

Feasibility Study

**Cyclone insurance for low-income homeowners
and micro and small enterprises in Sofala
Province, Mozambique**

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Executive Summary

Globally, an average of 84 tropical cyclones occurs each year. Those that make landfall kill over 20,000 people and cause about US\$ 10 billion worth of damage annually.¹ The Mozambican coast forms almost the entire western perimeter of an active tropical cyclone basin, the South-West Indian Ocean Basin, and is the most cyclone active area in the Southern hemisphere.² The central region of Mozambique, including Sofala Province, is particularly exposed to cyclones.

This vulnerability was made painfully clear in March 2019, when Cyclone Idai made landfall in central Mozambique at the port of Beira.³ Idai was one of the strongest and deadliest cyclones ever recorded in the southern Hemisphere.^{4,5} At its peak, it reached a speed of 215 km/h, and brought more than 200 mm of rain to several provinces in a space of 24 hours. As a result, floods impacted around 3,000 square kilometres, including 715,000 hectares of farmland.⁶ One and a half million people were affected in Mozambique alone, where more than 600 died, and over 1,500 were injured.⁷ With estimated losses surpassing US\$ 3 billion (about US\$ 250 million just in Beira), the socio-economic impacts of cyclone Idai are the highest ever recorded in the South-Western Indian Ocean.⁸

In order to provide future protection against the financial impacts of such cyclones, Blue Marble partnered with Hollard Insurance (Mozambique) to explore the possibility of introducing a microinsurance product offering protection against cyclone and high-wind damage to uninsured low-income housing and/or micro and small urban enterprises. This feasibility study was undertaken by Blue Marble Microinsurance in the Beira Corridor area of Mozambique to determine the viability of such a product, develop an initial product and distribution design, and to test the product prototype with potential customers.

A five-day survey of low-income homeowners and micro and small informal and formal business owners in the Beira Corridor was undertaken. A total of 23 micro and small business owners were interviewed, alongside 35 homeowners, and additional observations of approximately 30 houses.

Sections 3 and 4 describe the findings of the initial market research survey among low-income homeowners and micro and small business owners respectively. Weaknesses in construction practices and materials have been shown to make housing more susceptible to damage, and devastating damage occurred to homes during Cyclone Idai. Official figures indicate that 63,506 houses in Beira (54 per cent of the total) were damaged as a result of Cyclone Idai and 23,822 houses (20 per cent) were destroyed completely.⁹ Although most traditional houses, built of natural materials,

¹ Cited in Arnaldo Vieira, [How tropical storms have hurt Mozambique](#), *The East African*, 16 March 2022.

² A. Henderson-Sellers, H. Zhang, G. Berz, K. Emanuel, W. Gray, C. Landsea, G. Holland, J. Lighthill, S-L Shieh, P. Webster and K. McGuffre, [Tropical Cyclones and Global Climate Change: A Post-IPCC Assessment](#), *Bulletin of the American Meteorological Society*, Vol. 79, Issue 1, pp. 19–38.

³ Sharmila Devi, [Cyclone Idai: 1 month later, devastation persists](#), *The Lancet*, vol 393, issue 10181, 20 April 2019.

⁴ E.W. Kolstad, [Prediction and precursors of Idai and 38 other tropical cyclones and storms in the Mozambique Channel](#), *Quarterly Journal of the Royal Meteorological Society*, vol 147, issue 734, pp. 45–57, 2021.

⁵ Abubakr A. M. Salih, Marta Baraibar, Kenneth Kemucie Mwangi and Guleid Artan, [Climate change and locust outbreak in East Africa](#), *Nature Climate Change* vol 10, 2020, pp. 584–585

⁶ [Mozambique Cyclone Idai Post-Disaster Needs Assessment, Conference version, May 2019](#).

⁷ Ibid.

⁸ [Mozambique Cyclone Idai Post-Disaster Needs Assessment, Conference version, May 2019](#).

⁹ Government of Mozambique, United Nations, World Bank, European Union and African Development Bank: [Mozambique Cyclone Idai: Post-Disaster Needs Assessment](#), Conference version, 2019.

were largely destroyed, this type of housing is cheap and easy to rebuild. Conventional housing, built from conventional building materials, on the other hand, takes far greater time and resources to repair or rebuild, and, in many cases, is still in process today.

A quantitative analysis of the damage was conducted based on interviews and house-to-house surveys. The main damage suffered by respondents in the study was the loss of roofing sheets (*chapas*), often accompanied by the loss of *barrotes* (wood beams which hold the roofing to the house), which were ripped away from the cement or mud structures. The vast majority of the houses in the sample (89 per cent) suffered damage of less than US\$ 1,000 and almost two-thirds fell within the US\$ 500–1,000 bracket. These values included the more important household goods that were destroyed (the most common being the TV).

Interviews with business owners revealed that business premises were also damaged or destroyed, although advance warning of the cyclone allowed many to rescue their merchandise by storing it in protected areas. In addition, business owners suffered secondary impacts of the cyclone, including a general power outage that lasted for a month, reduced supplies of merchandise, a steep increase in prices, and reduced demand due to the temporary loss of livelihoods of much of the population. Furthermore, about a year later, while many businesses were still reeling from the effects of Idai, they were heavily impacted by the arrival of the COVID-19 pandemic.

Damage to informal micro businesses was minimal (less than US\$ 100), whereas the damage suffered by formal businesses was similar to those affecting low-income home-owners, including loss of roofing and cracked walls at business premises, and damage to assets and equipment. On the whole, the damage to businesses was lower than that suffered by low-income home-owners. Thirty-five per cent of all businesses interviewed suffered damage of US\$ 100–500, and only a few (13 per cent) suffering a loss greater than US\$ 1,000.

The majority of individuals and micro and small enterprises remain financially excluded. Despite government attempts to encourage urban informal enterprises to formalise their activities, a large proportion of micro and small enterprises continue to operate informally, limiting their ability to raise finance. A rapid increase in adults holding bank accounts occurred between 2009 and 2014 but this was followed by a virtual stagnation between 2014 and 2019. This stagnation is explained by the rapid uptake of mobile banking – a service that now exceeds traditional bank accounts and this trend is growing exponentially. In practice, the residents and small businesses interviewed for this study found it difficult to access formal financial services outside of mobile money.

Although only a small minority of Mozambican adults buy insurance, a substantial change in uptake has been recorded since 2009, when only 5.2 per cent of adults were insured. A decade later, in 2019, the proportion of insured adults had jumped considerably, to 17 per cent.

In response to the findings of the market research survey, an index insurance product providing protection against cyclone damage to policyholders' homes or businesses was developed. After analysing several potential data sets, it was decided to base the product on a wind-speed index using NASA Power data. The product will run during the cyclone season from the beginning of October to the end of April each year, and pricing and pay-outs will be determined at the geographical level of *postos administrativos* (administrative areas). The design of the product is described in detail in Section 6.

To test the product design with potential customers, a brief three-day survey of randomly selected small-scale formal and informal business owners was carried out. The survey was carried out through

a combination of interviews and a focus group discussion with a total of 37 business owners in the central area of Beira City. Responses, with few exceptions, were very positive, largely due to the possibility of selecting an affordable package in order to test the benefits. Almost all interview and focus group discussion participants said that they would be willing to experiment with the new product. The survey stressed the importance of offering a highly affordable product with rapid and transparent claim pay-outs- factors which can be achieved through an index insurance model.

There are a range of options for distributing insurance products in Mozambique, including brokers, bancassurance models, agents and alternative distribution models, and direct sales. After an analysis of all possible distribution channels, a decision was made to distribute the product through direct sales from the Hollard Beira office and through regional brokers in Beira during the pilot phase. In the next phase, the distribution channels could be expanded to include microfinance institutions as well as digital payment platforms.

The enabling environment is generally favourable to the introduction of such a product, with the government regulator facilitating the release of this kind of product through its sandbox initiative, and the National Financial Inclusion Strategy promoting access to financial and insurance products. Nonetheless, Hollard continues to push for a more favourable environment, including a separate category for inclusive insurance products with corresponding fiscal incentives.

Given the adequate enabling environment, the needs identified in the initial market research survey, and the positive response to the product in the product validation survey, Blue Marble and Hollard have taken the decision to go ahead in piloting the cyclone insurance product designed during this project. The aim is to make the product available for sale to individuals for the next cyclone season, with sales starting in September and closing in mid-October 2022.

1. Introduction

Blue Marble Microinsurance partnered with Hollard Insurance (Mozambique) to explore the possibility of introducing a microinsurance product offering protection against cyclone and high-wind damage to low-income housing and/or micro and small urban businesses. The initiative was prompted by the increasing frequency and severity of cyclones in the South-West Indian Ocean Basin and by the devastating impact of Cyclone Idai in particular, which caused severe damage to housing and business premises.

This study was undertaken by Blue Marble Microinsurance in the Beira Corridor area of Mozambique to determine the viability of such a product, develop an initial product and distribution design, and to test the product prototype with potential customers.

The Beira Corridor

The Beira Corridor is the network of roads and railway lines that connect the Port of Beira with major inland cities in Mozambique and neighbouring countries including Harare (Zimbabwe), Lusaka (Zambia) and Lilongwe (Malawi). For the purposes of this report, the term is used to refer to the stretch of land running between the city of Beira and the small town of Inchope, just beyond the border with Manica Province.

Beira and its suburbs

Beira, Mozambique's fourth-largest city, stands at the confluence of the rivers Púnguè and Buzi on the coast of the Indian Ocean. It is located in Sofala province and was developed as a port in the early twentieth century by the Portuguese to connect Rhodesia and other land-locked colonies with the coast.

The mean temperature is 24°C, with an average minimum temperature of 16°C, and a mean maximum temperature of 31°C. The mean annual rainfall is 1,600 mm. Beira's population, currently 500,000, is expected to double in the next 10 to 15 years.

Box 1. Governance of Beira

The municipal district of Beira comprises 26 administrative “*bairros*” (neighbourhoods), grouped in five “*postos administrativos*”, two urban, two peri-urban and one rural. Each *bairro* is divided into several “*quarteirões*”, socially homogeneous subdivisions that are in turn divided into “*unidades*” of ten households. Each level is governed by a chief and, collectively, by the municipal institutional councillor (“*vereador*”). This organisation permits a direct, two-way communication and ensures the municipal authorities have good knowledge and understanding of the neighbourhoods. A few of the urban *bairros* are informal settlements, not fully recognised by the Municipality.

Source: Schofield and Deprez, *Supporting Urban Recovery after Cyclone Idai*.

Unfortunately, Beira has been ranked the coastal city most vulnerable to climate change in Mozambique, and one of the cities in eastern Africa most vulnerable to climate hazards like cyclones, rising sea levels, and coastal flooding.¹⁰ Lying at the confluence of two rivers, the city is susceptible to flooding. Large-scale drainage works have been undertaken in the city, which have reduced the risk,

¹⁰ A.K. Theron and L. Barwell, [Responding to Climate Change in Mozambique: theme 2: Coastal planning and adaptation to mitigate climate change impacts, CSIR, Stellenbosch, 2012](#).

but most low-income urban *bairros* are not connected to the primary drainage network. Furthermore, reduced investment and chaotic urban development in recent decades have left many areas of the city poorly protected against environmental risks.¹¹

Dondo

The town of Dondo, capital of Dondo District, lies some 30 km from the centre of Beira but only around 10 km from the edge of the city. It is effectively an extension of the industrial part of Beira, extending northwards from the port. Dondo's principal industries are the production of concrete sleepers and cement. There is also a factory producing fibro-cement roofing. The town has a population of approximately 100,000, of whom a much larger proportion than in Beira live in houses made of traditional materials (see Annex 3).

Buzi

The town of Buzi is the capital of Buzi District. It is less than 20 km from Beira but, by road, the distance is more than 100 km, and one must travel via the town of Tica. Buzi is located on a large and fertile flood plain (with rice the principal food and cash crop), and many of the better-off residents own tractors. These residents live in the higher parts of the town, whereas poorer residents and newcomers live in areas such as Bairro 2000, which are on the edge of the flood plain.

Chimoio

Chimoio is the capital city of the inland province of Manica, just east of Sofala province. It is the fifth-largest city in Mozambique, and an important industrial centre for cotton and steel production. Chimoio has a humid subtropical climate. Its average temperature in the coldest month is 17.4°C, while in the warmest month it is 24.9°C. The rainfall amounts to 1,090 mm on average per year. The city is located in the Beira Corridor 750 metres above sea level and is linked to the coast by road and railway. Because of its position, it is less vulnerable to tropical storms than Beira. Nevertheless, it has experienced damage in the past from storms travelling inland, including Cyclone Idai.

Chimoio was not included in the research into homeowners and small businesses, but it was one of two cities used for the modelling exercise to determine the insurance product design.

¹¹ Holly Schofield and Simon Deprez, [Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#), CARE, Geneva, 2019.

Cyclone Risks In Mozambique And Sofala Province

Tropical cyclones and their impact

Tropical cyclones are a natural feature of the Earth's atmosphere, as they transfer heat and energy between the cooler regions and the equator. However, their impact and the cost of the damage they cause have recently increased significantly because of increases in the human population and the value of assets. Tropical cyclones, which are known as hurricanes in the Atlantic Ocean or the Caribbean and typhoons in East Asia, pose a significant threat in that they generate high-intensity winds, heavy rainfall, storm surges and river floods that affect human health, activities and infrastructures, besides affecting all kinds of ecosystem services and the environment in general.^{12,13,14} Globally, an average of 84 tropical cyclones occur each year. Those that make landfall kill over 20,000 people and cause about US\$ 10 billion worth of damage annually.¹⁵

Population density is rising in many places, and people are moving to exposed regions in coastal areas and to the outskirts of crowded and fast-developing towns, where the quantity and value of assets is increasing as a result. Additionally, climate change is likely to alter the current trajectory pattern of cyclones, which could expose other regions that are less prepared.¹⁶ Africa, where vulnerability is high and response capacity low, has recently experienced billions of dollars of damage as a result of tropical cyclones Idai and Kenneth.

Cyclone risks in Mozambique

The Mozambican coast is particularly exposed to the impacts of climate change. Rising sea levels, the risk of earthquakes, and increasingly frequent and intense cyclones all put the country at risk. The Mozambican coast forms almost the entire western perimeter of an active tropical cyclone basin, the South-West Indian Ocean Basin. Indeed, this area is the most cyclone active area in the Southern Hemisphere.¹⁷ Every year, between November and April, three to twelve cyclones form in the Mozambique Channel,^{18,19} and Mozambique ranks second in Africa, after Madagascar, in terms of the number of tropical cyclones and storms experienced in the country.

¹² P. Peduzzi, B. Chatenoux, H. Dao, A. De Bono, C. Herold, J. Kossin, F. Mouton and O. Nordbeck, [Global trends in tropical cyclone risk](#), *Nature Climate Change* 2, pp. 289–294, 2012.

¹³ Q. Zhang, X. Gu, P. Shi and V.P. Singh, [Impact of tropical cyclones on flood risk in southeastern China: spatial patterns, causes and implications](#), *Elsevier Open Access*, 2016.

¹⁴ X. Wu and J. Guo, [Impacts of tropical cyclones on employment – An analysis based on meta-regression in *Economic Impacts and Emergency Management of Disasters in China*](#), Springer, 2021, pp. 137–165.

¹⁵ Cited in Arnaldo Vieira, [How tropical storms have hurt Mozambique](#), *The East African*, 16 March 2022.

¹⁶ I. Noy, [The socio-economics of cyclones](#), *Nature Climate Change* 6 pp. 343–345, 2016.

¹⁷ A. Henderson-Sellers, H. Zhang, G. Berz, K. Emanuel, W. Gray, C. Landsea, G. Holland, J. Lighthill, S-L Shieh, P. Webster and K. McGuffre, [Tropical Cyclones and Global Climate Change: A Post-IPCC Assessment](#), *Bulletin of the American Meteorological Society*, Vol. 79, Issue 1, pp. 19–38.

¹⁸ Direccao de Engenharia dos Portos e Caminhos de Ferro de Mocambique, [Estudo Ambiental Simplificado da Dragagem do Canal de Acesso da Porto Da Beira: Resumo Não Técnico](#), 2007.

¹⁹ A.F. Mavume, L. Rydberg, M. Roualt and J.R.E. Lutjeharms, [Climatology and Landfall of Tropical Cyclones in the South-West Indian Ocean](#), *Western Indian Ocean Journal of Marine Science*, vol. 8, issue 1, 2009.

Annex 1 provides a brief chronological summary of the cyclones, tropical storms and tropical depressions that have affected Mozambique between 1970 and 2022. From 1970 to 2022, 24 cyclones were recorded. A decade-by-decade analysis suggests an increasing frequency and intensity. During the first decade (1970–1979) only two cyclones were registered, while during the following two decades (1980–1989 and 1990–1999), four cyclones were recorded each decade. During the next two decades (2000–2009 and 2010–2019), five cyclones occurred per decade, indicating a steady increase in the last 50 years. An even more significant increase occurred over the past four cyclone seasons (2019–2022), with five cyclones observed each season. Not only has frequency increased, but a significant upward trend in cyclone strength seems to be taking place. Of the eight weaker Category 1 cyclones detected, six (75 per cent) were recorded over the 30-year period 1970–1999 and they accounted for 60 per cent of all the ten cyclones occurring during that period. In stark contrast, during the much shorter period of the past ten years (2012–2022), eight cyclones were recorded, of which none was Category 1. They included 57 per cent of the seven Category 2 cyclones, 43 per cent of the seven Category 3 cyclones, and half of the two Category 4 cyclones, from 1970.

