Post-Event Briefing - Tropical Cyclone Guambe

Mozambique | 02 March 2021

Highlights

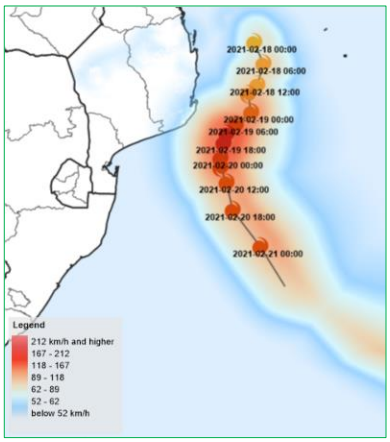
- The tropical cyclone Guambe, which developed in the Mozambique Channel on 17 February 2021, remained clear of any inhabited land. However, its peripheral influence was felt over parts of the Mozambican coast, but no significant damage or loss of life has been reported.
- A total of 38,871 people was modelled as living in the areas affected, and economic losses caused by the cyclone Guambe in Mozambique were estimated at 2,266 USD by the ARC Tropical Cyclone Explorer (TCE).
- Portfolio losses of the cyclone Guambe in Mozambique would be less than the attachment point of 7,221,694 USD. As a result, no payout would have been due to the Government if Mozambique had taken out the TC parametric insurance.

Event Overview

On 17 February 2021, a tropical system named Guambe developed in the southern half of the Mozambique Channel in a south-southeast direction. Its centre was located about 250 km east of Inhambane province (Central Mozambique), with maximum sustained winds reaching 83 km/h. Guambe strengthened as it moved south towards the central and southern coast of Mozambique, with maximum sustained winds of up to 150 km/h[1]. On February 18, the moderate tropical storm Guambe picked up speed and turned into a tropical cyclone with a maximum wind speed of 140 km/h and wind gusts of 195 km/h. But no landfall occurred in Mozambique as the heart of the cyclone remained 150 km from the Mozambican coast. Guambe then weakened thereafter as it moved away from inhabited land. However, its peripheral influence was been felt over parts of the Mozambican coast with gusts of 100 km/h and heavy rains, but no significant damage or loss of life has been reported.

Monitoring TC Guambe using ARC's TCE

ARC's Tropical Cyclone Explorer (TCE) software was used to monitor the tropical cyclone Guambe which developed in the Mozambique Channel and slightly touched the coast without making landfall in Mozambique. The wind and storm surge footprints shown to the right are part of TCE outputs, highlighting the regions affected by certain extents of the tropical cyclone Guambe. Based on TCE's footprint, a maximum wind speed of 149.5 km/h was estimated in Mozambique. The storm surge footprint modelled by TCE indicated that Guambe caused storm surges that reached a maximum height of 0.7 meters along the Mozambican coast.



TCE Loss Calculations

The post-event run of the ARC's TC model showed that a total of 38,871 people were living in the areas affected by the tropical cyclone Guambe. The economic losses associated to TC Guambe in Mozambique were estimated at 2,266 USD. These losses are direct losses solely due to wind hazard and storm surges, and do not consider damages due to flooding, nor indirect economic losses.

Country	Event name	Losses (USD)	Population potentially affected per wind speed category				
			Category 1 (63 km/h)	Category 2 (89 km/h)	Category 3 (119 km/h)	Category 4 (159 km/h)	Category 5 (211 km/h)
Mozambique	Guambe	2,266	38,871	0	0	0	0

TC Insurance Policy

The payout under the parametric cyclone insurance policy held by a country depends on the conditions of coverage chosen. A key parameter is the Attachment point, the minimum severity of the event loss that results in a payout.

For Mozambique, the calculation of the losses caused by the cyclone Guambe was made using the following insurance model parameters: Premium of 1,700,000 USD, Coverage limit of 14,720,025 USD, Ceding percentage of 2.50%, Attachment point of 7,221,694 USD and Exhaustion point of 596,579,708 USD. The results indicated that if Mozambique had taken out the TC parametric insurance, the losses caused by the tropical cyclone Guambe would be less than the Attachment point of 7,221,694 USD. **As a result, no payout would have been due to the Government of Mozambique under the policy of the parametric insurance against the risks of tropical cyclones with the above parameters.**

ARC expresses its sympathy to the Government and people of Mozambique for the impacts on communities and infrastructure caused by the tropical storm Guambe.

