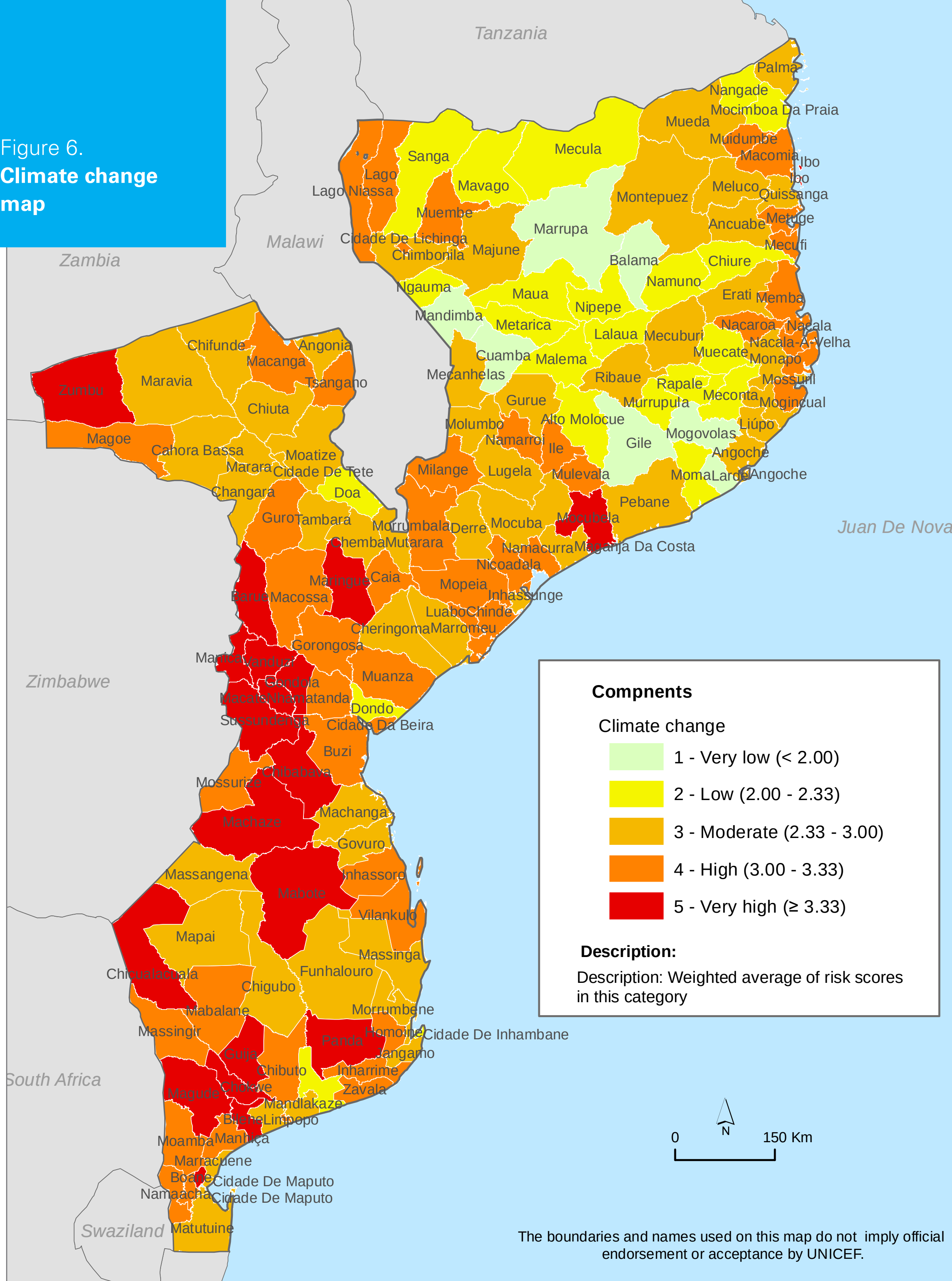
Projections for a change in the total average annual rainfall are negligible[8]. However, the frequency and length of droughts in southern Africa are expected to increase as a result of less regular rainfall[9].

While destructive earthquakes are very rare and tsunamis are yet to be recorded in Mozambique, risks of these two hazards are considered high in certain areas of the country.

Other hazards are more targeted. Conflict is currently most prominent in Cabo Delgado. Public health outbreaks generally appear in pockets and may vary substantially[10].

As shown in Figure 6, the risk related to climate change is generally higher in the southern and western parts of Mozambique. For the purpose of the analysis, climate change risk was based on the unweighted average of temperature, rainfall and sea level rise projections.

Figure 6.
Climate change map



8 According to the CORDEX Africa and CCCma model (with a moderate scenario (RCP 4.5) and a time period of 2021-2050) that was included in the analysis.

9 CDKN and ACDI, 2022. Impacts, adaptation options and investment areas for a climate-resilient southern Africa.

10 The cholera outbreak which started in September 2022 is not considered in the data review.

Mozambique, 2023

Eugenia Vasco, her husband, and their one-year-old daughter Valentina cultivate the land for their livelihood. Cyclone Freddy's strong winds and floods destroyed their home, forcing them to seek shelter in a small room provided by neighbors. Eugenia is deeply concerned about the lack of access to clean drinking water. Cyclone Freddy has caused widespread devastation, severely impacting homes, schools, and infrastructure across Mozambique.