In terms of tropical storms and depressions (less severe storms), the data also suggests increasing frequency. Over the period studied (January 1970 to March 2022), 21 tropical storms and depressions were recorded (there were considerably more tropical storms than depressions, but the exact numbers could not be obtained for certain years). During the first decade (1970–1979), four storms or depressions were recorded, dropping to two in 1980–1989 and then to one in 1990–1999, but jumping to seven during the decade 2010–2019. Three were recorded during the past two to three years alone (January 2020 to March 2022).

Experts predict that, with further global warming, Indian Ocean cyclones will move southwards and will increasingly threaten the southern Mozambican provinces, as well as major cities such as Maputo and Durban (which, in April 2022, suffered its highest rainfall in 60 years).

The impact of cyclones on Sofala Province



Figure 1. Map of Mozambique (derived from a United Nations map).

The central region of Mozambique, including Sofala Province, is the area most prone to cyclones in the country. During the 52-year period studied, eight cyclones (one-third of all recorded cyclones over this period) and three tropical storms (14 per cent of the 21 tropical storms and depressions recorded) have entered Sofala Province. Of the eight cyclones, five (62.5 per cent) have directly affected the city of Beira, as has one of the two tropical storms. Significantly, three cyclones hit Beira, including the hugely destructive Idai, and one tropical storm in a period of three years (2019–2022). The most severe tropical cyclones striking Sofala at large, and affecting the lives of millions of inhabitants, were Bonita in 1996, Lisete in 1997, Eline in 2000, Japhete in 2003, Idai in March 2019,²⁰ and Eloise in January 2021, which also caused substantial damage to Beira.²¹

Annex 2 looks specifically at cyclones, tropical storms and tropical depressions that have had some impact on Sofala Province.

²⁰ Food and Agriculture Organization of the United Nations, [Atlas for disaster preparedness and response in the Limpopo basin, 2003](#).

²¹ Célia Macamo, [After Idai: Insights from Mozambique for Climate Resilient Coastal Infrastructure](#), *Africa Portal*, 15 June 2021.

Tropical Cyclone Idai

Cyclone Idai made landfall in central Mozambique in March 2019 at the port of Beira and continued along the Beira Corridor through Manica province towards Zimbabwe.²² Idai was one of the strongest and deadliest cyclones ever recorded in the southern Hemisphere.^{23,24} At its peak, it reached a speed of 215 km/h, and brought more than 200 mm of rain to the provinces of Sofala, Manica, Zambezia, Tete and Inhambane in the space of 24 hours. As a result, floods impacted around 3,000 square kilometres, including 715,000 hectares of farm land.²⁵ One and a half million people were affected in Mozambique alone, where more than 600 died, and over 1,500 were injured.²⁶ Owing to the decay and loss of sanitation facilities, vast areas were later affected by cholera.²⁷ With estimated losses surpassing US\$ 3 billion (about US\$ 250 million just in Beira), the socio-economic impacts of cyclone Idai are the highest ever recorded in the South-Western Indian ocean.²⁸

²² Sharmila Devi, [Cyclone Idai: 1 month later, devastation persists](#), *The Lancet*, vol 393, issue 10181, 20 April 2019.

²³ E.W. Kolstad, [Prediction and precursors of Idai and 38 other tropical cyclones and storms in the Mozambique Channel](#), *Quarterly Journal of the Royal Meteorological Society*, vol 147, issue 734, pp. 45–57, 2021.

²⁴ Abubakr A. M. Salih, Marta Baraibar, Kenneth Kemucie Mwangi and Guleid Artan, [Climate change and locust outbreak in East Africa](#), *Nature Climate Change* vol 10, 2020, pp. 584–585

²⁵ [Mozambique Cyclone Idai Post-Disaster Needs Assessment, Conference version, May 2019.](#)

²⁶ Ibid.

²⁷ W.H. Chen and A.S Azman, [Mitigating Cholera in the Aftermath of Cyclone Idai](#), *American Journal of Tropical Medicine and Hygiene*, vol 101, issue 5, 2019, pp. 960–962.

²⁸ [Mozambique Cyclone Idai Post-Disaster Needs Assessment, Conference version, May 2019.](#)

2. Methodology

Market research survey

A five-day survey of low-income homeowners plus micro and small informal and formal business owners in the Beira Corridor was undertaken, with a focus on the area around the city of Beira (population 500,000). A few interviews were conducted in small towns, starting from Inchope, which lies at the intersection of two main roads, the EN1 (Maputo–Nampula) and the EN6 (Chimoio–Beira). Interviews were then conducted in the central part of Beira, in the suburb of Alto da Manga, and in the town of Dondo. Further interviews were conducted in Buzi, a town on the banks of the Buzi River, which was particularly badly hit by Cyclone Idai. Interviews were conducted with homeowners but not business owners. Attempts to talk to district government officials in Dondo failed because an official request had not been submitted.

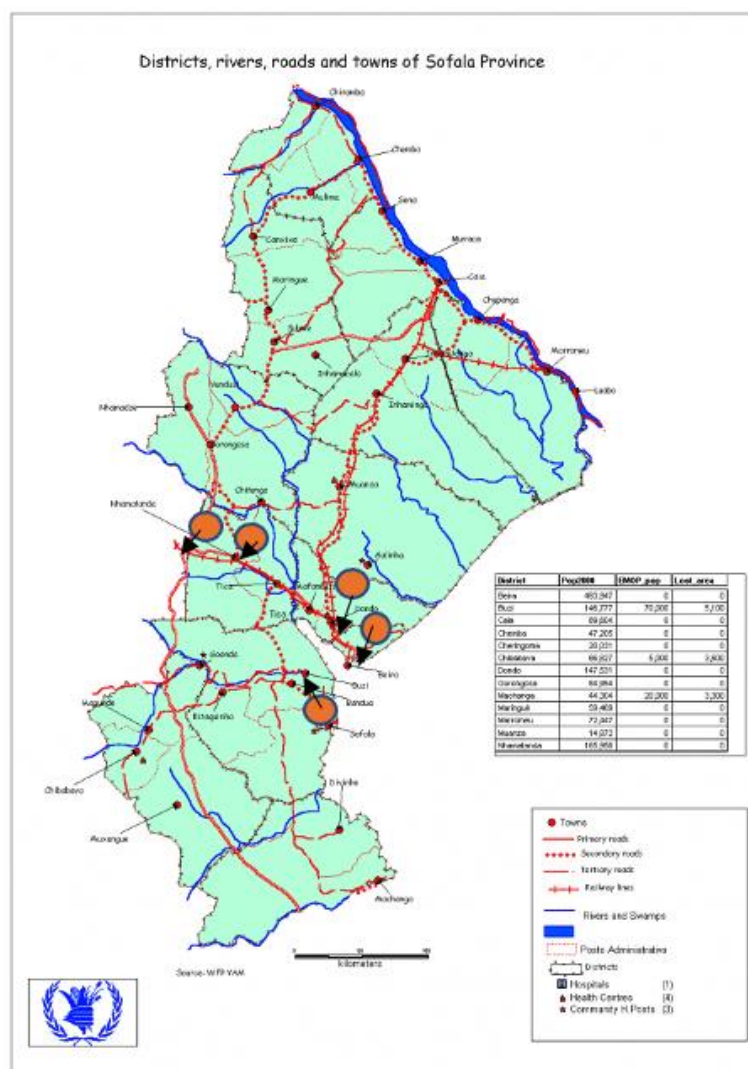


Figure 2. Map of Sofala Province showing the areas where the interviews took place

Micro and small urban enterprises

A total of 23 micro and small business owners were interviewed, of which four were informal (Table 1). Seven were interviewed along the Beira Corridor between Inchope and Nhamatanda, one in Dondo

and the rest (15) were interviewed in central Beira (12) and in the *bairro* (neighbourhood) of Alto da Manga (3). All but two of those interviewed in central Beira were located in or around the main informal market Goto. In the Goto Market, an executive member of the Association of Informal Vendors of Beira Markets (AVIMBE) was interviewed.

Location	Formal	Informal	Total
Beira Corridor	7		8
Dondo		1	
Beira (centre)	9	3	12
Beira, <i>bairro</i> of Alto da Manga	3		3
Total	19	4	23

Table 1. Interviews with owners of micro and small enterprises: categories and locations.

Low-income homeowners

After the business owners had been interviewed regarding their businesses, they were asked about the damage caused to their homes. Additionally, eight people encountered during these interviews (curious onlookers) and four home-owners were also interviewed at their homes. In both Dondo and Buzi, people whose homes had been affected by the cyclone offered to show them to the researcher. These visits lasted about two hours each and included 15 houses in each area. In total, 35 home-owners were interviewed and approximately 30 houses were observed, with explanations about their current state being offered by the guides (Table 2).

Location	Directly interviewed	Guided tour	Total
Beira Corridor	16 (8+8)		16
Beira (3 <i>bairros</i>) ⁱ	19 (12+3+4)		19
Dondo		15	15
Buzi		15	15
Total	35	30	65

Table 2. Interviews with low-income homeowners: categories and locations.

ⁱ These include the suburb of Alto de Manga, where owners were interviewed directly, and unrecorded *bairros* where the some of the owners of the micro and small businesses lived.

Product validation survey

In order to test the product design with potential customers, a brief three-day survey of randomly selected small-scale formal and informal business owners was carried out to assess their interest in purchasing the proposed product.

The survey was carried out through a combination of interviews and a focus group discussion with a total of 37 business owners in the central area of Beira City. It was decided to focus interviews on business owners, given that this group was also able to speak about their experiences as homeowners. Interviews were conducted with two business owners in their homes in the suburb of Bairro Alto de Manga, and with twenty formal small business owners, who were interviewed at their place of business in the neighborhoods of Maquinino, Espangara and Goto. Businesses ranged from welding to food and drink, with the most common business type being sale of car parts (Table 3).

In addition, in order to reach a larger number of participants, a focus group was organized through one of the larger Beira markets, Maquinino Market, which is controlled by the municipality. Around 15 informal market vendors, mostly engaged in selling food items, participated in the discussion. In total, two homeowners and around 35 business owners participated in the survey.

Category	Number
Formal Enterprises	22
Car parts	6
Clothing/cloth	4
Alcoholic drinks	2
Food	2
Cosmetics	1
Second-hand electro-domestic	1
Construction materials	1
Production of sound systems	1
Carpentry	1
Welding	1
Fashion design	1
Landlord	1
Informal Vendors (largely selling food items)	15
Total Respondents	37

Table 3. Types of business owned by survey participants

All interviewees, with one exception, were registered on the AgriTask app, providing the name of the interviewee, the name of the enterprise, mobile phone contact, zone, whether the person has an insurance policy and the GPS coordinates of the interview. The AgriTask app is a GIS app that is used by Hollard to collect key data of interviewees.

In general, the interviews were challenging because business owners were, in most cases, reluctant to devote more than a few minutes to the interview because it interfered with their work.

Previous study on the impact of Cyclone Idai in the Beira area

In 2019, immediately after Cyclone Idai, the non-governmental organisation CARE carried out a major study of the effects of Cyclone Idai on the poorer residents of the Beira area, in order to determine its response to Cyclone Idai.²⁹ This study provides a lot of information and useful points of comparison for this feasibility study. The CARE study investigated the impact of the cyclone and the actions taken by residents immediately after the cyclone, whereas the field work conducted for the present report analyses the impact and the strategies adopted by residents to rebuild three years after the cyclone hit. Together, the two provide a rich understanding of how residents have been affected in the short and longer term and have worked to rebuild their lives, homes, and businesses since Cyclone Idai. The CARE study has been an important source of information for this feasibility study and is referenced throughout this document.

²⁹ Holly Schofield and Simon Deprez, '[Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#)', CARE, Geneva, 2019. The study was intended to help international actors make decisions about how best to use their resources to support the people who had had their homes destroyed by Cyclone Idai. It gives a very full picture of the situation.

3. Low-Income Home-Owners

Livelihoods

The major study conducted by the NGO CARE on the effects of Cyclone Idai on the poorer residents of the Beira area provides detailed information on the livelihoods of these residents.³⁰ It found that livelihoods across the urban communities featured were informal and precarious. Many of its respondents worked as fishers, block-makers, daily workers, small-scale retailers, security guards, domestic workers or farmers. Common (informal) salaries ranged from 4,000 to 6,000 Mozambican meticals (MZN) (US\$ 65 to 100) per month, even though the minimum monthly wage is MZN 12,500 (US\$ 200). Many people in low-income communities relied on traditional forms of informal cooperation, exchanging their labour for food and/or cash. Family ties offered an important form of social protection and a degree of social security for the elderly or those who were ill. People lacking the capacity to work and without family ties could be among the most vulnerable groups.

Several of the communities visited by the CARE researchers had thriving local markets at community entry points just off the main road, with residents selling a range of commodities, including fruit and vegetables, dried fish and charcoal. Markets are an important source of income for women. The small stalls found inside the community are typically owned by women, and in some *bairros*, the vast majority of vendors in the main market are also women.

Land ownership and renting in Mozambique

Tenure

Following independence, land in Mozambique was nationalised and now formally belongs to the state, but the realities of land ownership are complex. The situation is summarised by Schofield and Deprez:³¹

Land in Mozambique is the property of the state. However, the right to plan, develop and grant licences is delegated to the district- or municipal-level authorities. Despite there being no private ownership, land tenure is generally considered to be secure. Residents possess constitutional rights to the land on which they live, even if they lack a formal title. If the government or the municipality requires a piece of land, they must provide the resident with an alternative, with compensation for land “improvements”. Residents have the right to the land that they have occupied for ten years or more if the use of the land was for residential purposes. With no formal market, informal mechanisms provide the most important means of accessing land in urban areas. The trade in “improvements” on the land is done on the understanding that the plot of land and the structure on it will be part of the same transaction. Without a formal title, however, residents struggle to obtain credit for land improvement or for small-scale business.

Only 10 per cent of urban inhabitants have a formal land title, even though those without one could claim one after ten years’ residence. The legal processes involved are complex and lengthy, so not an option for poorer inhabitants.

³⁰ Holly Schofield and Simon Deprez, ‘[Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#)’, CARE, Geneva, 2019.

³¹ Ibid.

Homeowners are able to make decisions about the construction (and reconstruction) of their homes and rely on masons and carpenters for advice. Because of their low, precarious and sporadic incomes, households are not usually able to afford high-quality materials or pay for skilled labour.

Renting

While some families own their homes, many rent them, with rents ranging from MZN 1,700 to MZN 4,000 in 2019.³² It is often the landlord's responsibility to carry out repairs or to rebuild after a disaster. However, residents responding to the study conducted by CARE reported that landlords were often either absent or were also on low incomes and therefore did not repair rented homes.³³

Types of housing

Housing in urban areas of Mozambique can be divided into three types:

1. **Traditional houses:** Traditional housing is built from mainly natural materials, such as mud, sticks, stones and thatch.
2. **Conventional houses:** These are built from conventional (western) building materials (cement block walls and corrugated iron, zinc or fibro-cement roofing sheets).³⁴
3. **Temporary houses:** The very poorest urban residents construct their housing from damaged or discarded materials, including roofing sheets, plastic and wood. Following Idai, this type of housing is now much more common, as many cyclone victims have very limited resources for shelter and are forced to live temporarily in such housing while repairing their former homes.

Relatively few houses in urban Beira are made entirely of "traditional" materials. Even those that are predominantly traditional will usually have metal or fibro-cement roofing. With the exception of a small percentage of the very poorest, poor urban newcomers will usually transition from a mainly traditional house to a conventional one, but normally over the course of many years (20 years or more), paying for materials and construction as and when their resources allow. Traditional houses are more common in the peri-urban and rural *bairros* of the city, where low-cost traditional construction materials are more readily available.

Surveys undertaken for the 2007 census show that between 23 and 54 per cent of houses had connections to the water network available on the household plot, and 46 to 70 per cent had access through a neighbour. The older communities have better connections to water networks, whereas in the more recently developed areas, all water sources are illegal and come from connections to surrounding neighbourhoods. Electricity coverage in surveyed *bairros* ranges from 66 to 93 per cent. Coverage consisted of both formal contracts and illegal connections.

Construction practices and costs

The CARE study conducted in 2019 identified several key weaknesses in the houses which made them more susceptible to damage. These include low-quality materials as well as the following construction practices:

³² Ibid.

³³ Ibid.

³⁴ The term "zinc" is often used to cover any type of metal roofing, including roofing made of corrugated galvanised iron (CGI). These roofing sheets – or *chapas*, as the local people call them – are imported. The "zinc" *chapas* also include inverted box rib (IBR) roofing, which is stronger and more expensive. The fibro-cement sheets are manufactured in Dondo and known as "Lusalite", their brand name. Until 2010, they contained asbestos, but regulations now prohibit that. However, dealing with old asbestos roofing involves extra risks and costs.