For additional information, contact the ARC at: info@arc.int

[1] Météo France - La reunion

Tropical Cyclone Explorer (TCE)

About ARC

The African Risk Capacity (ARC) was established by treaty as a Specialised Agency of the African Union (AU) to help Member States improve their capacities to better plan, prepare and respond to extreme weather events and natural disasters, therefore protecting the food security of their vulnerable populations. By linking early warning systems with contingency planning and supported by modern financial mechanisms, ARC enables governments to provide targeted responses to disasters in a more timely, cost-effective, objective and transparent manner, thereby reducing response costs and loss of livelihoods.

About TCE

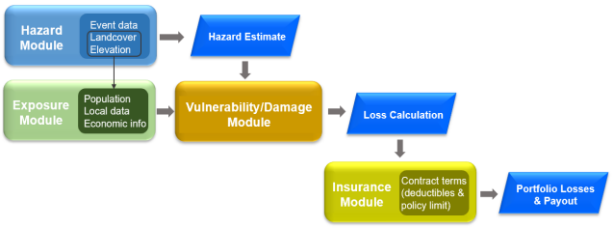
The ARC Tropical Cyclone (TC) risk model is a parametric insurance product developed for the South West Indian Ocean (SWIO) region to provide rapid financing and early response to countries affected by tropical cyclone events**.** It covers winds and storm surge hazards while excess rainfall associated with cyclones will be covered under another ARC insurance product.

The Tropical Cyclone Explorer (TCE) software package is a dedicated interface, developed by the ARC to allow users to easily access all the model data and view the characteristics of the cyclone (trajectory, wind speed, storm surge heights, etc.), calculate the affected population as well as the economic losses caused by the cyclone event. The losses calculated by TCE are limited to six SWIO countries: Mozambique, Comoros, Madagascar, Mauritius, Seychelles and Tanzania. The TCE will be available to ARC Member States and partners via the ARC's *Africa RiskView* (ARV) platform.

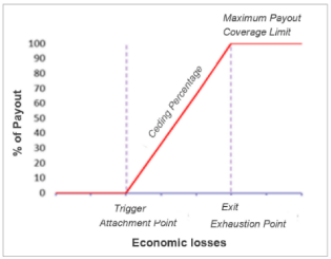
Methodological Note on TCE

TC Risk Model

The ARC's TC risk model is implemented through four modules, logically sequenced to offer a reliable estimate of people affected and economic losses caused by cyclones, namely hazard, exposure, vulnerability/damage and insurance modules.



- *Hazard module*: It calculates in near-real time the maximum wind speed and the height of storm surges caused by a tropical cyclone.
- *Exposure module*: It describes the economic assets based on the land use categories in each country as well as the replacement cost of each exposed asset.
- *Vulnerability/Damage module*: It defines the probability distribution of economic losses for different levels of wind speed and storm surge height induced by a tropical cyclone.
- *Insurance module*: It calculates loss estimates for an asset portfolio based on contractual conditions. The payout is based on the following set of parameters selected by each country: Attachment Point, Exhaustion Point, Coverage Limit and Ceding Percentage.



As per Section 6.2 of the TC Policy, the calculation of the MCLD (*Modelled Cyclone Losses and Damages*) payout amount is shown below using the following formula:

P = min (L, y * x), where x = min (EP - AP, max (MCLD - AP, 0))

where:

P	MCLD Payout Amount
L	Coverage limit
AP	Attachment Point
EP	Exhaustion Point
x	The amount by which the MCLD exceeds the Attachment Point (AP) (which amount shall not be greater than the Exhaustion Point (EP) minus the Attachment Point)
y	Ceding Percentage

TCE Components

The TCE is a client Windows application which is composed of three main modules:

- *Loss Calculator*: It is the main element for calculating the economic losses and the population affected and for each country.
- *Event Overview*: It is a dedicated module which combines mapping and loss calculation. It helps viewing different elements of one event during calculation.
- *Map*: It provides to users a general GIS mapping functionality including vector and raster-based project parameters.

After downloading the dataset, the *Loss Calculator* engine calculates the modeled losses for the selected country (ies) and selected cyclone event(s). The losses (in USD) is calculated only for A-deck and B-deck data, not for in-event data and forecasts. In addition, the TCE's *Loss Calculator* calculates the number of populations affected for five categories of cyclone wind speeds.