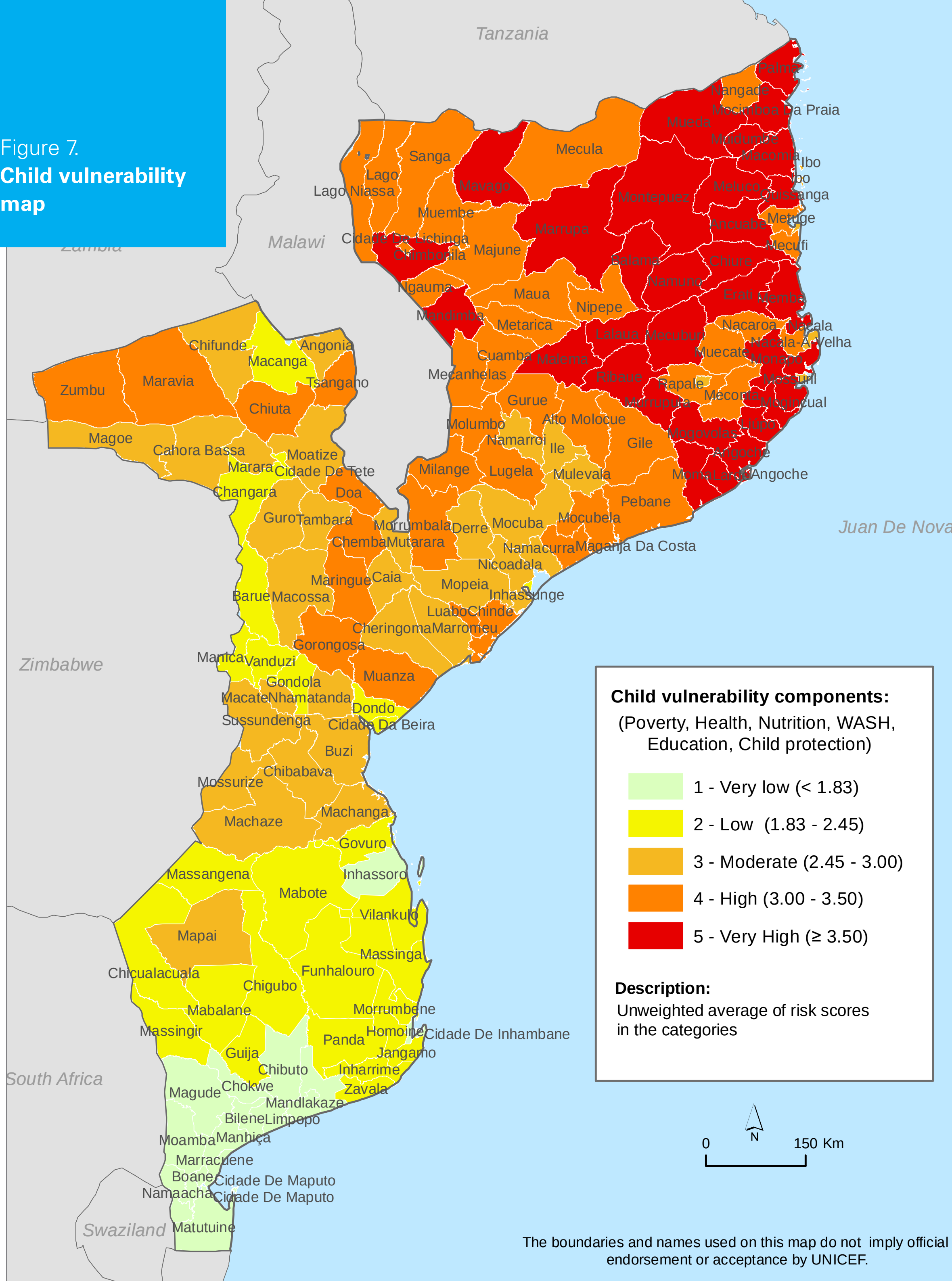
5 Sensitivity

Sensitivity to hazards was assessed through six thematic areas: poverty, health, nutrition, education, WASH, and child protection, and cross-cutting disability and gender.

Sensitivity is a complex function of physical, social, economic, and environmental factors that determine how a system or population might be affected by hazards. It is also path-dependent as sensitivity is related to past exposure to hazards and built-up resilience.

As seen in Figure 7, the most socio-economic vulnerable districts (considering the above-mentioned thematic areas) are concentrated in the three northernmost provinces: Cabo Delgado, Nampula and Niassa. Thematic-specific vulnerabilities show clear geographic patterns, as described below. The vulnerability index used for this analysis is based on several indicators across the six thematic areas.

Figure 7.
Child vulnerability map



Poverty is most significant in the northern provinces, with multidimensional poverty being very high in Cabo Delgado, Nampula, Niassa, Zambezia, and Tete, and monetary poverty being very high in Cabo Delgado and Nampula[11]. Poverty worsens health, malnutrition, and educational disparities, with poor WASH conditions increasing disease risk and increasing a child's vulnerability to climate change.

Health vulnerabilities are concentrated in Cabo Delgado and Nampula. Low birth weight can be found countrywide, with Palma in Cabo Delgado being the worst. Climate change and hazards significantly impact children's health, with rising temperatures and altered rainfall patterns increasing vector-borne diseases like malaria and dengue fever. Mozambique's already strained health system faces increased challenges post-disaster, exacerbating vulnerabilities.

Malnutrition is highest in Cabo Delgado, Niassa, Nampula, and Zambezia. Gaza and Inhambane show low vitamin A supplementation despite lower global acute malnutrition levels. Post-disaster and climate change disruptions to food systems increase acute malnutrition risk, especially for families reliant on subsistence agriculture and coastal fishing.

Education in Mozambique shows clear geographic disparities, with the northern provinces, particularly Cabo Delgado, Niassa, and Nampula, exhibiting the lowest primary completion and net enrolment rates. Disasters exacerbate these educational challenges, disrupting access to schooling due to infrastructure damage and repurposing of facilities as emergency shelters. Overcrowded classrooms and poor infrastructure diminish educational quality.

[11] Estimativas e Perfil da Pobreza em Moçambique: Uma Analise Baseada no Inquérito sobre Orçamento Familiar. Retrieved from mef.gov.mz

Such disruptions can have lasting impacts on childhood development, potentially perpetuating intergenerational educational disadvantages.

Access to safe water and adequate sanitation is particularly deficient in Zambezia and Nampula[12], with districts in these provinces experiencing the lowest access rates, but challenges persist across all northern and central provinces, such as Cabo Delgado, Niassa, and Sofala. Disasters further exacerbate these challenges, with cyclones and flooding often causing damage to WASH systems, leading to adverse health conditions including increased open defecation and the spread of waterborne diseases such as diarrhoea. Long-term climate change impacts, including altered rainfall patterns, compound the vulnerability of Mozambique's WASH sector[13].

Child protection risks are highest in Nampula, Niassa, Cabo Delgado and Zambezia, with child-headed households and child marriages most prevalent in Cabo Delgado, Niassa, and Nampula. High child labour and low civil registration rates are dispersed, with the lowest registration on the Nampula coastline and borders with Malawi and Zambia. Climate change exacerbates these risks, contributing to food insecurity-related child marriages and increased violence due to substance abuse.

Children with disabilities face increased threats and exclusion during and after disasters due to pre-existing and emerging barriers, including stigma. Families may hide disabled children, hindering their psychosocial well-being.