- Phased construction, with foundations, lower and upper walls, and roofing all built at different times and by different builders, as resources become available to households. This phasing is often detrimental to the overall structural integrity of homes.
- Foundations are frequently too shallow.
- Connections between structural elements are weak, particularly in conventional houses.
- Structural elements are generally insufficient or too small. Most houses lack concrete columns and do not have ring beams at eaves level, resulting in weak connections between the roof and the walls.
- Walls are often built from thin and poor-quality blocks.
- Use and quality of nails and screws for fixing roofing sheets is insufficient.³⁵

The quality of the sand used for construction is the most critical issue affecting the quality of conventional houses. Poor-quality sand results in more fragile cement blocks, which makes houses far less robust. Some households gathered sand from the beach or bought it cheaply from unreliable sources. There is often too much air in the sand and cement mixture used to make blocks, because they are not mixed properly.

Building materials and prices

The most common reconstruction purchase among the respondents interviewed for this study was roofing sheets, as well as a high proportion of wood roofing beams, as the originals had often been ripped off the walls. When a traditional house is built, the items that are usually purchased are nails and binding wire although some make use of plastic sheeting between two layers of thatch to make the house more waterproof.

Table 4 shows the prices of common building materials.

Item	Price (MZN/US\$)
Lusalite (fibro-cement) sheet (2.10m)	MZN 1,180 (US\$ 18)
Zinc sheet (3.6m)	MZN 728 (US\$ 11)
IBR sheet (3.6m)	MZN 1,250 (US\$ 19)
<i>Estacas</i> (poles)	MZN 50 (US\$ 0.77) each
Cement (50kg bag)	MZN 420 (US\$ 6.50)
Cement block (15 cm wide)	MZN 28 (US\$ 0.43)
Sand (25 kg bag)	MZN 100 (US\$ 1.50)
Daily unskilled worker (<i>biscateiro</i>)	MZN 300 (US\$ 5)
Skilled builder & assistant	50–100 % of the value of material used

Table 4. Prices of construction materials and labour. Source: Construa Hardware staff

³⁵ Holly Schofield and Simon Deprez, [Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#), CARE, Geneva, 2019.

The 2019 CARE study identified the sources of common building materials:

- Most construction materials are provided by large companies in the city centre, which offer the best prices and were generally preferred by respondents to the CARE study. These companies import most of these materials from surrounding countries, although fibro-cement roofing sheets are produced in Dondo by Mozalite.
- Sand and gravel are provided by suppliers in the suburbs. Sometimes people get sand from the beach.
- Cement blocks are usually made on-site by labourers, masons or household members, but higher-quality blocks can be bought from suppliers at a higher cost. These suppliers are medium-sized businesses, usually located in peri-urban areas of Beira or in smaller towns like Dondo, who in turn purchase the blocks from large suppliers.³⁶

Damage to housing caused by Cyclone Idai

Official figures indicate that 63,506 houses in Beira (54 per cent of the total) were damaged as a result of Cyclone Idai and 23,822 houses (20 per cent) were destroyed completely.³⁷ The cyclone impacted homes in three stages:

1. Heavy winds and pelting rain, which mainly caused damage to roofs but also to walls. The most common damage suffered was the loss of roofing, but heavy rain had a devastating impact on mud walls, and strong winds also caused large cracks in masonry and sometimes the collapse of cement block houses.
2. Flooding, which in some areas reached very high levels (commonly roof level). Such flooding was usually temporary and disappeared within hours. Water damage was more evident with traditional housing, with mud walls literally disintegrating.
3. Lingering stagnant water, which in some *bairros* lasted two weeks and sometimes longer at high levels. This erodes structures and causes considerable damage. Prolonged flooding in some of the lower-lying areas (in some areas lasting for two weeks) resulted in significant damage.

The 2019 CARE study reported on some key factors for the differing levels of damage experienced in Beira in the immediate aftermath of Cyclone Idai:

- Houses in isolated positions suffered greater damage than those in densely-built *bairros* or those surrounded by dense vegetation.
- Traditional houses suffered most damage, because of their fragile construction. Heavy rains were particularly damaging to mud walls (both where mud was used as a render and where it was used to fill in gaps between other materials). The disintegration of mud in many cases led to houses collapsing altogether.
- Damage to conventional houses, on the other hand, was often sequential. High winds often removed zinc roofing, which injured people and damaged other houses as it was blown around. In some cases, the whole roof structure, including the wooden beams, was swept off. Sometimes, particularly when construction was not complete, loss of roofing, or severe

³⁶ Holly Schofield and Simon Deprez, '[Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#)', CARE, Geneva, 2019.

³⁷ Government of Mozambique, United Nations, World Bank, European Union and African Development Bank: [Mozambique Cyclone Idai: Post-Disaster Needs Assessment](#), Conference version, 2019.

damage to it, weakened or damaged the top part of the walls and led to further damage lower down, occasionally completely destroying the house.

The damage caused by high winds was exacerbated by a combination of poor-quality materials and a low standard of construction, as described previously. Cyclone-induced flooding had little impact on housing in the urban *bairros* in Beira because it lasted only a few days. However, other areas like Buzi were severely affected by flooding.

Although most traditional houses were largely, if not completely, destroyed by Cyclone Idai, this type of housing is cheap and easy to rebuild. In a few cases, those living in conventional houses opted to quickly build temporary traditional housing as they waited for their conventional houses to be repaired (although they more commonly lived in the damaged house while repairing it).

In the research conducted for this feasibility study, the damage reported varied according to the geographical area:

- **Beira:** Poor construction practices and exposure to Idai's extremely strong winds caused houses of all types in Beira to be severely damaged. The cost of reconstructing Beira (including its damaged municipal buildings, schools and hospitals) has been estimated at around US\$ 200 million.³⁸
- **Dondo:** The main damage suffered in Dondo was the loss of roofing and collapsed mud walls. The very slow progress in repairing damaged housing, largely due to income constraints, was striking.
- **Buzi:** Within two days of Idai's landfall, the initial cyclone damage was exacerbated by extensive flooding caused by prolonged rainfall and the increased flow in the Buzi River provoked by the rainfall and by the opening of dams upstream (because maximum levels were being approached). It is estimated that 75 per cent of settlements in the District of Buzi were flooded for seven days and large areas of crop land still remained underwater after three weeks. Most land within 25 km of the coast was flooded. Most residents of Buzi fled their homes and sought shelter in churches and mosques, where they had to sleep on tables and benches as the water depth varied between 75cm and 2m. Out of a total population of 177,384 (2017 Census), according to government figures, 154,332 people were affected (30,867 families), there were 108 deaths, 13,600 flooded houses and 58,337 hectares of land were affected (as of 5 April, 2019).³⁹

Economically, the impact of Idai was much harsher on Buzi residents than on residents of Beira and Dondo because their livelihoods were more severely affected, owing to the loss of crops and livestock. A post-cyclone rapid assessment⁴⁰ found that all respondents reported crop losses, and three-quarters of respondents reported the loss of all their crops. All locations in the District of Buzi noted that the community had lost cattle, with half saying most of the cattle were lost. The majority of locations also reported a loss of pigs, goats and sheep in similar proportions. Chickens were most affected, with three locations reporting the complete loss of all poultry. A significant number of people rely on selling their labour to

³⁸ 'Mozambique Cyclone Idai: Post-Disaster Needs Assessment', UN, EU and World Bank, May 2019.

³⁹ INGC, Red Cross/Crescent, OCHA: [Mozambique Rapid Assessment: Buzi District Profile](#)

⁴⁰ National Institute for the Management of Calamities (INGC), International Federation of the Red Cross and OCHA, *Mozambique Rapid Assessment (MRA) – Buzi District Profile*, 2019.

generate income, largely in local farms. The disruptions caused by the cyclone to agriculture prevented people from earning income for some time.

An analysis of the type of damage and estimated costs of repairs

A quantitative analysis of the damage was conducted on the basis of the 35 interviews undertaken with low-income homeowners and observations of 30 traditionally built houses in Dondo and Buzi (15 in each community).

Figure 3 demonstrates that the main damage suffered among the respondents in this study was the loss of roofing sheets (*chapas*). This was often accompanied by the loss of *barrotes* (wood beams which hold the roofing to the house), which were ripped away from the cement or mud structures.

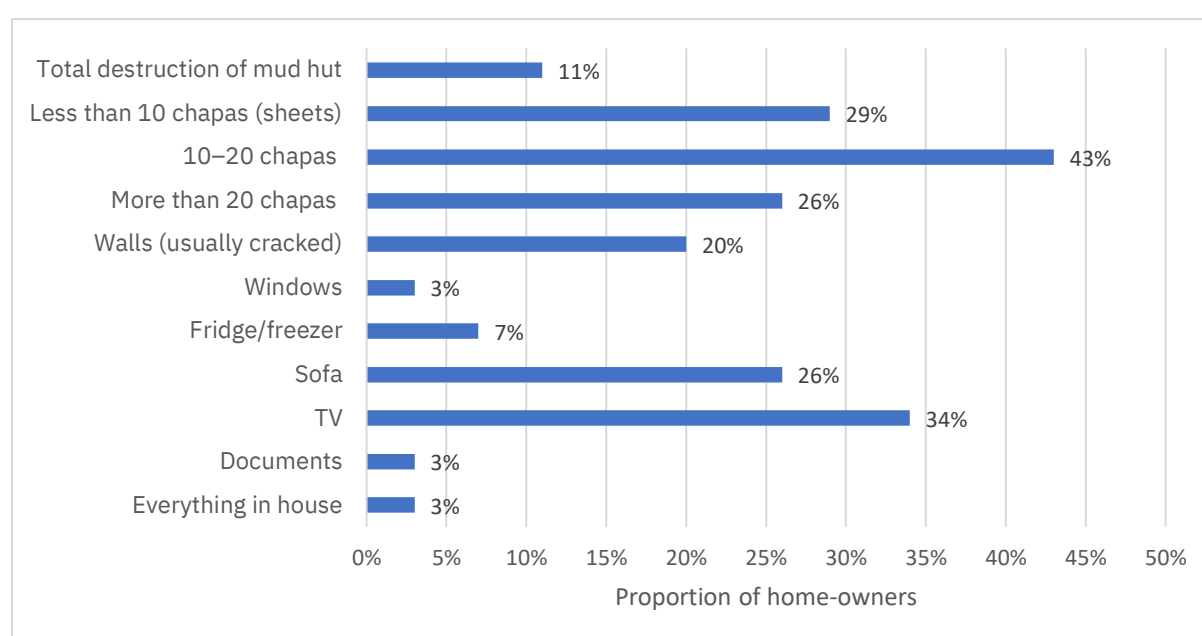


Figure 3. Types of damage or loss incurred by low-income homeowners interviewed

On the basis of brief interviews, an attempt was made to estimate the value of the assets that were damaged. Figure 4 summarises the results obtained from the 35 homeowners interviewed. It shows that the vast majority of the houses in the sample (89 per cent) suffered damage of less than US\$ 1,000 and almost two-thirds fell within the US\$ 500–1,000 bracket. These values included the more important household goods that were destroyed (the most common being the TV).

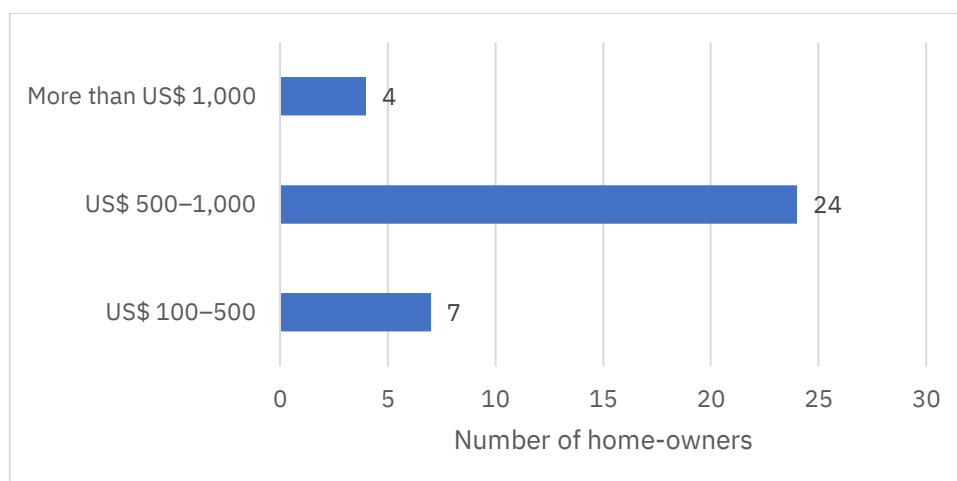


Figure 4. Estimated cost of repairing house and replacing lost household goods

Where buildings were destroyed completely, some residents had to completely rebuild their homes. In these cases, the 2019 CARE study estimated the costs of reconstruction of conventional block houses in urban areas for low- and middle-income families at MZN 150,000 to 300,000 (approximately US\$ 2,000 to 4,000) for a cheaply built two-room house. This would typically take a family three to 15 years to build. The study estimated that safer construction, according to commonly agreed standards, would cost around US\$ 5,000 (and the cost of construction of the housing type recommended by the government for relocations is estimated at US\$ 6,800).⁴¹

Additional impacts on residents

In addition to the destruction of their homes, the 2019 CARE study found that residents faced additional impacts in the aftermath of the cyclone, including problems with rented housing and with housing they owned.

Rental issues

Some tenants reported that they had moved because of the damage to their rented housing, whereas others stayed and waited for repairs. In some cases, tenants were evicted by landlords whose own accommodation had been destroyed. Although, some tenants were able to arrange rent waivers or delays to rent payments, most were suffering economically and many were concerned about their ability to make future payments.

Asset security/investments

Some homeowners explained that the value of their homes had decreased. The flooding had shown how vulnerable these areas were to risks, and land prices had gone down. Some homeowners reported that plots of land bought at a high price in peri-urban areas just a few years ago were now worth very little. This impacted on the families' resources as well as their willingness to invest in repairs.

⁴¹ Holly Schofield and Simon Deprez, [Supporting Urban Recovery After Cyclone Idai, Beira, Mozambique](#), CARE, Geneva, 2019.

Coping mechanisms used by residents in the aftermath of Cyclone Idai

In the aftermath of Cyclone Idai, the 2019 CARE study highlighted several ways in which residents responded to the damage to their homes. These included temporary stays with friends and neighbours, attempts at reconstruction and resettlement by the government. In many cases, displaced residents tried to return to their homes as soon as they could.

Temporary stays with friends and neighbours

Following Idai, most of the people in urban communities who had been affected by the disaster remained in their houses or were hosted by friends and neighbours. Hosting between neighbours was often short term, with families usually returning to the sites of their housing within days. Staying with host households was estimated as the most common coping strategy for sheltering after the first days of the cyclone.

Reconstruction attempts

Where possible, people returned to their houses as soon as they could and attempted to rebuild or repair them. Many of the inhabitants whose homes were damaged or destroyed were struggling to make ends meet in the aftermath of the cyclone, and their efforts to rebuild were slowed by limited resources. Some groups, including, the elderly, widows, and families headed by women or children, were especially vulnerable. Some people were given new houses by international agencies. These agencies also trained masons, labourers and ordinary people in how to build safer, more robust houses.

Resettlement

Resettlement is an approach traditionally adopted by the government after extreme weather events. Following the Zambezia floods in 2007, 30,000 families were resettled, and after the floods in the south of the country in 2000, about 106,000 families were resettled. In these cases, families were provided with untitled land, construction material, and, in 2007, with labour. A major resettlement process is taking place at Guara near Buzi, where the government hopes that the more vulnerably located Buzi residents will live. Six transit sites and one accommodation centre have been constructed by the government with the intention of resettling residents to higher ground,⁴² but observations indicate that only some of the Buzi residents are willing to leave their homes for Guara, and those who remain there are the most vulnerable, who have no other option.

Returns of displaced residents

Returns were more common in the first days and weeks after the cyclone. Concerns over looting and cholera outbreaks encouraged residents to return to their housing even without support. In some cases, owners left other family members (particularly women and children) in displacement facilities, to increase their chances of accessing support or because the house was not yet habitable.

⁴² OCHA, [Mozambique: Cyclone Idai and floods. Situation Report No. 19, 2019](#)

4. Micro And Small Businesses

Characteristics of the micro and small businesses

Interviews were conducted with 23 micro and small business owners along the Beira Corridor and in Beira itself (see Section 2 for details).

Out of these interviewed, four were owners of informal micro enterprises. These business owners were vendors with minimal capital investment operating from precarious structures made of a few poles (*estacas*) and some zinc roofing sheets. Some of them displayed their goods on a cardboard box and some sat on the ground to sell them. Informal enterprises are either located in official markets, such as Goto, where daily fees are collected by the Municipality, or on the streets, where they operate illegally and are subject to periodic raids by the Municipality's urban police. The 19 small formal business owners interviewed normally operated their businesses in small, protected, conventionally built premises. Table 5 shows the types of enterprises interviewed.

Type of enterprise	Number
Formal	
Bar/restaurant	5
Accommodation	3
Carpentry /sawn timber	3
Car repair/parts	2
Food and general household items	3
Maize mill	1
Maize mill producer	1
Prepared food	1
Informal	
Cold drinks	1
Prepared food	1
Building poles	1
Miscellaneous items	1

Table 5. Types of enterprises interviewed

The impact of Tropical Cyclone Idai on micro and small enterprises

According to the informal market vendors' association, AVIMBE, all the stalls in Goto market were destroyed by Cyclone Idai, and flood water remained in some parts of the market for days. The association also claimed that most vendors only managed to resume their business activity around a month after the cyclone. Little merchandise was destroyed, because of advance warning, and vendors managed to store their goods in warehouses or other spaces (often rented from surrounding residences) which were, in general, not affected by the flood waters.