[12] As defined by the 2017 census.

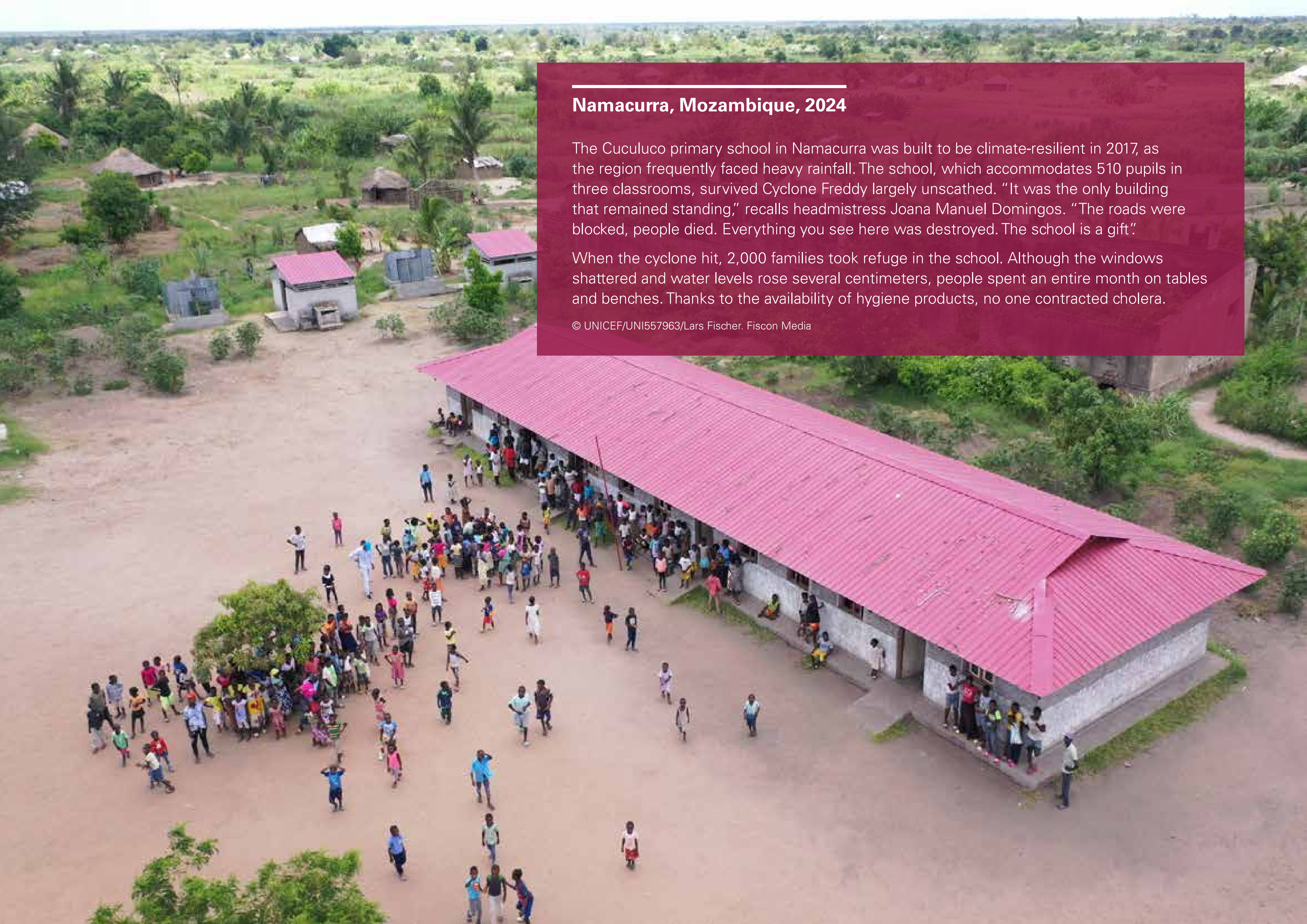
[13] Muradás, P., Puig, M., Ruiz, Ó. and Solé, J.M., 2021. Mainstreaming Climate Adaptation in Mozambican Urban Water, Sanitation, and Drainage Sector. In African Handbook of Climate Change Adaptation (pp. 2631-2652). Cham: Springer International Publishing.

Their exclusion from disaster planning and early alert systems heightens vulnerability. Disability is poorly integrated into preparedness and response plans, with communication barriers affecting warning access. The lack of data on risks, barriers, and needs of children with disabilities before and after disasters limits inclusive humanitarian measures.

Both boys and girls are affected by climate change and hazards, but girls face disproportionate impacts. In Mozambique, hazards increase the risk of sexual and gender-based violence as protection mechanisms weaken[14]. Child marriage may rise as families try to reduce household needs, and girls may face neglect during disasters or displacement. They also face health risks due to increased caregiving responsibilities and challenges in accessing reproductive care. Poverty exacerbates these issues, pushing girls out of school and into work or child marriage, especially in female-headed households. Exclusion from disaster risk reduction (DRR) efforts and insufficient gender mainstreaming resulting in inadequate targeted assistance.

[14] Thurston, A.M., Stöckl, H. and Ranganathan, M., 2021. Natural hazards, disasters and violence against women and girls: a global mixed-methods systematic review. BMJ global health, 6(4), p.e004377.

The Global Programme to End Child Marriage supports a birth registration campaign in Milange, Zambezia, benefiting adolescents at risk and ensuring every child's right to identity is guaranteed.



Namacurra, Mozambique, 2024

The Cuculuco primary school in Namacurra was built to be climate-resilient in 2017, as the region frequently faced heavy rainfall. The school, which accommodates 510 pupils in three classrooms, survived Cyclone Freddy largely unscathed. “It was the only building that remained standing,” recalls headmistress Joana Manuel Domingos. “The roads were blocked, people died. Everything you see here was destroyed. The school is a gift.”

When the cyclone hit, 2,000 families took refuge in the school. Although the windows shattered and water levels rose several centimeters, people spent an entire month on tables and benches. Thanks to the availability of hygiene products, no one contracted cholera.

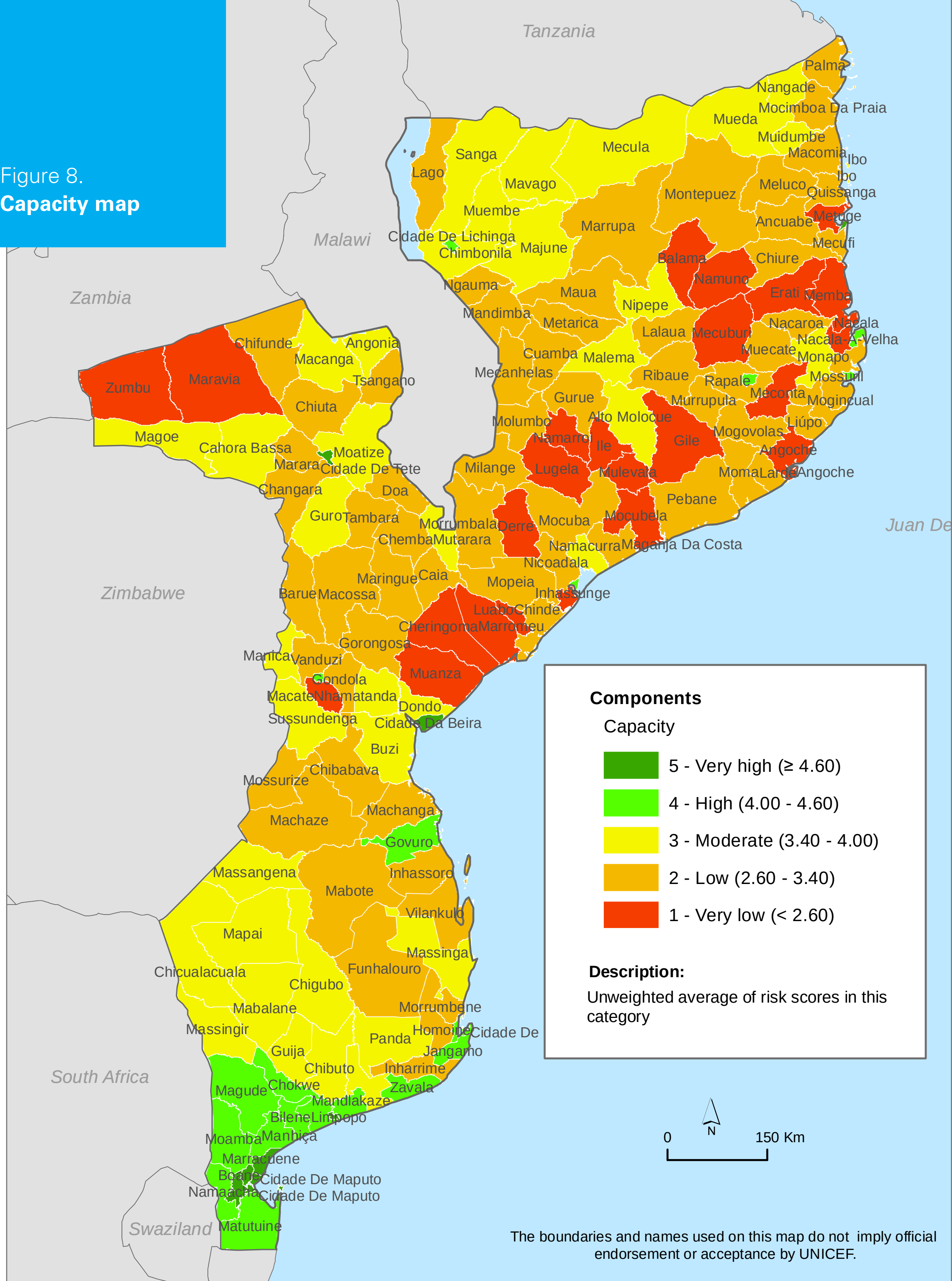
6 Adaptive capacity

Adaptive capacity is a crucial element of vulnerability and was assessed using both quantitative and qualitative methods.

Places and people with high adaptive capacity may be resilient even if they are highly exposed to hazards. Conversely, low adaptive capacity exacerbates vulnerability. An index of adaptive capacity was generated using a set of proxy indicators covering the different aspects that contribute to the capacity to anticipate risks, respond to hazards, and recover and change. Then capacity was assessed qualitatively based on adaptive capacity as a function of different forms of capital (human, social, natural, physical, and financial). The scope of the assessment was further refined to focus on key elements within each dimension of adaptive capacity.

Although the analysis of adaptive capacity includes many general indicators, a child-centred approach is necessary. In the context of adaptation, child-centred approaches can broadly be classified into two categories: interventions specifically focused on children's needs (also known as 'child-targeted') and interventions aiming to involve children in their design and delivery ('child-led'). Adaptive capacity scores are presented in Figure 8.

Figure 8.
Capacity map



Human capital (knowledge and skills) significantly influences adaptive capacity. Mozambique has a number of early warning and disaster management information systems. They provide insights into when a disaster might occur and collect critical data in the aftermath of one. These include risk modelling, early warning systems, alert systems, rapid assessments after disasters, and a registry of potential beneficiaries to facilitate the distribution of post-disaster assistance.

Despite recent improvements in information and early warning national-level systems, community-level vulnerability information remains limited. Communication systems are not inclusive for people with disabilities or without smartphones. Post-disaster assessments may be constrained by the capacity of district-level technicians, who might be affected by the disaster themselves. Adaptive capacity and local knowledge play vital roles.

Educational attainment is low in Mozambique. Despite free education, financial and cultural barriers, especially for girls, affect attendance. Poor teacher attendance, management, and infrastructure degrade education quality, limiting adaptive capacity¸ as schools teach essential skills for responding to hazards.

Manhaua Primary School in Sofala was converted into a temporary shelter following the impact of Cyclone Freddy in March 2023.

© UNICEF/UN0801981/Zuniga

Emergency services in Mozambique are hampered by limited electricity and mobile phone access, particularly in non-urban areas. Less than five per cent of populations in 37 per cent of districts in Mozambique use electricity. Mobile phone access is generally below 25 per cent in each district, with better access in the south.

Social capital includes both informal and formal institutions that can contribute to adaptive capacity. This also includes the relationships and networks that exist between key stakeholders. Social capital is assessed through three aspects: informal institutions, the capacity of relevant state institutions, and the policy and legal framework.

Very few districts across the entire country have access to fully functional local committees for DRR[15]. In disaster anticipation, communities rely on informal networks led by influential figures like religious and community leaders. Recognising children as agents of change, efforts focus on building adaptive capacity through knowledge dissemination.