In addition to the direct damage inflicted by Idai, collateral damage included a general power outage that lasted for a month, reduced supplies of merchandise because road access had been cut, a steep increase in prices, and reduced demand due to the temporary loss of livelihoods for much of the population or diversion of income for higher-priority expenses such as emergency repairs to shelter or the replacement of key household items. Furthermore, while many businesses were still reeling from the effects of Idai, about a year later they were heavily impacted by the COVID-19 pandemic.

The types of damage suffered by formal micro and small enterprises were similar to those affecting low-income home-owners, i.e. loss of roofing, cracked walls and damage to assets and possessions, including equipment such as fridges, freezers, compressors, electrical hand tools and, in one case, a computer.

Figure 5 shows the range of estimated damage by value, indicating that, generally, the damage to enterprises was lower than that suffered by low-income home-owners. As indicated above, damage to informal micro enterprises was minimal (less than US\$ 100). The formal enterprises had structures considerably smaller than houses. The highest proportion, at thirty-five per cent suffered damage of US\$ 100–500 and only a few (13 per cent) suffering a loss greater than US\$ 1,000. The highest loss reported was US\$ 5,000.

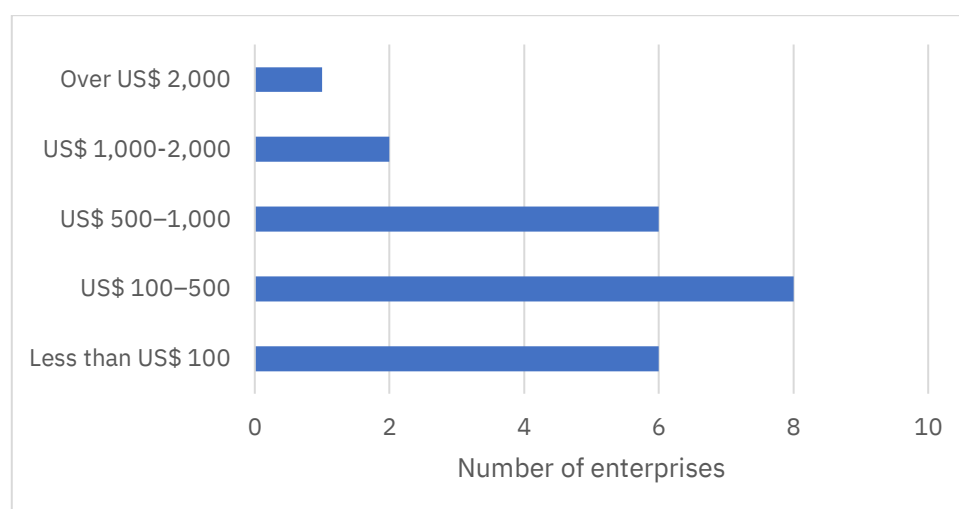


Figure 5. Estimated cost to repair damage to enterprise premises or structure and to replace lost equipment.

5. Use Of Financial Services

Background

Very significant changes in the use of financial products by Mozambicans, mainly driven by digital technology, have significant implications for the provision of cyclone insurance. These changes have been monitored by three national surveys, referred to as the *Finscope Consumer Surveys*, which have been conducted every five years since 2009 (2009, 2014 and 2019). These surveys assessed adult usage of both formal and informal financial products, levels of financial literacy and asset holdings. The decade covered by the three surveys demonstrated major shifts in mobile money use, and use of banking services and insurance. The introduction of mobile money in 2011 was a game-changer for financial inclusion, providing opportunities for small transactional operations such as payments of utility bills and for other services (including insurance).

Nonetheless, a large part of the population remains financially excluded. Despite government attempts to induce urban informal enterprises to formalise their activities, a very large proportion of micro and small enterprises continue to operate informally, which limits their ability to raise finance. The most common source of lending for these small businesses is friends and family, followed by microfinance institutions and money lenders (*agiotas*), the latter two charging interest rates considerably higher than conventional banks.

Banks and microfinance institutions

A rapid increase in adults holding bank accounts occurred between 2009 and 2014 but was followed by a virtual stagnation between 2014 and 2019, despite a much broader presence of banks in rural areas. This stagnation is explained by the rapid uptake of mobile banking – a service that is now used by considerably more people than those holding bank accounts and is growing exponentially. The category of “micro-bank” was introduced to promote microfinance through the provision of conventional banking services but with substantially lower capital requirements. Despite this, the microfinance industry has suffered a considerable decline,⁴³ with only one microfinance institution – Socremo – showing profitability and substantial growth. Other microfinance institutions have either been bought out by conventional banks, gone bankrupt, or remained small with little growth.

In practice, the residents and small businesses interviewed for this study found it difficult to access the services provided by these institutions. Only one of the small formal enterprises interviewed had obtained a loan from a financial institution (the microfinance bank Socremo). With the exception of Socremo, there are no longer any microfinance banks which give loans to those without guaranteed incomes such as salaries. One entrepreneur in Nhamatanda tried all possible options to obtain institutional finance but gave up and had to resort to private money lenders (“*agiotas*”) at an interest rate of 50 per cent per month.

Mobile money

The table 6 demonstrates the access to financial services of Mozambicans by different means (formal banking, formal non-banking services such as mobile money, and informal services such as savings and credit groups), indicating a significant rise in the percentage of Mozambican adults who are financially included, increasing from 22 per cent in 2009 to 54 per cent in 2019. This change is largely

⁴³ Personal observation by consultant who has studied the Mozambique microfinance sector for approximately 30 years.

attributed to a major increase in Mozambican adults using mobile money services for their financial transactions. This was the main reason for the increase in those using “other formal (non-bank)” products, which went from 1 per cent in 2009 (before the introduction of mobile banking in 2011) to 4 per cent in 2014 and leapt to 22 per cent in 2019 (Finscope surveys). The Integrated Agricultural Survey 2020 commissioned by the Ministry of Agriculture and Rural Development found that more than one-third (36 per cent) of rural households had mobile money accounts, with more than half having them in the southern provinces (including Sofala), but far fewer in the northern provinces. The Finscope surveys also found that that people in the southern provinces were much more financially included than the centre and north.

Date of survey	Bank			Other formal (non-bank)		Informal only	Excluded
2019	21%		22%		11%	46%	
2014	20%		4%	16%	60%		
2009	12%	1%	9%	78%			

Table 6. Access to formal and informal financial services by adults in Mozambique, 2009–2021 (%)
Source: Finscope 2009, 2014, 2019 – Mozambique.

Insurance

Although only a small minority of Mozambican adults buy insurance, a substantial change in uptake has been recorded since 2009, when only 5.2 per cent of adults were insured, with 2.3 per cent covered by formal providers and 2.9 per cent by informal mechanisms (such as funeral associations). By 2014, this had increased to 8 per cent, of which 5 per cent was formal and 3 per cent informal. By 2019, the proportion of insured adults had jumped considerably, to 17 per cent (11 per cent were covered by formal providers and 6 per cent by informal mechanisms). The reasons for this significant change are not clear but the evidence available suggests rapidly changing attitudes, despite the fact that most insurance is not purchased voluntarily (for example, compulsory third-party automobile insurance, or employee medical insurance cover). The main barrier to increased insurance uptake is indifference (in 2019, 39 per cent of adults claimed they had never thought about it, while 29 per cent said they could not afford it.⁴⁴

The small and micro urban traders and low-income homeowners included in this study had little understanding of the concept of insurance and its value proposition. This is the case even for those who are required to buy third-party automobile insurance. These are groups that are not currently served by Hollard insurance agents or brokers.

The development of inclusive index-insurance products

Hollard, in collaboration with Blue Marble Microinsurance and other technical service providers, has taken the lead among Mozambican insurance companies with the introduction of weather-indexed insurance products. In 2020, the company collaborated with the American NGO NCBA-CLUSA and the Company Phoenix Seeds to introduce weather-indexed seed insurance aimed at rural smallholder

⁴⁴ Finscope Consumer Survey Highlights, Mozambique 2019, p. 30:
https://finmark.org.za/system/documents/files/000/000/154/original/Mozambique_Pocketguide_English-2020-07-21.pdf?1597303342

producers. In 2021, Hollard, in collaboration with the World Food Programme and in partnership with Blue Marble Microinsurance, piloted crop insurance against low or irregular precipitation.

Insurance literacy

Levels of financial and particularly insurance literacy are currently low. Improving the understanding of insurance among the population is a gradual process and is expected to be facilitated by the imminent launch of the National Financial Education Programme, the successor to the National Financial Inclusion Programme (2016–2022). In mid-2022, a national diagnostic of financial literacy is expected to provide important insights into the level of awareness of the adult population of basic financial products, including insurance. Although financial education has been promoted on national radio (Radio Mozambique) and TV (TVM) as part of the National Financial Inclusion Programme, insufficient use has been made of community radio stations, which are extremely effective in educating rural and less-educated urban audiences in the local languages. Furthermore, USSD mobile telephone platforms providing messages on specific issues, including agriculture, health, nutrition and microfinance, such as those provided by Vodacom’s 3-2-1 platform (explored in more detail in Section 5), are still in their initial phase of development and acceptance, and are currently restricted to written messages, which limits their use to literate users (who often pass messages on to illiterate friends or family members).

6.Product Design

In response to the findings of the market research survey with low-income homeowners and with owners of micro and small businesses, an index insurance product providing protection against damage to policyholders' homes or businesses as a result of cyclones was developed. The initial product design is outlined in this section.

Index insurance overview

Traditional indemnity insurance solutions pay out on the basis of actual losses incurred and require losses to be verified before a claim is paid. The costs of verifying the losses are included in the premium paid by customers who purchase insurance. This makes indemnity-based insurance expensive and claims payments generally take increased time to pay out. With parametric solutions such as index insurance, pay-outs are automatically triggered when an adverse event, like wind speed or deficit of rainfall, reaches a certain magnitude. This is based on a pre-defined index.

The benefits of parametric solutions include:

- Reduced costs without the need for loss assessments
- Timely automatic pay-outs made when parameters are met, with no need to submit a claim to the insurer
- The possibility to offer wide coverage, including any location
- Objective and transparent criteria used to determine pay-outs
- Low moral hazard as beneficiaries cannot influence pay-outs

These benefits make parametric solutions suitable for financially under-served groups like low-income households and micro and small enterprise owners, over a vast geographic area.

The primary drawback of index insurance is basis risk. Basis risk is the risk that an insurance payment is made without the customer suffering loss, or where a loss does occur without the insurance product paying out. This occurs because index insurance is not an indemnity product and actual losses are not assessed. It is important to educate customers about this concept, in order to manage their expectations.

Existing tropical cyclone insurance schemes

African Risk Capacity

The African Risk Capacity Group developed a model capable of estimating the risk and economic losses of tropical cyclones. The model covers the South-West Indian Ocean Region, which includes Mozambique.⁴⁵ The model covers wind, storm surge and wave damage, while the effect of excess rainfall associated with cyclones is covered by a separate model for flooding.

Tropical cyclones in Beira and Chimoio to be considered for the product

The modelling for this study is focused on the cities of Beira and Chimoio in the provinces of Sofala and Manica, respectively. These two cities are described in the introduction of this study (Section 1), alongside the impact of cyclones in the province of Sofala.

⁴⁵ <https://www.arc.int/tropical-cyclone>

Figure 6 shows the tropical storms and cyclones that passed within 60 nautical miles of Beira or Chimoio between 1980 and 2019, according to the IBTrACS dataset.⁴⁶ It shows that an insurance product against cyclones would be required to make a pay-out for Cyclone Idai for both locations. Additionally, it might have been appropriate for pay-outs to be triggered for Cyclone Favio in 2007 in Chimoio, and possibly for Cyclone Eline⁴⁷ in 2000. Smaller pay-outs could be expected for Cyclones Lysette (1997) and Bonita (1996), as those were classified as tropical storms and not cyclones by the time they approached Beira and Chimoio.

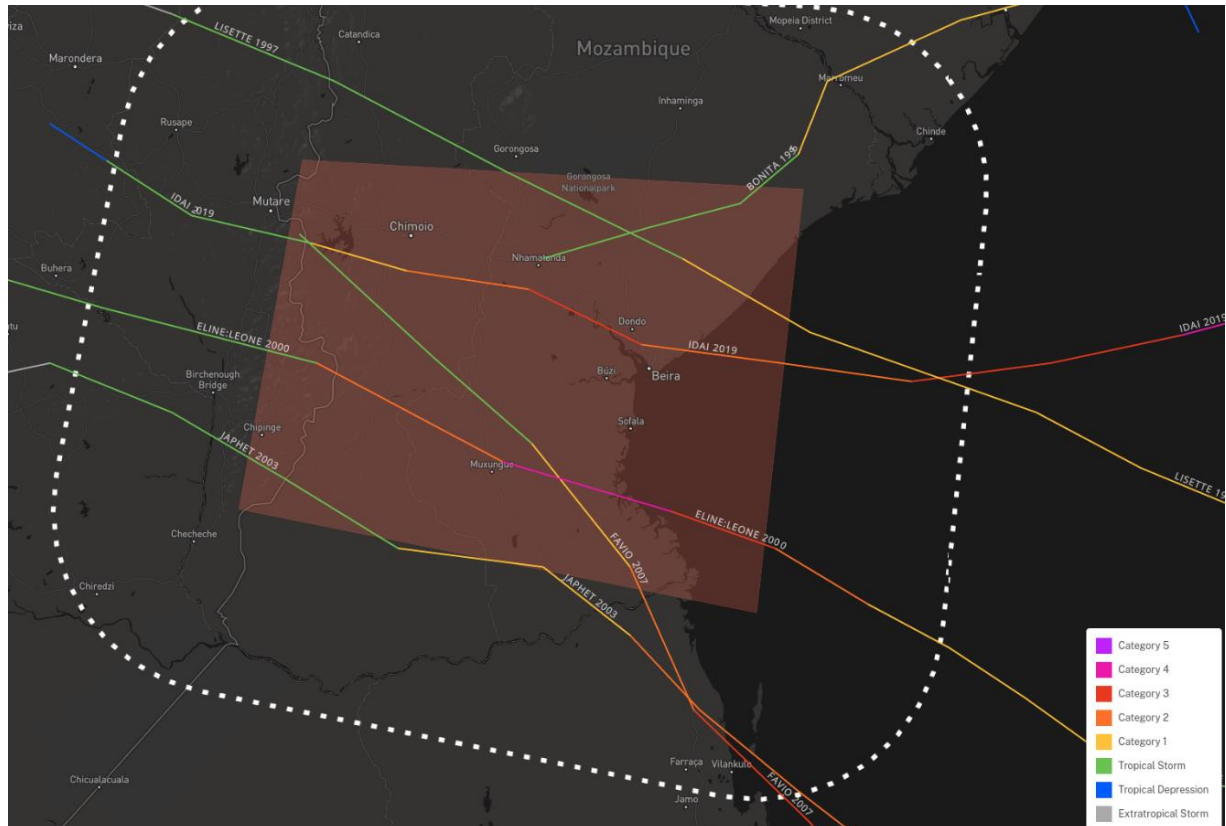


Figure 6. Cyclones, tropical storms, tropical depressions and extratropical storms from IBTrACS archive in the vicinity of Beira or Chimoio in the years 1981–2019 (Source: IBTrACS database)

Cyclone Eloise, which hit Beira in 2021, should also be considered as a cyclone which ought to trigger an insurance payment. However, this cyclone was not added to the IBTrACS dataset. This important gap in the records makes it impossible for this dataset to be used directly to design the index insurance product, so satellite data was instead considered.

⁴⁶ [International Best Track Archive for Climate Stewardship \(IBTrACS\). National Centers for Environmental Information \(NCEI\)](https://www.ncdc.gov/data-access/international-best-track-archive)

⁴⁷ This was known as Cyclone Leon when it first emerged in the Australian Basin but was renamed Cyclone Eline after it had crossed into the South-West Indian Ocean Basin. It is sometimes known as Cyclone Leon-Eline.

Data sources

Tropical cyclones cause storm surge, flooding, extreme winds, tornadoes and lightning.⁴⁸ Satellite datasets for rainfall, tropical cyclones and excess wind were therefore considered when developing the index prototype.

Data sources for cyclones or excess wind

The International Best Track Archive for Climate Stewardship (IBTrACS)⁴⁹ provides a collection of global tropical cyclone data. It is described in the following way:

IBTrACS merges recent and historical tropical cyclone data from multiple agencies to create a unified, publicly available, best-track dataset that improves inter-agency comparisons. IBTrACS was developed collaboratively with all the World Meteorological Organization (WMO) Regional Specialized Meteorological Centres, as well as other organizations and individuals from around the world.⁵⁰

NASA Power⁵¹ provides data on wind speed at three levels above the Earth's surface: 2 m, 10 m and 50 m. The maximum sustained wind speeds for tropical cyclones are the highest surface winds occurring within the circulation of the system and are estimated to occur at a height of 10 m in an unobstructed exposure.⁵² Wind speed increases with increase in height above Earth's surface. This is caused by fewer obstructions and reduced surface friction.