The mandate for responding and adapting to climate change and disasters is shared by a number of state institutions based on areas of expertise. A recently updated policy and legal framework supports state institutions and DRR actors. However, financial and technical limitations hinder proactive disaster responses.

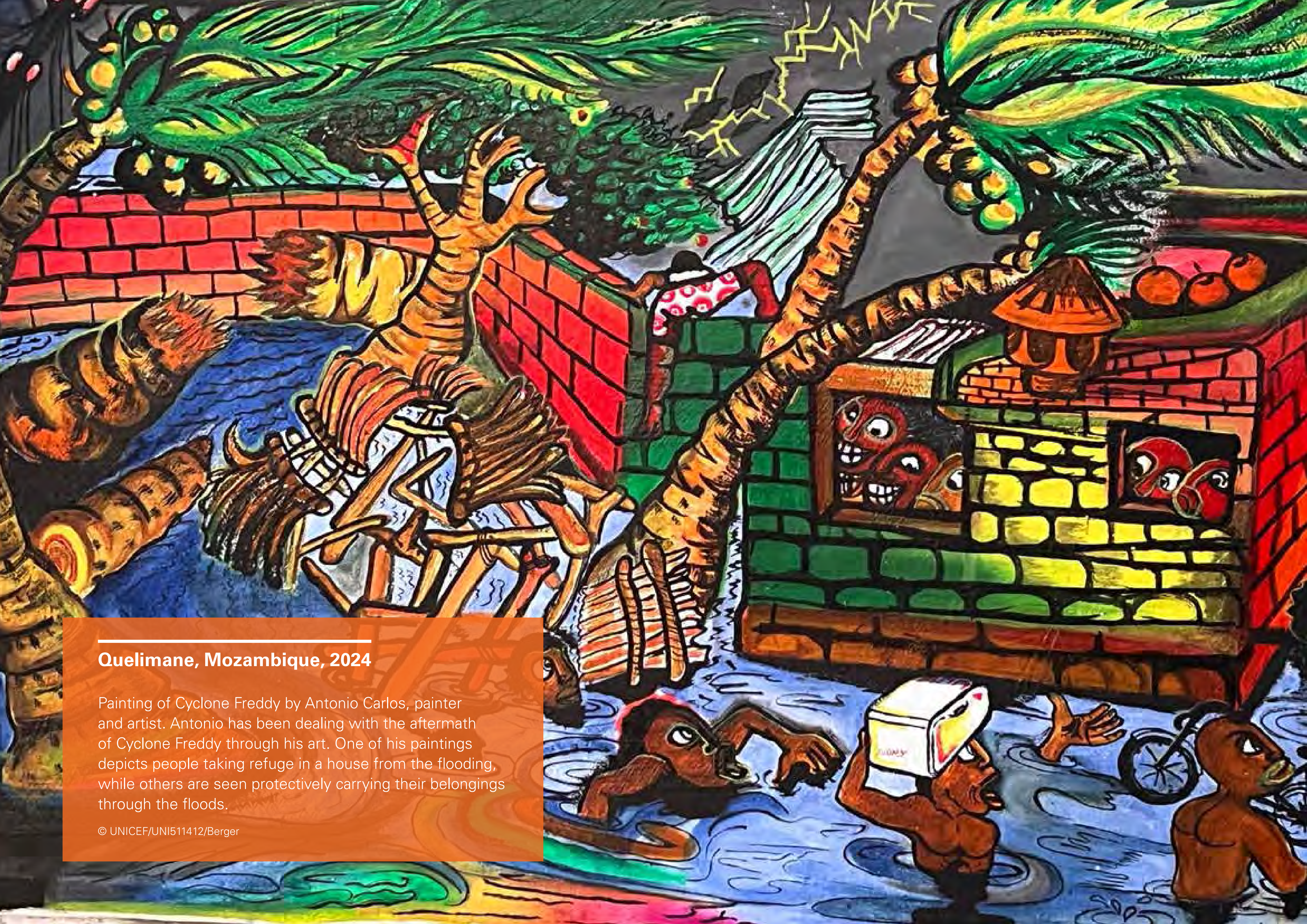
Natural capital in Mozambique, such as forests and mangroves, plays a crucial role in mitigating climate change and supporting ecosystems. However, this is under threat from deforestation, pollution, and overharvesting. Efforts to protect these ecosystems include the government's five-year plan for sustainable resource management and international support which focus on enhancing protected areas, environmental education, and fostering resilience and sustainable livelihoods in regions like Gorongosa National Park. Children are recognized as important stakeholders in environmental awareness and education for sustainability initiatives success[16].

Physical capital and transportation — critical infrastructure, including health facilities, WASH systems, communication networks, and the electrical grid — is highly vulnerable to disasters due to poor construction, staffing shortages, and coordination challenges. This lack of resilience exacerbates the immediate impacts of disasters. Climate change threatens to further strain hydroelectric power generation (due to hydrological changes) and the already limited response capacity of healthcare systems. Efforts to "build back better" aim to improve resilience, particularly in schools (used also as emergency shelters) and household robustness.

Financial capital in Mozambique impacts adaptive capacity at both household and institutional levels, with widespread poverty leaving 60 per cent of the population without personal financial resources though remittances provide some support. While substantial aid exists, Mozambique strives for financial autonomy, highlighted by the establishment of a disaster management fund in 2022. Efforts also involve leveraging the private sector financing for adaptive capacity development.

[15] Based on analysis of INGD data.

[16] World Bank, 2020. Upscaling nature-based flood protection in Mozambique's cities.



Quelimane, Mozambique, 2024

Painting of Cyclone Freddy by Antonio Carlos, painter and artist. Antonio has been dealing with the aftermath of Cyclone Freddy through his art. One of his paintings depicts people taking refuge in a house from the flooding, while others are seen protectively carrying their belongings through the floods.

7 Summary and recommendations

Summary

Children in Mozambique are vulnerable and face risk across multiple dimensions.

They are impacted both in the short term by frequent disasters and in the longer term by climate change. Though children face many of the same threats faced by the general population, they are more sensitive than adults and face additional sources of risk. Despite efforts to reduce the vulnerability of children, adaptive capacity is limited by deficiencies across sectors. Some of the overall findings of this assessment are highlighted below, followed by key findings from each of the components of the CCRA.