Table 7 summarises the properties of the tropical cyclone/excess wind datasets considered for the product prototype.

⁴⁸ World Meteorological Organization, [Tropical cyclones](#), Natural hazards and disaster risk reduction.

⁴⁹ [International Best Track Archive for Climate Stewardship \(IBTrACS\)](#), National Centers for Environmental Information (NCEI)

⁵⁰ [International Best Track Archive for Climate Stewardship \(IBTrACS\)](#), National Centers for Environmental Information (NCEI)

⁵¹ [NASA POWER, Prediction of Worldwide Energy Resources](#).

⁵² International Best Track Archive for Climate Stewardship (IBTrACS), [Technical documentation, Dataset IBTrACS version 04](#)

Name of database	Source	Historical record	Spatial resolution	Temporal resolution	Latency	Confirmation from reinsurers
IBTrACS Version 4	World Meteorological Organization, National Hurricane Center and Joint Typhoon Warning Center	1980 to date	0.1° (~10 km)	Daily	Updated twice a week, usually on Monday and Friday	No
NASA's GMAO MERRA-2 assimilation model and GEOS 5.12.4 FP-IT .	National Aeronautics and Space Administration (NASA)	1981 to date	1.0° (~110 km)	Daily	5–7 days	Yes

Table 7. Properties of the cyclone /excess wind databases considered.

Index insurance product design

Insurance policy period

The policy period for the insurance cover was chosen as 1 October to 30 April. This was chosen on the basis that it is this period in which cyclones typically occur.

Insured areas

The insurance model operates at the geographical level of the administrative boundary level 3 of *posto*. The *postos administrativos* used to design the pilot product are Urbano 1 – Central, Urbano 2 – Munhuva, Urbano 3- Inhamizua and Urbano 4 – Manga Loforte, all in Beira in Sofala province; and the *posto* in Chimoio in Manica province. All households and enterprises in the *postos* would have similar insurance pricing and pay-outs. This approach facilitates the marketing, distribution and scale-up of the product.

Index insurance model

The impact of cyclones on ecosystems and infrastructures has already been widely studied.⁵³ The impacts arise from the mechanical action of strong winds and storm surges, drag and deposition of sediments and gravel, and flooding associated with heavy rainfall. To design the index insurance product, various options were investigated, such as using a model for cyclones informed by the IBTrACS trajectories,⁵⁴ as well as using CHIRPS rainfall data for Beira and Chimoio⁵⁵ and wind

⁵³ See for example K.W. Krauss and M.J. Osland, [Tropical cyclones and the organization of mangrove forests: A review](#), *Annals of Botany* vol 125, issue 2, 2019; or M.Z. Hossain, M.T. Islam, T. Sakai and M. Ishida, [Impact of Tropical Cyclones on Rural Infrastructures in Bangladesh](#), *CIGR Journal*, 2008.

⁵⁴ [H.E. Willoughby, R.W.R. Darling and M.E. Rahn](#), Parametric Representation of the Primary Hurricane Vortex. Part II: A New Family of Sectionally Continuous Profiles, *Monthly Weather Review* volume 134, issue 4, 2006, pp. 1102–1120.

⁵⁵ CHIRPS: Rainfall estimates from rain gauge and satellite observations, Climate Hazards Center, U.C. Santa Barbara.

estimates from NASA Power. The approach based on IBTrACS trajectories was not feasible because Cyclone Eloise was not included in the dataset, while it was not possible to detect Cyclone Idai with rainfall data, which made this approach unworkable for the product. The proposed product is therefore based on cubic daily maximum wind data at 10 m above the Earth's surface, derived from NASA Power satellite observations. A cubic value for wind is used, since the power exerted by the wind on a surface scales in this way.⁵⁶ It should be kept in mind that this type of data does not aim to match wind gusts of cyclones, as NASA Power data are averaged both in time (hourly) and in space (the resolution is $\frac{1}{2}^\circ \times \frac{5}{8}^\circ$ latitude/longitude, which is remapped for this model to $\frac{1}{2}^\circ \times \frac{1}{2}^\circ$ for compatibility).

In order to proceed with this approach for the model, it was vital that the relevant cyclones could be detected in the data. As seen in Figure 7, this is the case for both Cyclone Idai and Cyclone Eloise in Beira.

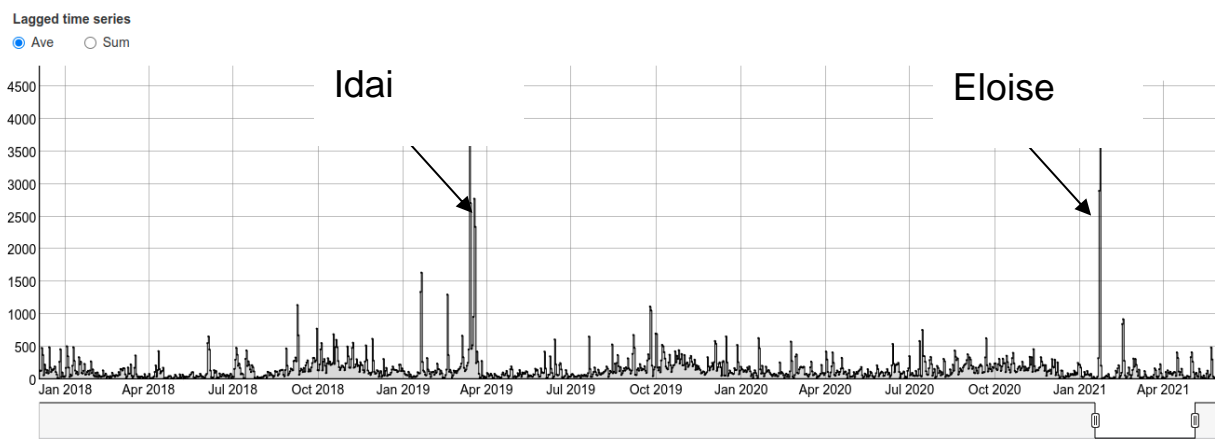


Figure 7. NASA Power daily-maximum cubic wind data (m/s)³ at 10 m height, 2018–2021, Beira

Figure 8 depicts the pay-out that is obtained using the index design that was chosen, which is detailed in the index insurance description section above. It is important to note that this model would have granted full pay-outs (80 per cent of the sum insured) for cyclones Idai and Eloise in all of Beira's postos administrativos. It would also have granted a full pay-out for Idai in Chimoio. For Cyclone Eline, there would have been a substantial pay-out in Chimoio and a smaller one in Beira. Chimoio would also have benefited from a small pay-out for Cyclone Favio. When testing using data not used for the design (see years 1995–1997 in Figure 8), it is clear that the design would also have resulted in pay-outs for Cyclone Bonita in Beira, which is a further indication that the design is meaningful and appropriate.

⁵⁶ University of Leipzig, Physics of Wind Turbines, Energy Fundamentals.

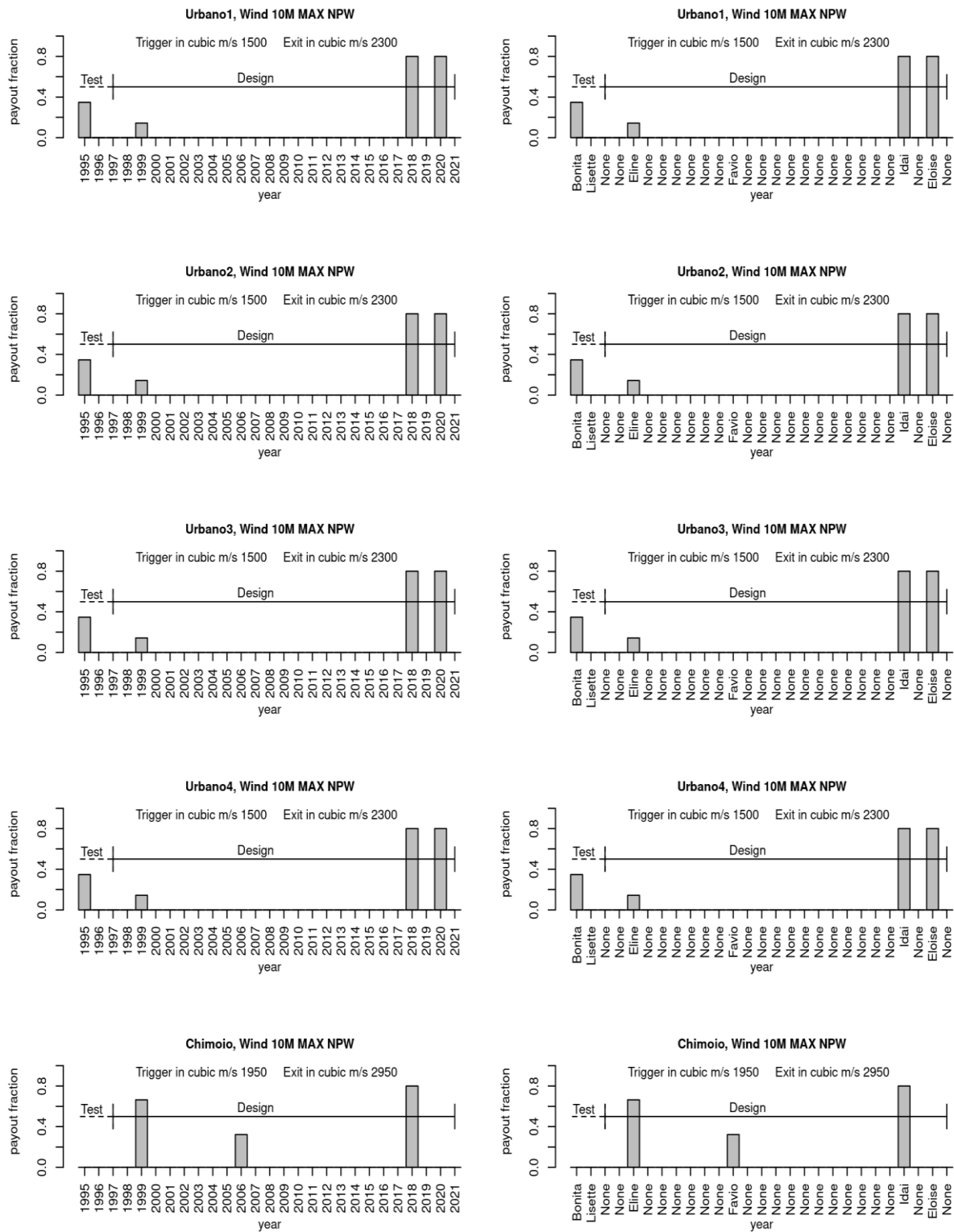


Figure 8. Pay- out for postos administrativos in Beira and for Chimoio for the years used to design the product (1998–2021) and for the three years before. Right: total pay-out per year. Left: total pay-out per cyclone.

Technical design

The Blue Marble AgSuite platform was used to design the product. Figure 9 depicts the grid overlay (1.0° by 1.0° resolution) with the geo-location footprints of the *postos*.

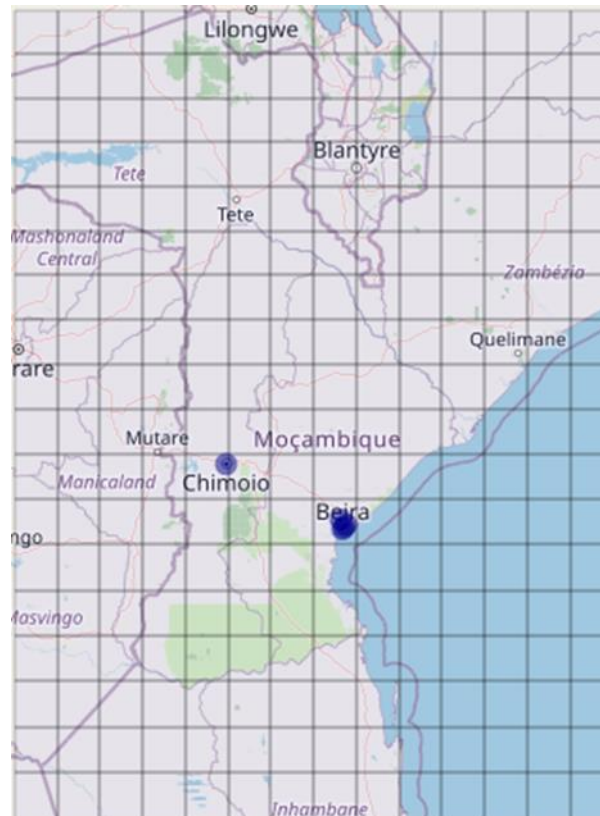


Figure 9. Two grid cells overlay the five postos administrativos.

The best measure of the peril was found to be the maximum wind speed. Target technical premium is expressed as a loss–cost ratio (LCR), which represents the technical price (minus any operational expense loading) as a fraction of the asset-value insured. The primary driver of this is the balance of affordability versus meaningful insurance protection.

Actuarial model

Quantiles of empirical cumulative distribution function (ECDF) of the rolling window times series are used to set the trigger and exit values of a linear pay-out function (ramp). The resulting pay-out series is bootstrapped, with out-of-sample extreme events causing total loss added in through stochastic overwriting. Figure 10 illustrates this graphically for the insurance policy period.

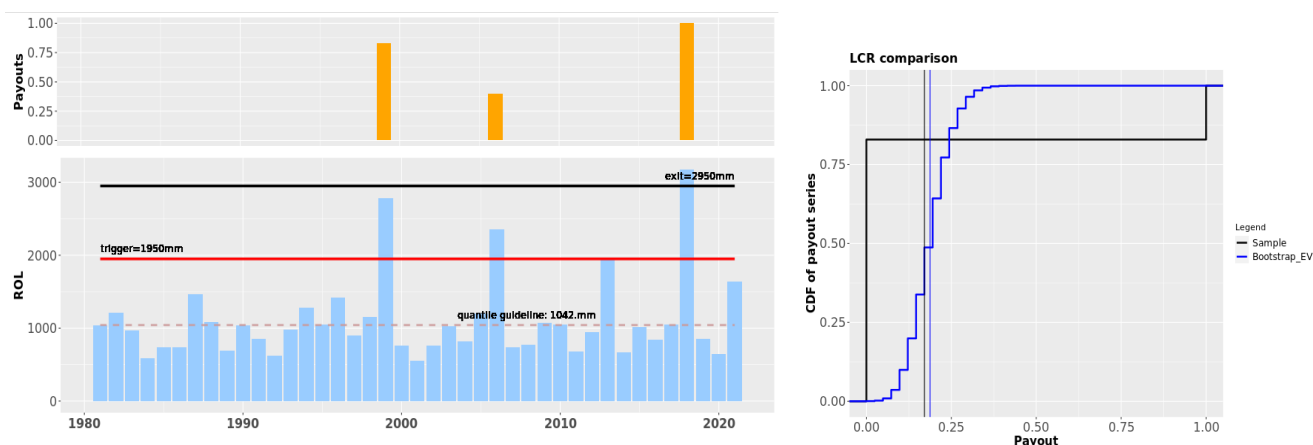


Figure 10. Example of pay- out time series since 1981 (left panel) with assigned trigger and exit values as horizontal lines (ends of the ramp pay-out function) and the corresponding sample and bootstrapped ECDF of the pay-out time series (right panel)

Selection of triggers and exits

Sampled grids are used to set quantile values for triggers and exits (as described previously), which are then iterated across all grids to balance the following objectives:

- The resulting LCR for each grid cell is close to the target LCR.
- The variation in LCR across the grid cells is minimal.
- The absolute-value ramp gradient of the pay-out in all grid cells is neither too steep nor too shallow.
- Historic pay-out time series are consistent with observed or recalled adverse years (extreme perils occurred resulting in loss of insured assets).

Table 8 shows the loss–cost ratio for each *posto administrativo*.

Province	District	<i>Posto administrativo</i>	Loss–cost ratio
Sofala	Beira	Urbano 1 – Central	8.04%
		Urbano 2 – Munhuva	8.04%
		Urbano 3 – Inhamizua	8.04%
		Urbano 4 – Manga Loforte	8.04%
Manica	Chimoio		8.01%

Table 8. Loss–cost ratios for each *posto administrativo*

7. Product Validation

In order to test the product design with potential customers, a brief three-day survey of randomly selected small-scale formal and informal business owners was carried out to assess their interest in purchasing the proposed product. The survey was carried out through a combination of interviews and a focus group discussion with a total of 37 business owners in the central area of Beira City. The results are described below.

Awareness of cyclones and strong wind events

Early responses indicated that awareness of cyclones and strong wind events was limited largely to Cyclones Idai and Eloise, although a few mentioned the Cyclone Guambe, and participants had only a vague memory about the months during which the events occurred. Some respondents felt that the number of strong wind events, other than cyclones, had increased over recent years.

Experiences of wind-related damages

Most of the damage experienced to participants' businesses and houses were related to excess winds, mainly in the form of loss of roofing. The extent of wind-related damage varied considerably, with minimal damage occurring in premises (businesses or houses) where the roof was a concrete slab. This is uncommon in individual houses, but normal for apartment blocks. In other types of building, participants reported experiencing extensive loss of roofing and, in a few instances, collapsed walls or shattered windows.

This, in turn, led to considerable damage to merchandise and household items, particularly furniture and TV sets, left exposed to the rain. One respondent indicated that he had lost 10,000 MZN worth of roofing due to excess wind, which resulted in an indirect loss of goods worth 500,000 MZN. In addition, some business owners lost merchandise from theft resulting from unprotected premises. Considerable damage was also experienced from the wind-related impact outside of the home or business premises, including fallen trees; flying objects, including zinc roofing; falling objects, such as coconuts; and a prolonged outage of power, resulting in damaged refrigerated goods.

Previous experiences and attitudes towards insurance

Most respondents were aware of insurance because of the obligatory motor third-party insurance required for all car owners, but were often unaware of how it worked. Only a few had some other form of insurance, such as comprehensive car insurance, fire insurance, or credit life insurance, which were purchased through commercial banks. Almost no participants had heard of any insurance companies.

One respondent recounted his frustration with a well-known public insurer. He had found the process of obtaining a damage-related payout very complicated, making him very skeptical of any insurance product and therefore uninterested in the proposed prototype. The overall impression obtained was that, although few understood how insurance works and the types of products available, respondents were, on the whole, skeptical of the benefits of insurance and wary of the proposed product. Nevertheless, there was a willingness to experiment with the product if it would be affordable for them.

Willingness to purchase the proposed product

Given the time constraint for the interviews, some simplifications to the product prototypes presented to business owners were necessary. In particular, the payout-premium relationship was expressed as

a linear ten-to-one ratio. In fact, it is anticipated that payouts would be limited to 80 per cent of the insured amount, but this is subject to modification before rollout and was considered too complicated to explain in the brief interaction for the validation exercise. For the same reason, the specific wind parameters were not explained.

Overall, the prototype was presented in the simplest manner possible, with the following characteristics explained to participants:

- The product would be available in simple ratcheted premium packages with the hypothetical lowest starting at 100 MZN per season.
- Payout would be a maximum of 10 times the premium.
- Premiums could be paid on a one-off basis.
- The level of payouts as a multiple of the premium would depend on the recorded windspeed.

In the presentation of the product, the following advantages were emphasized:

- Payouts would not depend on subjective damage assessments by insurance agents but would be determined by two objective variables: size of premium and windspeed.
- The product would be very accessible and affordable.
- Claim payouts would be made through mobile money agents or through digital payment platforms
- Premium collection will also be flexible and options of mobile payments through entities such as Recarga Aki will be considered in the second phase.
- Eligibility will not depend on ownership but according to the possibility of being affected by excessive wind damage, meaning that tenants would be eligible for the product.

Responses, with few exceptions, were very positive, largely due to the possibility of selecting an affordable package in order to test the benefits. Almost all interview and focus group discussion participants said that they would be willing to experiment with the new product.

The factors most often appreciated by participants were:

- The affordability of the product and the option to increase the premium and coverage
- The fact that no claims assessment is necessary, and that pay-out is based on objective criteria rather than subjective human assessment
- The automatic payout process triggered by any wind event exceeding the lower limit
- The potential to receive multiples of the premium in payouts
- The possible option to pay through mobile-money agents (discussions are currently being held with Vodacom, M-Pesa) and instant cash options through ATMs or digital platforms.

Conclusions

- **The product was positively received and should be possible to sell as a stand-alone product.** Due to the simplicity and affordability of the prototype, and the apparent willingness of potential beneficiaries to experiment with the product, the product can be launched as a stand-alone product and does not need to be bundled with other services, such as a loan.
- **Product simplicity will be key to successful sales.** Given the low-level of financial and insurance literacy, the product should be kept as simple as possible, with clear benefits. Particular care must be taken to find simple ways to present the relationship between wind velocity and payout increments.

- **A wide range of distribution channels will be important to make the product widely available.** The product validation survey found that the few people who do have insurance policies have obtained them through commercial banks. It is likely that many small formal business owners will have a bank account and can therefore be targeted through their banks rather than by the Hollard offices, of which they are generally not aware. Nonetheless, fear of institutional intimidation is a serious obstacle among the poorer segments of the population, both in the case of business owners and homeowners. In addition, with the advent of mobile money, the use of banking facilities has dropped considerably among poorer adults,⁵⁷ who have now become accustomed to making financial transactions via mobile money (currently dominated by M-Pesa) and, more recently, through digital platforms such as RecargaAki.
- **Affordability is vital to encourage potential clients to take a chance on the product.** Most respondents indicated that they would be willing to experiment with the product if the premium were low enough. During the initial promotional stages, very low entry-point premiums, even as low as 100MZN (approximately USD 1.50), could be offered to attract informal customers and vendors. Promotions could also offer free policies through raffles or lotteries. Significant growth will then depend on the number of policy holders who benefit from an excess wind event, whose positive experience will convince others to buy the product. The sooner the occurrence, or larger the number of excessive wind events that occur, the faster the subsequent round of uptake. It is therefore crucial to maximize the number of first round policy holders, even at lower premium levels, before the next excess wind event occurs.
- **The strong presence of Nigerian business owners represents an opportunity for product sales.** There is a very strong Nigerian presence among small-scale enterprises in Beira (as in Maputo). Nigerian businessowners come with capital from Nigeria, whereas Mozambican businessowners find access to capital difficult because of very high rates of interest from local banks. They also benefit from solid business experience. Unlike in neighboring South Africa, there is little xenophobia in Mozambique, and Nigerians have been well accepted by both the business community and clients. All Nigerians interviewed spoke Portuguese fluently and appear well-integrated into their communities. With greater business experience, Nigerian respondents more readily understood the value proposition of the index insurance product. Nigerians in Mozambique also represent a tight-knit community and positive experiences could spread quickly.

⁵⁷ See the trends found by the 3 successive Finscope studies (2009, 2014 and 2019) as described in the First Round Survey Report *Findings Relating to Interviews with Urban Low-Income Homeowners and Micro and Small Enterprises (Sofala Province)*

8. Distribution And Marketing Model

Potential distribution channels

There are a range of options for distributing insurance products in Mozambique, which are explored below.

Brokers

Brokers represent the most significant distribution channel for traditional insurance business, accounting for 30% of insurance business, and 70 per cent of all business generated through third-party distribution channels, as reflected in the latest insurance market report by the insurance regulator (see Table 9).⁵⁸

Distribution channel	Premium (MZN)	Market share (%)
Brokers	5,747,600,000	30
Bankers	1,754,100,000	9
Agents	546,700,000	3
Direct	11,167,400,000	58
Total	19,215,800,000	100%

Table 9. Performance of key distribution channels in Mozambique

Brokers tend to be the insurance distribution partners with the highest levels of insurance expertise, and some of the operators are part of large multinational insurance brokerage groups or networks. The primary focus of large brokers is on large risks for clients that have a critical need for advice and support in the designing, planning and placing of their insurance contracts, as well as after-sale services. It is usually not cost-effective for the larger brokers to be involved in insurance for low-income households or micro and small enterprises, especially those outside Maputo. However, there are also smaller regional entities established in locations outside the capital city, and these operators tend to have more of an appetite for smaller risks in their locations.

Bancassurance

Bancassurance refers to the arrangements made for commercial banks and microfinance institutions (MFIs) to distribute insurance on an insurer's behalf. This type of distribution model has been the fastest growing insurance distribution model in Mozambique. Banks and MFIs rely on their extensive distribution infrastructure and solid client base to distribute insurance products connected to their services. The bulk of their business is generated from conditional selling arrangements, where insurance products such as credit life insurance and mortgage life insurance are sold in combination with associated banking products such as loans. Hollard has bancassurance agency agreements with Standard Bank, FNB, Nedbank, Access Bank, Socremo, First Capital and Futuro. Levels of insurance

⁵⁸ [Instituto de Supervisao de Seguras de Mocambique, Relatorio Anual a Actividade Seguradora em 2020](#), Maputo, 2021.

knowledge among bank and MFI staff tend to be lower than those of brokers and insurance company sales staff.

Microfinance institutions

Although an obvious partner for microinsurance, the MFI sector in Mozambique has unfortunately experienced a precipitous fall during the past 20 years.⁵⁹ They are being replaced by lending institutions offering salary-based loans, such as Letshego and Bayport.

The main problems leading to the demise of the microfinance industry were (i) high interest rates, which reflected the higher risks associated with lending to informal businesses and the relatively high administrative costs linked to small loans; (ii) inappropriateness of the loan product (the biggest issue being a relatively high repayment due at month-end when clients would have preferred daily repayment, even at considerably higher interest rates); and (iii) the late adoption of mobile money transactions, which would have substantially reduced the amount of time clients had to spend in the premises of the microfinance institutions rather than managing their businesses.

Currently, there is only one microfinance institution targeting the relevant target group at a national level – Microbanco Socremo, which operates in all the major cities and most provincial capitals and has a network of 18 branches. There are other microfinance institutions but with a much more limited provincial or regional presence: Microbanco Confianca (Maputo Province), Microbanco Futuro (Nampula Province), CCOM (operating in Maputo, Gaza and Cabo Delgado provinces), Africa Works (Maputo, Gaza and Inhambane provinces) and small district-based microfinance institutions, often linked to the development finance institution Gapi, such as Microbanco Yingwe (Murrumbene District, Inhambane Province).

For a pilot cyclone insurance initiative in Sofala Province, Socremo would be the only microfinance institution which would be suitable for collaboration. Hollard currently has a partnership with Socremo for other insurance products: (i) credit life (microcredit) with embedded funeral cover; (ii) stand-alone funeral insurance; and (iii) credit life fund (protecting Socremo against loan default, embedded in the loan).

As indicated earlier, it will be a challenge to introduce cyclone insurance to low-income homeowners and micro and small enterprises. Uptake will largely depend on the demonstrated impact which will then convince potential clients of its benefits. Socremo is the only financial institution in Sofala that deals directly with these target groups. Cyclone insurance could be sold as a risk-mitigating measure to protect assets or goods associated with a Socremo loan or as a stand-alone product insuring non-loan-linked assets, such as buildings, equipment and inventory.

Agents and alternative distribution models

This segment consists of individual insurance agents and non-financial-sector entities that may distribute insurance on top of their core business. Entities such as the seed distribution company, Phoenix Seeds, which is Hollard's main distribution partner for index insurance, are included in this category, alongside Hollard's agency agreement with Recarga Aki, the mobile payment platform.

Partnerships with such channels are particularly valuable in reaching low-income homeowners or micro and small enterprises who have little to no experience of insurance. Other potential distribution

⁵⁹ Personal observation by consultant who has studied the Mozambique microfinance sector for approximately 30 years.

channels include informal funeral associations, savings and credit groups, digital payment platforms, cell phone messaging services and NGOs.

Informal funeral associations

As discussed previously, the Finscope 2019 Consumer Survey found that 17 per cent of Mozambican adults are insured. Around 6 per cent of adults (approximately 1 million people), representing around one-third of those insured, are covered through informal groups – principally funeral associations. This is a significant share of the adult population, and most would have at least a rudimentary understanding of premiums and pay-out benefits. Most funeral associations are well administered and can be expected to be cooperative when it concerns the welfare of their members. At a minimum, associations could be expected to help explain another insurance product and, if conditions permit, act as an insurance broker on behalf of Hollard. Funeral associations have a much larger member base than microfinance institutions and are potentially much more of a target as they promote microinsurance not microfinance.

Savings and credit associations

Findings from the 2020 Integrated Agricultural Survey indicate that there are some 500,000 members of community-based savings and credit associations, commonly known as ASCAs. These informal groups have usually been trained by NGOs, usually through donor-funded projects, and tend to be well organised and highly disciplined. Although some NGOs, such as Ophavela, which is based in Nampula, have introduced microinsurance, most ASCA members are not aware of insurance products. Savings meetings run by ASCAs could provide excellent opportunities for introducing the topic of insurance to new groups. These meetings can take two to three hours and usually occur fortnightly or monthly, providing a captive audience of 20–25 members willing to listen to presentations covering a host of topics relevant to their lives.

Digital payment platforms

Recarga Aki is currently the most developed digital payment platform in the country, offering the largest range of products and services in Mozambique, which include pre-paid airtime, electricity, water, TV subscriptions and insurance (mainly third-party premiums but also life cover). It is also used by the mobile phone operators Vodacom, Movitel and MCell.

Recarga Aki maintains a countrywide network of approximately 7,000 agents in Mozambique, with a reasonably dense presence in each of the major cities as well as a growing presence in almost all the country's smaller towns. It also sells its suite of products through several of Mozambique's banks. The platform has been operating since 2015, being integrated directly into its various suppliers' systems. Hollard states: "With our current basic inclusive insurance product, they are currently achieving sales of 3,000 per month nationwide, from which 300 are from Beira. With the right product, their agents can be a very useful sales force."

Cell phone messaging services

The 3-2-1 Service of Vodacom offers public information for free via SMS, USSD or voice to Vodacom users, providing messaging on such topics as health, nutrition, gender, agriculture, financial services and weather available through eight channels. Messages via SMS or USSD are free (six calls per month, with subsequent calls being charged at MZN 4 for each call).

The information provided for agriculture included advice about technologies and good agricultural practices regarding a variety of crops, as well as information and advice about agricultural products and services, such as seeds, inputs, financial products and service providers, all aimed at the

smallholder agricultural sector and available in four languages (Portuguese, Changana, Macua and Sena). Price information was also included.

NGOs

Hollard's collaboration with the American NGO NCBA-CLUSA has demonstrated how important it is for an insurer to work with an NGO which has familiarity with a target group with which the insurer has little experience (in this case, smallholder producers). The promotion of the weather-indexed seed insurance product through the USAID-funded SEEDS Plus Project was only possible with the active involvement of NCBA-CLUSA. For the introduction of cyclone microinsurance, it is recommended that Hollard seek out NGOs working with the urban poor on a long-term developmental basis as opposed to those providing short-term relief. NGOs operating in urban areas are normally involved in bettering the lives of the poorest people and would, in general, be expected to enthusiastically embrace the opportunity to promote cyclone insurance among the communities they support. With climate change resilience a rapidly emerging focus for donors, interest from NGOs will be virtually guaranteed, with NGOs only too willing to showcase their involvement in the promotion of an innovative pro-poor prototype product, as was the case with NCBA-CLUSA.

Direct sales

Direct sales are those made by the insurer without the use of an intermediary. Direct sales are most common in the provincial cities in the centre and north of Mozambique, where there are few or no insurance brokers. Besides its head office in Maputo, Hollard has branches in Beira, Tête and Nacala. Hollard believes that as the financial services market starts to develop, there will be a reduced reliance on direct placements. However, for the time being, direct sales continue to be an important channel to consider.

Planned distribution model

Taking into account these options, Hollard proposes that the cyclone insurance product is distributed through direct sales from the Hollard Beira office and through a regional broker in Beira for the pilot phase. In the next phase, the distribution channels could be expanded to include a microfinance institution and possibly digital payment platforms.

Pilot phase (2022–2023)

In the pilot phase while Hollard is still testing the product and refining its messaging, models and marketing material, it is vital to focus on a small group of distribution agents that can be given high levels of support.

Hollard branch in Beira

Hollard has a branch in the city of Beira that is responsible for marketing its insurance products to individuals and micro and small enterprises in the central region of Mozambique (the provinces of Beira and Manica). The Hollard Beira team would be the best option for distribution in the piloting stage since they know all Hollard's existing products and would be able to assist with any other requirements that the target individuals and micro and small enterprises might have. Furthermore, the Hollard Beira team already has a portfolio of clients that have bought some of the typical microinsurance products aimed at the low-income market, like funeral and motor third party, who could be an ideal target market for this new product.

Beira regional broker

None of the major corporate brokers with head offices in Maputo are directly represented in Beira. However, Beira has two regional brokers. Given that they operate in a fairly small market, they do not have the luxury of cherry-picking only large risks, and therefore have an interest in helping place all sizes of risk. Hollard has a good working relationship with both agents and has been able to secure an agreement with both for the pilot phase.

Next phase (2023–2024)

After the prototyping, testing and refinement of the product, the distribution channels could be expanded to include the Recarga Aki mobile payment platform (described in more detail in the subsection on ‘Digital payment platforms’ above), bancassurance partners, possibly including an MFI. Bancassurance partners could include Socremo, Futuro, and Confiança, among others. It will be easier to persuade these institutions to support the initiative after results can be shown from the pilot phase.

9. Enabling Environment

The current insurance market regulatory framework of Mozambique offers a generally positive enabling environment for the exploration of inclusive insurance models and products.

The National Financial Inclusion Strategy

Mozambique adopted a national financial inclusion strategy for the period 2016 to 2022⁶⁰ with three pillars:

1. Use and access of financial services
2. Strengthening of financial infrastructure
3. Consumer protection and financial education

Pillar I is particularly relevant to this study. Its aim is to “ensure the availability, proximity, and effective use of an adequate range of financial services by businesses and individuals in rural and urban areas”.⁶¹ Hollard has been exploring parametric insurance models, inclusive insurance products and alternative distribution channels as part of its contribution to this pillar of the national financial inclusion strategy.