- **Increasing exposure to risk:** Mozambique is among the countries most vulnerable to climate change[17] due to its location. Armed conflict in the north since 2017 exacerbates these issues. These factors affect a large population of children, especially in major urban centres, informal and rural settlements, and in the north of the country where vulnerability is highest.

- **Risk Multipliers:** Poverty heightens vulnerability across all dimensions (education, health, nutrition, WASH, and child protection). Disabilities increase risk by limiting access to information and disaster avoidance, reducing resilience, and exposing children to social stigma. Girls face specific risks, such as increased sexual and gender-based violence during disasters.

- **Limited Adaptive Capacity:** Mozambique's adaptive capacity is constrained by a lack of skills, high poverty levels, weak infrastructure, and environmental degradation.

- **Geographical Differences:** Risk, hazard exposure, sensitivity, and adaptive capacity vary across Mozambique. Despite higher exposure, southern Mozambique is less at risk than the northern and central regions due to greater vulnerability and lower adaptive capacity in the latter.

- **Encouraging signs:** Positive developments include strengthening state institutions, improving early warning systems, reinforcing critical infrastructure, and enhancing community-level resilience.

At the Namitangurine support center in Zambezia, children can be re-registered if documents were lost while fleeing disasters.The center also supports victims of violence or abuse and assists in finding lost family members.

[17] Clim-HEALTH Africa, 2020. First of its kind: Health vulnerability and adaptation to climate change assessment conducted in Mozambique. Retrieved from: https://climhealthafrica.org/news-mozambique-vulnerability-and-adaptation-assessment

Recommendations

Given the vulnerability of children in Mozambique to climate change and other hazards, there are significant opportunities to enhance resilience.

This report presents opportunities to strengthen resilience by addressing underlying factors that increase children's sensitivity to climate change and disasters and investing in adaptive capacity to strengthen children's ability to cope with the lasting impacts of climate change.

1. **Support efforts to improve DRR and vulnerability data.** The availability of reliable data across sectors is vital for prioritising needs and identifying vulnerable populations and children. Relevant stakeholders should collaborate to enhance data collection, shared information, and databases, particularly on education infrastructure, disease surveillance and disability.

2. **Increase evidence-based programming.** Although considerable hazard-related data is already available, gaps remain in its application for decision-making and programming. Support should be provided to operationalise the use of this data, particularly focusing on children, is critical to ensure it effectively informs programming and interventions.

3. **Support community-level resilience.** Given the unavoidable risk of hazards in Mozambique and climate trends, considerable emphasis should be placed on developing community-level resilience. The goal is to reduce the sensitivity of communities to disasters, avoiding loss of life, destruction of physical property, and mass displacement. Key entry points to engage on this include gender inclusion in community initiatives, community-level drought responses, readiness and response planning, ensuring an inclusive approach, and addressing post-disaster risks for children in community programming.

4. **Promote gender mainstreaming.** There is significant work to be done towards the mainstreaming of gender in DRR and climate change responses. Gender tools and guidelines are often overlooked. Developing targeted approaches to address the vulnerabilities of women and girls using sex-disaggregated data will enable more responsive programming that reduces risks to girls and women.

5. **Promote disability mainstreaming.** Similar to gender, the vulnerabilities and needs of disabled children in DRR and climate change programmes must be better integrated. Disability considerations must be included in future policies and plans across all sectors

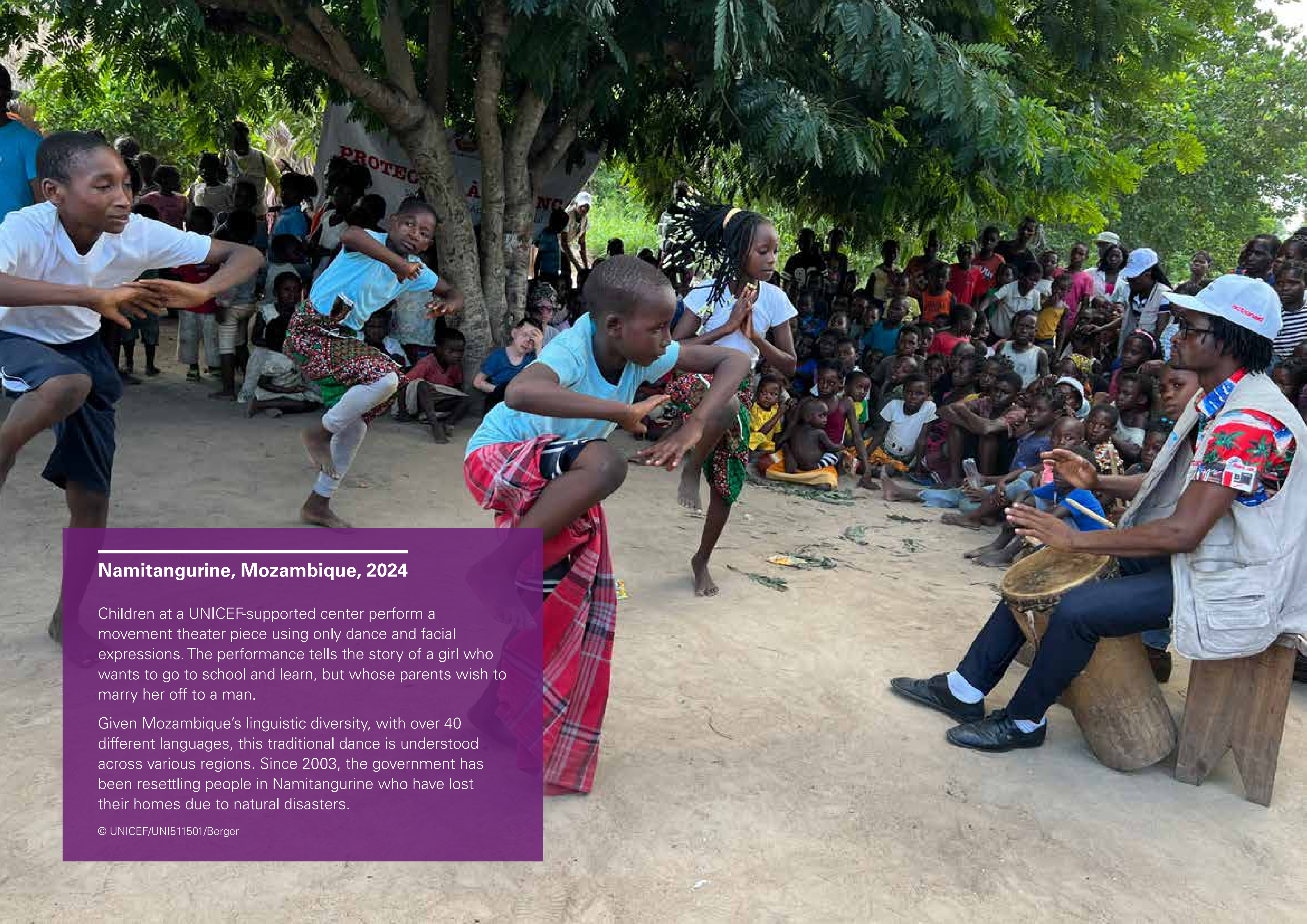
6. **Support readiness and resilience of critical infrastructure and systems.** Efforts should be made to improve the resilience of critical infrastructure and address issues that directly impact children including ensuring access to education, enhancing water and sanitation infrastructure, and strengthening resilient healthcare facilities and services.

7. **Advocate for the inclusion of children as agents of change in DRR and climate change adaptation strategies.** This can be achieved through DRR youth committees, integrating DRR into the school curriculum, and supporting the dissemination of hazard-related information to strengthen adaptation approaches nationwide.

8. **Support technical capacity within government agencies** in translating DRR policies into actionable outcomes. Training should focus on post-disaster support, including psychosocial support, addressing nutrition needs, and mitigating child protection risks.

9. **Engage the private sector** to provide additional financial and technical capacity across various sectors, such as capital investments in vulnerable districts and innovative technologies.

In addition to this report, further data is available to interested parties upon request. For more information, please contact UNICEF Mozambique directly at www.unicef.org/mozambique



Namitangurine, Mozambique, 2024

Children at a UNICEF-supported center perform a movement theater piece using only dance and facial expressions. The performance tells the story of a girl who wants to go to school and learn, but whose parents wish to marry her off to a man.

Given Mozambique's linguistic diversity, with over 40 different languages, this traditional dance is understood across various regions. Since 2003, the government has been resettling people in Namitangurine who have lost their homes due to natural disasters.

8 Annexes

Annex 1: Methodological details

Table 2. **Climate change indicators**

Measure	Description
Projection for change in average annual temperature	Calculated using the CORDEX Africa and CCCma model with a moderate scenario (RCP 4.5) and a time period of 2021-2050.
Projection for change in average annual precipitation	Calculated using the CORDEX Africa and CCCma model with a moderate scenario (RCP 4.5) and a time period of 2021-2050.
Projection for sea level rise	Calculated through the reanalysis of storm surges and extreme sea levels using the GTSR data set based on hydrodynamic modelling. For this assessment, a 25-year return period was selected.

Table 3. **Capacity indicators**

Measure	Description	Source
Local committees for disaster risk reduction (DRR)	Calculated as the number of local committees for DRR, weighted by their operating status and divided by the district area. Local committees were given a value of 1 when existing but non-functional, 2 when somewhat function, 3 when moderately functional and 4 when fully functional.	INGD - 2022
Access to electricity	% of the child population that lives in a household that uses electricity	Census - 2017
Access to a mobile phone	% of the population between the ages of 3 and 17 with a mobile phone	Census - 2017
Road infrastructure	Calculated as the total length of primary and secondary roads divided by the total area.	Open Street Maps (OSM) - 2022
Classroom resilience	% of classrooms built with conventional material	MINEDH - 2022

Table 4. **Hazard indicators**

Measure	Description
Flood	World Food Programme (WFP) integrated Context Analysis (ICA) Reclassification based on aggregated flood data from 1981 through 2019.
Cyclone	Tropical Cyclonic Wind and Storm Surge hazard is calculated using the GAR15 cyclone wind and storm surge model, which uses information from 2,594 historical tropical cyclones, topography, terrain roughness, and bathymetry. The risk was calculated with the CAPRA-GIS platform which is risk modelling tool of the CAPRA suite (www.ecapra.org).[18] In coordination with the UNICEF Mozambique Climate and Environment Officer, a 50-year return period was selected.
Extreme Heat	Based on an existing and widely accepted heat stress indicator, the Wet Bulb Globe Temperature (WBGT, in °C). The damaging intensity thresholds are applied following this definition of slight/low (<28°C), moderate/high (28-32°C) and severe/very high (>32°C) heat stress.[19] In coordination with the UNICEF Mozambique Climate and Environment Officer, a 20-year return period was selected.
Earthquake	Earthquake risk is classified using a fully probabilistic seismic hazard analysis at the global level, using the program CRISIS2014. A set of tectonic provinces were identified and characterized by means of a set of parameters that describe the future seismic activity on each of them based on historical records together with relationships to obtain hazard intensities as a function of magnitude and distance.[20] In coordination with the UNICEF Mozambique Climate and Environment Officer, a 475-year return period was selected.
Tsunami	Tsunami risk is based on the data that serves for the Global Tsunami Model. The data contains maximum inundation heights, calculated at offshore hazard points and projected to shoreline by simple interpolation.[21] In coordination with the UNICEF Mozambique Climate and Environment Officer, a 50-year return period was selected.
Drought	Drought risk is based on the Standardized Precipitation-Evapotranspiration Index (SPEI). The SPEIbase is based on monthly precipitation and potential evapotranspiration from the Climatic Research Unit of the University of East Anglia. It covers the period between January 1901 and December 2020.[22]
Conflict	Conflict risk is measured based on the number of violent incidents including battles, explosions and violence against civilians in 2022. The data is sourced from the Armed Conflict Location and Event Data (ACLED).[23]
Disease outbreak	Disease outbreak risk is measured by the number of measles cases within the population of 23 months or under, divided by the population of 23 months or under in 2022 (calculated using the official figure of 7% of the total population). The data is sourced from the Ministry of Health's (MISAU) Health Monitoring and Evaluation Information System (SISMA).