Regulation of InsurTech

There is currently no specific reference in the country’s insurance laws to the application of technology to facilitate the distribution and operation of insurance to support financial inclusion initiatives. The current insurance legislation (Decree-Law reference number 1/2010 of 31 December 2010⁶²) only refers to traditional insurance models and the use of traditional indemnity-based forms of insurance. When this legislation was passed, more than a decade ago, no operator in the market was involved in the use of insurance technology (usually abbreviated as “InsurTech”) or index insurance models.

Nonetheless, Hollard has been exploring index-based inclusive insurance products in Mozambique since 2012. The insurance regulator has been authorising all such initiatives to date as part of an emerging local “regulatory sandbox” model.⁶³

The regulator is interested in creating a conducive environment for the development and growth of inclusive insurance. As part of the national financial inclusion strategy, the insurance regulator is expected to review the regulatory framework to create a more enabling environment and to implement activities to improve consumer awareness and protection.

⁶⁰ Referred to in Portuguese as *Estratégia Nacional de Inclusão Financeira (ENIF)*

⁶¹ World Bank and Alliance for Financial Inclusion, Mozambique National Financial Inclusion Strategy 2016 – 2022: Mid-Term Review, 2019.

⁶² Referred to in Portuguese as Decreto-Lei nº. 1/2010, de 31 de Dezembro

⁶³ Joshi, A., Pandey, M., Chopra, P., and Kumar, R. (2019), Developing Micro-Insurance Ecosystem in Mozambique, Lucknow – MicroSave Consulting

Clearance process for piloting new products

After developing a new product, insurance companies are required to go through a product compliance process.⁶⁴ Companies are generally expected to apply for this product clearance at least 30 days before releasing a new product on the market.

Reinsurance regulations

Hollard will require financial capacity for underwriting the product designed as part of this project. This is an essential risk management process allowing the company to spread its risk, as it does for all other types of insurance business. The current insurance regulatory framework in Mozambique does not impose any restriction on the nature and scope of reinsurance arrangements, which can be made in international markets, subject to the clearance of due diligence processes on the supplier. This is a critical enabling condition in place in Mozambique, in comparison to many African insurance markets which have started imposing certain restrictions on reinsurance, such as discriminatory taxation on foreign reinsurance premiums and first right of refusal for local reinsurance operators, regardless of their financial security, risk appetite, know-how and capacity.

Taxes and fees

In Mozambique, insurance premiums are exempt from the Value Added Tax (VAT)⁶⁵ of 17%, which is applied to most domestic and imported goods and services. However, insurance premiums are subject to other taxes and there is a market practice of charging an administration fee related to the costs of capital. These taxes and fees are outlined below.

Stamp Tax

Insurance premium invoices and other specified documents that have a financial value are subject to a form of taxation developed from the Portuguese system known as Stamp Tax (*Imposto do Selo*). The word ‘stamp’ (*selo*) has been maintained from an old practice in which physical stamps were used to prove payment of required taxes. This tax applies to all documents, contracts, licenses, trademarks, patents, financial guarantees, insurance premium and other items as defined in the Stamp Tax Code (Código do Imposto do Selo).⁶⁶ For insurance transactions, the Stamp Tax is charged on the total insurance premium, including gross intermediary commissions, and administration fees charged by the insurer.

The rates vary according to the line of insurance business. The proposed index insurance product will be treated as part of the property class of business in line with the classification of Hollard’s other index-based crop insurance products. The rates applicable for each class of insurance are outlined in Table 10 below, with property insurance taxed at the highest rate, at 5 per cent. This compares to obligatory classes of insurance like motor third party liability insurance, which benefit from a favourable rate of 2 per cent.

⁶⁴According to Chapter II, Article no. 86 of Decree number 30/2011 of 11 August 2011 (known in Portuguese as *Decreto n.º 30/2011 de 11 de Agosto*) which contains the regulations relating to access and operation of insurance business and intermediation.

⁶⁵ Referred in Portuguese as *Imposto do Valor Acrescentado (IVA)*

⁶⁶ As provided for in Decree no. 6/2004, of 1 April 2004 and subsequent alterations in Decree no. 38/2005, of 29 August 2005.

Class of insurance	Rate
Life, accident and health	1%
Obligatory motor third party liability and other obligatory insurance policies	2%
Marine, aviation, goods-in-transit and rolling stock	2%
Guarantees and credit insurance	3%
All other classes	5%
Intermediary commission	2%

Table 10. Stamp Tax Rates for Insurance⁶⁷

Hollard believes that there is a need for these rates to be reviewed for products promoting financial inclusion for low-income market segments and MSMEs not served by traditional insurance markets. The company is lobbying for a separate categorization of inclusive insurance products, which would provide an opportunity for authorities to offer fiscal incentives for these products and promote the growth of inclusive insurance.

Insurance Supervisory Tax

As stated in Article 7 of the Insurance Law, all insurance business and intermediary services are subject to an Insurance Supervisor Tax or Surtax as presented in Table 11.

Business	Basis for application of Rate	Rate
Non-life insurance	Gross Premium Before Taxes (GPBT)	1.50%
Life insurance	Gross Premium Before Taxes (GPBT)	0.35%
Insurance brokers	Flat annual amount	MZN 10 000
Insurance agencies	Flat annual amount	MZN 3 000
Individual tied agents	Flat annual amount	MZN 1 000
Private pension fund administrators	Flat annual amount	MZN 30 000

Table 11. Insurance Supervisory Tax

⁶⁷ As defined in article 24 of the Stamp Tax Code.

Administration fee related to cost of capital

Unlike the regulatory framework in most insurance markets in Africa, the solvency regulations in Mozambique do not provide relief for the reinsured portion of risk.⁶⁸ This lack of relief applies for both the portion of premium reinsured as well as the reinsured portion of outstanding losses. This means that, even on risks with reinsurance, the basis of calculating solvency is not the net retained portion of risk but the underlying gross risk. As part of the measures to mitigate this cost of capital on risks assumed, there is a practice of charging an administration fee of 15% on all risks underwritten in the local insurance market. However, as part of Hollard's efforts to support financial inclusion, the company's Board has authorized a reduction in this administrative fee to 5% for products targeting financial inclusion.

⁶⁸ As defined in Article 26 of Chapter III of the current insurance law as provided for in Decree-Law reference number 1/2010 of 31 December 2010.

10. Conclusions And Next Steps

The impacts of cyclones, especially in central Mozambique, has intensified in recent years. This study has confirmed a need among low-income homeowners and owners of micro and small businesses for protection against the damage caused to their homes and livelihoods as a result of cyclones. Furthermore, it has demonstrated that, despite the catastrophic devastation caused, the financial value of losses for individual homeowners or micro and small businesses are relatively low, usually well below US\$ 1,000. This makes it feasible to offer a low-cost product offering meaningful protection to these groups.

Based on the initial market research survey, an index insurance product for cyclones was designed using a wind-speed index. The product validation survey, presenting a simplified version of this product design, confirmed interest in this product and stressed the importance of offering a highly affordable product with rapid and transparent claims pay-outs - factors which can be achieved through an index insurance model.

The enabling environment is generally favourable for the introduction of such a product, with the regulator facilitating the release of this kind of product through its sandbox initiative. Nonetheless, Hollard continues to push for a more favourable environment, including a separate category for inclusive insurance products with corresponding fiscal incentives.

Given the adequate enabling environment, the needs identified in the initial market research survey, and the positive response to the product in the product validation survey, Blue Marble and Hollard have taken the decision to go ahead in piloting the cyclone insurance product designed during this project.

Given the innovative nature of the product, and the target market's lack of insurance knowledge and experience, the initial steps will be challenging and experimental. The roll-out process may therefore take some time, but uptake will likely grow rapidly once the value proposition is demonstrated.

The aim is to make the product available for sale to individuals for the next cyclone season, starting in October 2022. The product will initially be sold through direct customer services of Hollard Beira Branch office, and through intermediation services of two local insurance brokers: Proxen Corretores de Seguros Lda. and Tayob Hassam Corretora de Seguros.

During the pilot phase, the product, distribution arrangements, processes and marketing materials will be tested and refined, before the product is launched through a wider range of channels in a second phase. As discussed in the section on distribution, the aim is to expand the distribution strategy in future years to include bancassurance arrangements and partnerships with digital payment platforms.

Annex 1. Overview Of Cyclones And Tropical Storms Affecting Mozambique (1969-2022)

Definitions of Cyclone Categories, Tropical Storms and Tropical Depressions

Cyclone Categories are by the Saffir-Simpson scale, with maximum sustained winds for 1 minute of: Category 4: 209-251 km/h Category 3: 178-208 km/h Category 2: 154-177 km/h Category 1: 119-153 km/h **Tropical storm:** 63-118 km/h **Tropical depression:** < 63 km/h

Chronological List of Cyclones, Tropical Storms and Tropical Depressions Impacting on Mozambique (1969-2022)⁶⁹

2022

Cyclone Gombe, category 3. Cyclone Gombe hit Nampula province making landfall in Mongicual district, between Ilha de Moçambique and Angoche. It continued west into Malawi. The heavy winds have caused extensive damage to buildings and infrastructure especially in Ilha de Moçambique and Nampula City. Also impacted Zambezia. Gombe killed 15 people, injured 50 and displaced 11,000 (INGD). The IOM said that more than 115,000 people would be affected by the storm in Nampula and Zambezia provinces.

Tropical Depression Dumako affected mainly the provinces of Nampula, Zambezia and Tete, and to a lesser degree Sofala and Manica.

Tropical Storm Ana. This storm mainly affected Zambezia but also significantly Sofala, Manica, Tete and Nampula.

2021

Cyclone Kenneth, category 4. Tropical Cyclone Kenneth was the strongest tropical cyclone to make landfall in Mozambique since modern records began, affecting mainly Cabo Delgado Province.

Cyclone Guambe, category 2. The storm struck less than a month after [Cyclone Eloise](#) had made landfall near the same place, worsening the ongoing crisis in the region. After Guambe re-emerged into the [Mozambique Channel](#) on 16 February and began strengthening, **eventually** affecting Sofala, Inhambane, Manica and Zambezia.

⁶⁹ This list is based on annual track maps of tropical depressions, storms, and cyclones from the WikiProject Tropical Cyclones, posted as "2018–19 South-West Indian Ocean cyclone season" on https://en.wikipedia.org/wiki/2018–19_South-West_Indian_Ocean_cyclone_season and for each previous year until the 1960s.

Cyclone Eloise, category 2. The cyclone brought heavy winds and rains, affecting the provinces of Manica, Sofala, and Zambezia (the same provinces affected by Tropical Cyclone Idai in 2019).

2020

Tropical Storm Chalane. Chalane made landfall (Beira) early in the morning on 30 December, hitting Sofala and Manica Provinces in areas already heavily affected by Cyclone Idai. Chalane caused less damage than expected

2019

Cyclone Idai, category 3. Formed in Mozambique Channel, crossed Zambézia as a tropical depression, looped and returned to sea, strengthened into a cyclone and hit Sofala and Manica and moved inland to Zimbabwe. Cyclone Kenneth, category 4, from north of Madagascar, hit Cabo Delgado and moved inland.

2018: an unnamed tropical depression crossed Zambézia and then returned to the sea (like Idai) but dissipated over the sea

2016-2017

Cyclone Dineo, category 2. formed in Mozambique Channel, hit Inhambane.

2015

Tropical Storm Chedza mainly affected the northern part of the country (details of which provinces were not found). It is estimated that the country lost 5 per cent of its GDP (\$861 million) as a result of Chedza.

Cyclone Bansi, category 3, affected mainly the Shire River a tributary of the Zambezi River occurring concurrently with Chedza

2014

5 tropical storms or depressions (but no cyclones) reached Mozambique, including one which reached Cabo Delgado and one which looped over Zambézia and returned to sea, reaching Madagascar a second time.

2012

Cyclone Funso, category 2, started off the coast of Cabo Delgado and moved south, causing extensive damage in Zambézia. It became a category 4 in the southern Mozambique channel but too far away to have any direct effect.

2008

Cyclone Jokwe, category 3, passed north of Madagascar and came south through the Mozambique Channel, passed along the coast of Zambézia.

2007

Cyclone Favio, category 3, passed south of Madagascar, hit Inhambane and moved inland.

2003

Cyclone Japhet, category 2, crossed Madagascar, hit Inhambane and Manica and continued into Zimbabwe and Zambia. Plus, two tropical storms, one of which looped over Zambézia and returned to sea.

Tropical Storm Delfina affected mainly Nampula and to a lesser extent Zambezia.

2001

Tropical Storm Dera came from north of Madagascar and passed the coast of Nampula as a tropical storm and only intensified into a cyclone when it was moving south and was relatively far from Mozambique.

2000

For the great flood of 2000, Mozambique was hit by 3 cyclones, a tropical storm and a tropical depression. Cyclone Connie, category 4 hit Reunion and then moved west; by then a mere storm, in early February it hit Maputo and moved into South Africa with heavy rain causing flooding. **Cyclone Eline**, category 3 had the longest storm track on record, 11,000 km, starting in Indonesia, crossing Madagascar, hitting southern Sofala, and crossing southern Africa to Namibia. In Sofala it caused as extensive flooding in the Pungue and Buzi rivers as Idai in 2019. Rain from Connie and Eline cause record flooding in the Limpopo River. The remnants of **Tropical Storm Gloria** crossed Madagascar and hit southern Mozambique with more rain, which exacerbated flooding. The **Cyclone Huddah**, category 1 crossed Madagascar and was **tropical depression** when it hit Zambézia. Finally in April a **Subtropical Depression** dropped heavy rain on Inhambane. In that flood, 700 people died.

1997

Cyclone Lisette, category 1, started in the Mozambique Channel and hit Beira, moving inland to Zimbabwe.

1996

Cyclone Bonita, category 1, crossed Madagascar, hit Zambézia, and crossed Zimbabwe and Zambia and became the first recorded Indian Ocean cyclone to reach the Atlantic Ocean.

1995

Tropical Storm Fodah started south of Madagascar and made landfall in Zambézia.

1994

Cyclone Nadia, category 1, started north of Madagascar and crossed Nampula province and moved south through Zambézia and Sofala, killing 240 people.

1991

Cyclone Debra, category 1 off the coast of Maputo.

1988

Cyclone Filao, category 2, started north of Madagascar and made landfall at Quelimane travelling south to Sofala, Inhambane and Gaza. Heavy flooding of the Pungwe and Limpopo rivers.

1984

Tropical storm Domoina, crossed Madagascar and made landfall at Maputo and crossed in Swaziland and South Africa, causing extensive flooding.

1983

Cyclone Elinah, category 1, started north of Madagascar and passed along the coast of Zambézia.

1982

Two cyclones and one tropical storm. Cyclone Benedict, category 2, made landfall in Zambézia and moved north into Malawi. **Tropical storm Electre** crossed Madagascar and made landfall in Zambézia and reached Malawi. **Cyclone Justine**, category 1, started north of Madagascar, passed along the coast of Zambézia, and moved back to Madagascar.

1979

Cyclone Angele, category 3. Started in the Mozambique Channel and moved north, then south, making landfall in Zambézia and then Inhambane, and then moving east across Madagascar.

1977

Tropical Storm Emile, crossed Madagascar and hit Inhambane and Gaza, causing severe Limpopo River flooding; continued on to South Africa

1976

Tropical Storm Terry-Danae crossed Madagascar, made landfall in Inhambane, and continued to South Africa. Two other tropical storms.

1972

Cyclone Eugenie, Category 1, made landfall in Inhambane and continued to Swaziland and South Africa. Tropical storm Caroline, started in Mozambique Channel and made landfall in Inhambane.

1970

Tropical storms Blanch and Corrie, both started north of Madagascar and made landfall in Cabo Delgado.

Annex 2. Information Relating To Cyclones And Tropical Storms/Depressions That Have Impacted Sofala Province

Year	Name	Areas of Sofala Affected	Impact
February 2022	Tropical Depression Dumako	Not known	Mainly impacted the provinces of Niassa, Nampula and Zambezia with lesser impact on Sofala, Tete and Manica. In addition to the impact of tropical storm Ana, on 18 February the tropical depression Dumako hit Mozambique, with rains up to 200 mm/24h and winds up to 65km/h. Dumako affected mostly the provinces of Zambezia, Nampula, and Niassa, and to a lesser extent Tete, Sofala, and Manica – all provinces already heavily impacted by tropical storm Ana.
February 2022	Tropical Storm Ana	All districts of Sofala were affected by the cyclone with the exception of Muanza and Beira City. Cheringoma District was the most seriously affected followed by Gorongosa and Marromeu.	The storm mainly affected Zambezia Province while also impacting Sofala, Manica, Tete and Nampula. The number of people affected by Tropical storm Ana has risen to over 185,000 according to latest information released by the National Institute for Disaster Risk Management (INGD). Across the provinces most affected by the storm, a total of 207 people has been injured, at least 38 people have been killed, and a total of 126,265 hectares of land have been affected.
February 2021	Cyclone Guambe, category 2	The storm struck less than a month after Cyclone Eloise had made landfall near the same place, worsening the ongoing crisis in the region. After Guambe re-emerged into the Mozambique Channel on 16 February and began strengthening, local authorities in Mozambique anticipated	After making landfall in Mozambique on 12 February as a subtropical low, Guambe's precursor disturbance caused widespread flooding across Mozambique , which destroyed homes and crops, and also displaced thousands of people weeks after Cyclone Eloise . Cyclone Guambe was estimated to have caused millions of dollars in damages (widespread flooding and displacing over 27,000 people). No deaths were reported from the storm.

		the threat of additional flooding from the storm in the southern portion of the country, especially the region between Beira and Inhambane	
January 2021	Cyclone Eloise, category 2	<p>Tropical Cyclone Eloise, category 2, made landfall in the first hours of 23 January 2021, 20km south of the Beira City in Sofala Province, bringing winds of 140km/h and wind gusts of over 160km/h as well as extreme and widespread rainfall in Beira – 250mm in 24h - and many districts in Sofala, Other areas were already flooded ahead of Eloise’s landfall, especially surrounding places including Buzi and Nhamatanda resulting in thousands of displaced people.</p> <p>The cyclone brought heavy winds and rains, affecting the provinces of Manica, Sofala, and Zambezia (the same provinces affected by Tropical Cyclone Idai in 2019).</p>	<p>Less than two years after the devastating landfall of Tropical Cyclone Idai, a new tropical system generated in the Mozambican basin. Only a month before, another tropical system was breaking over the coast of Beira and the whole province of Sofala once again. The uttermost vulnerability of the area to climate relate events has unfortunately been reconfirmed, while the Mozambican territories have been deeply worn out. The According to the National Institute for Disaster Risk Management and Reduction (INGD), 441.686 people have been affected while the IOM indicated that over 56.000 houses were severely destroyed leaving 43,327 displaced people together with 34.566 people who have been evacuated.</p> <p>At least 11 people died, and many were injured. The cyclone caused severe flooding in the same areas that were just recovering from Cyclone Idai and by tropical storm cyclone Chalane. Sofala Province was the most affected and Buzi District was the epicenter of the Cyclone and was heavily affected by post-cyclone flooding, especially for communities along the Pungwe and Buzi Rivers. There were significant damages to homes, water and sanitation infrastructure across the district. Latest reporting states in Sofala 10 accommodation centers are still open with over 4,000 households</p> <p>At least nine people died on Saturday after Tropical Cyclone Eloise hit the port city of Beira, most of them killed by falling trees, authorities said. Cars were submerged in water, walls of some low-lying buildings collapsed, and swathes of land were flooded in the city, posts on social</p>

			media showed. The United Nations Office for the Coordination of Humanitarian Affairs reports that nearly 7,000 people have been displaced and more than 5,000 houses have been destroyed, damaged or flooded.
December 2020	Tropical Storm Chalane,	Chalane made landfall (Beira) early in the morning on 30 December, hitting Sofala and Manica Provinces. In areas already heavily affected by Cyclone Idai. Affected locations include resettlement sites where some 90,000 IDPs displaced by Cyclone Idai continue to live, many of them in tents and semi-permanent structures that have been either destroyed or damaged by Chalane.	Chalane made less damage than expected. 7 were killed in Sofala and Manica provinces, all from drowning in floodwaters. ^[26] An additional 10 were injured. In Sofala Province , Chalane impacted at least 10,930 people (2,186 families). About 1,156 houses were destroyed and 1,439 damaged, about 272 tents in Buzi and Nhamatanda in resettlement sites where people displaced by Cyclone Idai were staying were destroyed, and 82 schools were destroyed and 87 damaged, affecting 22,910 pupils,
March 2019	Cyclone Idai, category 3	Making landfall in Mozambique near Beira, Idai produced a storm surge of 4.4 m (14 ft) in the city. Coupled with torrential rains, including earlier rainfall, disastrous flooding ensued in the region. Officials called the extensive flooded areas "an inland ocean" visible even from outer space. More than 500,000 people in the city, the majority of the population, lost power. Rainfall in the city exceeded 200 mm (8 in), while the heaviest totals of more than 600 mm (24 in) fell near Chimoio. As of 19 March, 100,000 people were reported as	<p>The World Meteorological Organization termed Idai as "one of the worst weather-related disasters in the southern hemisphere" with total property damages from Cyclone Idai estimated at some USD2.2 billion. Almost two years later, roughly 100,000 people remained in resettlement sites,</p> <p>Throughout Mozambique, Idai killed at least 602 people, injured 1,641 others. During its second landfall, Cyclone Idai wrought catastrophic damage across a large swath of central and western Mozambique. Destructive winds devastated coastal communities and flash floods destroyed inland communities. In Beira, airborne debris caused numerous injuries; in some instances, sheet metal from roofs decapitated people. More than 1,500 people were treated for storm-related injuries. As of 7 April, assessments indicate the destruction of 111,163 homes, damage to another 112,735 houses, and flooding to a</p>

		<p>requiring rescue in the Beira area. Communications in the city were crippled and all roads out were rendered impassable.</p> <p>A tsunami-like wave of water devastated Nhamatanda, sweeping many people to their deaths and destroying the town. People scrambled to rooftops in order to survive. Days after landfall, the Buzi and Pungwe rivers in central Mozambique overflowed their banks. Unprecedented flooding ensued along the banks of the Buzi River. President Filipe Nyusi stated "whole villages [disappeared]" along the Buzi and Pungwe banks. On 17 March, rivers in the western provinces of Mozambique were hit with floodwaters from rising rivers. The city of Búzi continued to flood as of 20 March, placing its 200,000 residents at high-risk. On 19 March, a 50 km (31 mi) section of the Buzi road remained flooded. The cyclone also incurred damage in Beira.</p>	<p>further 15,784 structures. An estimated 1.85 million people were affected by the cyclone. Alongside damage to infrastructure, approximately 711,000 ha (1,760,000 acres) of crops were damaged or destroyed nationwide. Much of this land near the landfall area was near harvest, compounding the risk of food shortages and placing the country at high-risk of famine. On 19 March, a 50 km (31 mi) section of the Buzi remained flooded. Thousands of people remained trapped on rooftops four days after Idai made landfall. Floodwaters estimated to be 6 m (20 ft) submerged entire communities</p>
February 2007	Favio, category 3	Favio mainly impacted Inhambane Province but also some districts of Sofala	About 130,000 homes suffered damage and 130 schools were leveled by the intense tropical cyclone in Mozambique. ^[31] In all, a total of ten

		<p>(Buzi, Machanga Dondo and Chibabava) and Beira.</p>	<p>people were killed by the storm and nearly 100 others were injured.^[32] Combined with an earlier flood,</p> <p>Favio caused \$71 million (2007 USD) in infrastructural damage.^[16] About 64,000 people moved to tents during the storm,^[25] and 33,000 people were displaced during the storm.^[33] Cyclone Favio destroyed 277,000 ha (684,480 acres) of crops, primarily in Inhambane. Overall, 160,000 people were affected by the storm.^[34]</p> <p>In Sofala province. The Buzi River surpassed alert levels. leading to the relocation of vulnerable river communities. Shelter and construction materials, non-food items and food assistance were the most crucial needs.</p> <p>Elsewhere, the storm damaged trees and blew off rooftops in Pontagea, a highly populated suburb in the port city of Beira.</p>
February 2000	Cyclone Leon-Eline, category 3	<p>Cyclone Leon–Eline was the longest-lived Indian Ocean tropical cyclone on record, traveling over 11,000 km (6,800 mi) during its 29-day duration throughout the entire month of February. The cyclone formed on February 1, 2000, in the Australian basin as Tropical Cyclone Leon, and was renamed <i>Eline</i> after crossing 90° E into the South-West Indian Ocean. On February 22, Eline made landfall about 80 km (50 mi) south</p>	<p>Before Eline's final landfall, Mozambique's worst floods since 1951 had killed about 150 people. The additional rainfall and flooding from Eline created the country's worst natural disaster in a century and disrupted ongoing relief efforts. The combined effects destroyed over 250,000 ha (620,000 acres) of crop fields and killed 40,000 cattle. The Limpopo River reached 15 km (9.3 mi) wide and 11 m (36 ft) above normal in some areas, which isolated the town of Xai-Xai. A dam broke along the river, flooding the town of Chokwe in the middle of the night and trapping several unprepared residents; this accounted for nearly half of the death toll. About 55 people drowned in Sofala Province after rescue helicopters arrived too late to save them. Around 20,000 people in the capital city of Maputo lost their homes. In addition to the floods, strong winds blew away many roofs and some entire houses made of mud. The</p>

		of Beira, Mozambique , near peak intensity.	combined effects of the preceding floods and Eline left about 329,000 people displaced or homeless, killed around 700 people, and caused an estimated \$500 million (USD) in damage. The flooding disrupted much of the economic progress Mozambique had made in the 1990s since the end of its war. After the storm knocked over 90 power poles, about two-thirds of Beira was without power and water, and two people were killed due to downed power lines. Flooding damaged the World Food Program warehouse in the city. Also in Beira, the combination of strong winds and waves sank five ships in the harbor, including one at the entrance. This halted port traffic for about two weeks. Floods submerged the primary highway connecting the north and south of the country, and damaged several other roads and rail lines, halting the region's economy by preventing movement of goods. About 4 km (2.5 mi) of the rail line between Maputo and Zimbabwe was under water.
1997	Cyclone Josie	In February 1997 an active Intertropical Convergence Zone was common over the Indian Ocean and especially in the Mozambique channel. Cyclone Josie formed in the Mozambique channel affecting Central (including Sofala) and northern Mozambique	Brought torrential downpours and triggered extensive flooding
1997	Cyclone Lisette, category 1	Started in the Mozambique Channel and hit Beira, moving inland to Zimbabwe. Lisette was the fourth tropical cyclone observed in the Mozambique Channel that season, though it was the only storm of the year to strike	Overall, 87 people perished in the cyclone while 80,000 others were directly affected. Most of the south-central Mozambique was drenched with rainfall totals ranging from 60 mm (2.4 in) to 200 mm (7.9 in), setting numerous records.

		Mozambique. Nampula Province was severely flooded, severely damaging roads. Sofala and Inhambane Provinces were also badly affected by the system; widespread flooding spread as far north as northern Mozambique.	
March 1994	Cyclone Nadia, category 1	Nadia started north of Madagascar and crossed Nampula province and moved south through Zambézia and Sofala.	Across Mozambique, Nadia directly caused 240 deaths, injured thousands and left 1.5 million homeless. High winds caused widespread power outages, left areas without water, and significantly damaged crops, notably the cashew crop. The storm struck before the harvest, and lack of food resulted in 300 deaths in the months after the storm
Feb 1988	Cyclone Filao, category 2	Filao was also the first storm to affect the nation since Tropical Storm Domoina in 1984. It mainly affected the provinces of Zambezia, Sofala but causing severe flooding of the Limpopo River in Gaza Province.	<p>Overall, the storm brought considerable damage to the nation; Damage totaled to \$10 million (1988 USD). Property damage alone totaled to \$1.5 million, just under \$1 million of which came from buildings. Moreover, insured losses from the storm totaled \$1 million. The death toll eventually reached 100. About 90,000 people were directly affected by the system.</p> <p>Zambezia Province, sustained the worst damage.</p> <p>Within the province of Sofala, 14,395 ha (35,570 acres) of harvest were destroyed, 28,174 people were rendered homeless, and 1,389 buildings were destroyed. In Sofala, the Pungwe River experienced its worst flood of the 1980s, but the worst flooding took place along the Limpopo River.</p>

Annex 3. Images Of Low-Income Homes

Siluvo (near Nhamatanda)



This was a multi-building homestead consisting of traditionally made huts, grain storage sheds and conventional housing. The huts were completely destroyed and the conventionally made house lost all its roofing. The owner is a poor farmer and is struggling to rehabilitate the buildings. The pile of damaged roofing has been collected from around the area and will be used temporarily until new material can be purchased. The farmer was hit consecutively by the Idai floods and then a drought during the 2020/21 season.

Beira and Environs



Scenes from immediately after Idai struck. Reports that Beira was 90% destroyed are still repeated but are exaggerated - though damage in some areas was horrific.

Conventional Housing - Bairro Manga (Beira)



Roofing is commonly protected from strong winds by “fixing” it by placing cement blocks and other heavy items on top



House with new zinc sheets and cement blocks to be used for repairing walls

Traditional Housing - Dondo Municipality



House using damaged zinc sheets and still unrepaired wall



Damaged walls



House being rehabilitated with new zinc sheeting and walls (awaiting to be plastered with mud)



Abandoned house with collapsed wall



Severely destroyed occupied house awaiting repairs



Traditionally built house being rehabilitated with only traditional materials

Buzi Town (on the Banks of the Buzi River)



Buzi Town during the flooding



Typical scene during the Buzi flooding



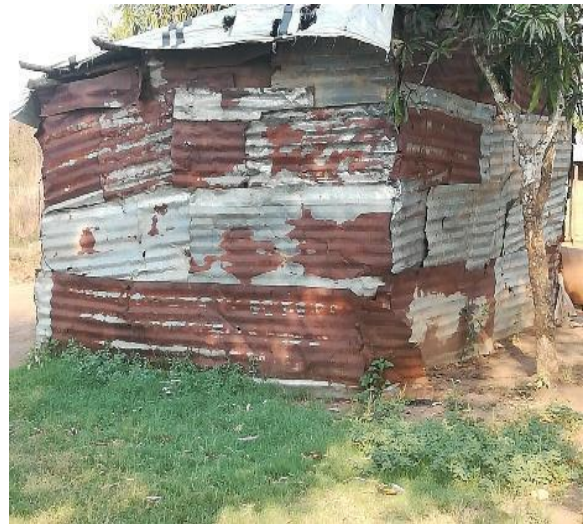
New bridge being constructed over the Buzi River. This is a strong indication that a shorter route from southern Mozambique to Beira is being planned.



Women shelling peas from their “machamba” outside of their Buzi Town residence which is only occupied part time as they are now spending more time in the Guara-Guara Resettlement Camp some 6 km from Buzi (only tents).



House in the higher part of Buzi demonstrating the height of the water which remained at that level for about 2 weeks.



Many residents have only managed to repair their houses temporarily with damaged zinc roofing sheets



Building belonging to District Government still unrepaired. The building is full of damaged computers.



House belonging to a schoolteacher in Bairro 2000 which was most affected due to its low altitude (flood waters reached above the roof). The house is in a gradual process of rehabilitation with some new zinc sheets and gradual repair of walls.



Abandoned house in Bairro 2000. The owners have relocated to Guara-Guara Resettlement Camp



Damaged house in Bairro 2000 undergoing gradual rehabilitation



Man with his family in Bairro 2000. When water started gushing into his house in the early morning, he ran to wake up others in the neighborhood to flee their houses so seek refuge in the Church.



Severely damaged but occupied house in Bairro 2000. The bag is full of clothing and is hung to avoid future flood damage.



Many houses use tarpaulins as a temporary means of making their houses habitable (Bairro 2000)



This house in Bairro 2000 was originally made of cement blocks (pile of broken blocks in the background). New zinc sheets have been placed but walls are temporarily made of damaged zinc sheets.

Annex 4. Images Of Micro And Small Enterprises In The Beira Corridor



Central Beira businesses flooded Idai

Inchope Town (intersection of N1 and N6)



This is the Social Centre (bar/restaurant) which forms part of truckers' overnight parking/accommodation and dining/drinking area just outside of Inchope on the main road to Beira (N6). In total 230 zinc sheets were lost, and serious damage was incurred on the dormitory section (see below)



Dormitory section of the truckers' overnight facility (damage included lost zinc roofing and collapsed wall).



Inside of dormitory without roofing



Some of the damaged IBR zinc roofing sheets

Nhamatanda Town and Nearby Villages (along N6 heading towards Beira)



Workshop producing grain mills. Damage incurred included lost zinc roofing sheets and two welding machines destroyed by water.



Maize mill. Damage incurred: 16 roofing sheets.



The owner of this bar suffered considerable flood damage (including the loss of a fridge) with water reaching the height of the top of the lower outside walls. She attempted to get financing for approximately USD 300 but was unable to from any of the financial institutions so had to resort to private lenders with the standard (exorbitant) rate of 50% per month.



Steps showing how much lower the bar is from the street level, resulting in considerable flooding.

Gota Market and environs (central Beira)



Informal seller (Gota Market) of cool drinks as well as school uniforms made by her tailor husband. The broken freezer was brought from her home after it was destroyed by flooding (drinks kept cold by ice)



This vendor (Gota Market) lost his structure comprising of “estacas” (poles) and zinc roofing sheets but was able to save his merchandise by storing it in nearby storage facilities. Virtually all stall vendors in Gota market lost their structures and were only able to rebuild them about a week after the cyclone.



This carpenter next to Gota Market suffered approximately USD 2,000 in damages including flood damaged machinery and roofing (he has still not managed to fully recuperate from the destruction)



This small grocery shop lost 15 roofing sheets and approximately USD 500 of merchandise (stocks remained in shop during cyclone)



This liquor shop suffered approximately USD 2000 of damage including a computer, 2 fridges, a freezer and 7 roofing sheets.



This seller of sawn timber had about a half meter of water stay in his place for about a week. Wood stocks are not affected by water. His only losses were 9 sheets of IBR zinc roofing sheets which, to date, have only been replaced by damaged sheets.

Zona Mascarinha (near airport)



This carpenter had these two machines destroyed by water (approximately USD 300) and lost some 30 roofing sheets which have only been provisionally replaced with damaged sheets. Flood waters reached 1 meter but fell back after 2 hours.



New “barrotes” (wood beams to hold roof sheets) have been installed but damaged roof sheets have not been replaced.