[18] https://www.geonode-gfdrrlab.org/layers/hazard:viento_mundo_tr50_int1

[19] https://www.geonode-gfdrrlab.org/layers/hazard:intensity_returnperiod20y

[20] https://www.geonode-gfdrrlab.org/layers/hazard:gar17pga475

[21] https://www.geonode-gfdrrlab.org/layers/hazard:ts_mih_rp50

[22] https://spei.csic.es/database.html

[23] https://acleddata.com/

Table 5. **Vulnerability indicators**

Measure	Indicator	Description	Source
Poverty	Multi-dimensional poverty (provincial level)	Calculated using the Alkire and Foster methodology and complemented by the Multidimensional Overlapping Deprivation Analysis (MODA)	Household budget survey (OIF) - 2014/15
	Monetary poverty (provincial level)	Calculated based on the national poverty line of consumption per capita adjusted for children's population	Household budget survey (OIF) - 2014/15
Health	Low birth weight	% of live births for which the children weighed less than 2,500g	MISAU SISMA - 2022
	DPT3 vaccination	% of children between 0 and 11 months that received their third dose of DTP3 vaccine	MISAU SISMA - 2022
Nutrition	Admissions for global acute malnutrition (GAM)	% of children between 6 and 59 months that have been admitted for severe or acute malnutrition[24]	MISAU SISMA - 2022
	Vitamin A supplementation	% of children between 6 and 59 months that received Vitamin A supplementation[25]	MISAU SISMA – first half of 2022
Education	Primary completion rate	% of the population of 11 year olds expressed as the population to pass the last grade of primary school	MINEDH Livro de Indicadores - 2022
	Primary net enrolment rate	% of children between 6 and 12 years that are enrolled in primary school	MINEDH Livro de Indicadores – 2021, 2022[26]
WASH	Access to clean water	% of the population between the ages of 0 and 17 that live in a household with access to clean water	Census - 2017
	Access to improved sanitation	% of the population between the ages of 0 and 17 that live in a household with access to improved sanitation	Census - 2017
Child protection	Child-headed households	% of the population between the ages of 12 and 17 that are the head of their household	Census - 2017
	Child labour	% of the population between the ages of 7 and 17 that have worked	Census - 2017
	Child marriage	% of the population between the ages of 12 and 17 that have been or are currently married	Census - 2017
	Civil registration	% of the population between the ages of 0 and 17 whose birth was registered	Census - 2017

[24] The population of children between 6 and 59 months was calculated as 16.4% of the total population, which is the official population rate of 6 to 59 months old in 2022.

[25] Ibid.

[26] The data is from 2021 for the district in Inhambane, Manica, Nampula, Niassa, Tete and Zambezia provinces and from 2022 for the districts in Cabo Delgado, Gaza, Maputo Cidade, Maputo and Sofala provinces.

Annex 2: Supplementary data

Table 6. **Districts with the highest population of children**

	District	Province	Child population	Girl population
1	**Matola**	Maputo Provincia	605,005	301,310
2	**Maputo**	Maputo Cidade	480,431	243,741
3	**Nampula**	Nampula	467,976	237,996
4	**Milange**	Zambezia	426,470	210,359
5	**Beira**	Sofala	387,966	192,602
6	**Angonia**	Tete	323,274	162,336
7	**Gurue**	Zambezia	293,885	146,094
8	**Mocuba**	Zambezia	279,995	140,438
9	**Chimoio**	Manica	275,960	137,758
10	**Monapo**	Nampula	275,073	137,317
11	**Erati**	Nampula	268,970	136,926
12	**Tete**	Tete	265,191	132,496
13	**Morrumbala**	Zambezia	263,813	131,049
14	**Mogovolas**	Nampula	256,279	126,398
15	**Alto Molocue**	Zambezia	246,613	122,768
17	**Angoche**	Nampula	243,150	121,152
16	**Quelimane**	Zambezia	241,813	121,712
19	**Molumbo**	Zambezia	230,867	112,791
18	**Memba**	Nampula	227,027	113,851
20	**Moma**	Nampula	225,411	110,756
24	**Mecanhelas**	Niassa	207,443	102,205
21	**Nacala Porto**	Nampula	207,146	104,558
22	**Cuamba**	Niassa	205,993	102,885
23	**Chiure**	Cabo Delgado	203,106	102,222
25	**Nhamatanda**	Sofala	193,263	94,912
27	**Moatize**	Tete	186,474	93,164
26	**Lichinga**	Niassa	186,127	93,515
28	**Montepuez**	Cabo Delgado	184,540	91,821
29	**Ribaue**	Nampula	179,653	89,796
30	**Namuno**	Cabo Delgado	166,663	83,210

Table 7. **Districts with the highest CCRA 'score'**

	District	Province	Global-CCRA with Climate change projections value	CCRA Severity
1	**Erati**	Nampula	3.50	Very high
2	**Milange**	Zambezia	3.43	Very high
3	**Moma**	Nampula	3.39	Very high
4	**Mogovolas**	Nampula	3.38	Very high
5	**Morrumbala**	Zambezia	3.36	Very high
6	**Memba**	Nampula	3.33	Very high
7	**Monapo**	Nampula	3.32	Very high
8	**Angoche**	Nampula	3.29	Very high
9	**Chiure**	Cabo Delgado	3.28	Very high
10	**Namuno**	Cabo Delgado	3.23	Very high
11	**Gorongosa**	Sofala	3.16	Very high
12	**Mocuba**	Zambezia	3.16	Very high
13	**Mossuril**	Nampula	3.15	Very high
14	**Caia**	Sofala	3.15	Very high
15	**Ancuabe**	Cabo Delgado	3.14	Very high
16	**Mecanhelas**	Niassa	3.12	Very high
17	**Maringue**	Sofala	3.10	High
18	**Molumbo**	Zambezia	3.10	High
19	**Buzi**	Sofala	3.09	High
20	**Lugela**	Zambezia	3.09	High
21	**Montepuez**	Cabo Delgado	3.07	High
22	**Mecuburi**	Nampula	3.07	High
23	**Macomia**	Cabo Delgado	3.06	High
24	**Namacurra**	Zambezia	3.04	High
25	**Mussorize**	Manica	3.04	High
26	**Balama**	Cabo Delgado	3.03	High
27	**Pebane**	Zambezia	3.02	High
28	**Meconta**	Nampula	3.02	High
29	**Chibabava**	Sofala	3.01	High
30	**Mueda**	Cabo Delgado	3.01	High

For every child
Whoever she is.
Wherever he lives.
Every child deserves a childhood.
A future.
A fair chance.
That's why UNICEF is there.
For each and every child.
Working day in and day out.
In more than 190 countries and territories.
Reaching the hardest to reach.
The furthest from help.
The most excluded.
It's why we stay to the end.
And never give up.

for every child

Published by UNICEF Mozambique
Av do Zimbabwe, 1440, Maputo City

www.unicef.org/mozambique