Post-Event Briefing - Tropical Depression ANA

Madagascar | 26 January 2022

Highlights

- The tropical depression ANA made landfall in northeastern Madagascar on Saturday January 22,2022, at midday. It caused very intense rainy episodes, followed by floods and landslides in several regions.
- According to the preliminary assessment of the BNGRC, at least 34 people lost their lives, and more that 65,000 were directly affected in the Grand Tana (epicenter of the damage).
- Portfolio losses due to ANA are less than the attachment point defined in the country's insurance policy. Therefore, no payout is due to the Government of Madagascar in relation to damage caused by cyclonic winds.

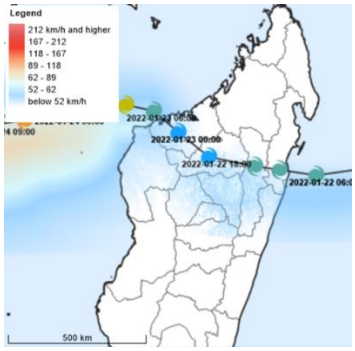
Overview of the Cyclonic Event

A low-pressure system had formed in the Indian Ocean from January 21, 2022. It gradually intensified towards the northeast of Madagascar. This system named ANA is the first of this cyclonic season. It landed on the east coast of Madagascar between Tamatave (Toamasina) and Sainte-Marie on Saturday January 22 at noon, at the stage of a tropical depression[1]. ANA weakened slightly while crossing Madagascar and left the country on January 23. It picked up speed in the Mozambique Channel towards the Mozambican coast.

In Madagascar, ANA mainly caused very intense rainy episodes which caused floods and landslides in several regions of the country. The preliminary assessment from the National Disaster Management Authorities (BNGRC[2]) in Grand Tana (epicenter of the damage) reported that more that 65,000 have been affected, at least 38,985 people have been displaced, at least 34 people have died, and more that 7,280 homes have been damaged or destroyed[3]. According to the BNGRC, part of the national road (RN2) was washed away overnight from Saturday January 22 to Sunday January 23.

Monitoring of ANA using TCE

As part of the ARC Parametric Tropical Cyclone Insurance Policy, a post-event report is required for any cyclone event affecting a Member State. The ARC's Tropical Cyclone Explorer (TCE) software enabled real-time monitoring of the characteristics of tropical depression ANA in Madagascar.



Wind and storm surge footprints are among the products generated by TCE, and these indicate the areas affected by ANA. TCE thus estimated wind speeds varying from 42 km/h to 57 km/h between ANA's landing and exit points from the Malagasy territory. As for the maximum storm surge, it was estimated at 40 cm by the TCE.

Calculation of Losses caused by ANA

The losses calculated by TCE are direct losses solely due to wind hazard and storm surges. They do not consider damages due to flooding, nor indirect economic losses. However, due to ANA's physical conditions, the impact of the storm surges is negligible and therefore did not contribute to the damage.

The tropical depression ANA not having reached the minimum stage of a moderate tropical storm, the number of affected populations calculated by TCE is nil as indicated in the table below. However, the economic losses related to winds associated with ANA were estimated at US$2,031.

Country	Event name	Losses (USD)	Population potentially affected per wind speed category				
			Category 1 (63 km/h)	Category 2 (89 km/h)	Category 3 (118 km/h)	Category 4 (167 km/h)	Category 5 (212 km/h)
Madagascar	ANA	2,031	0	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 Madagascar, the calculation of the payout per the insurance model, in relation to the wind risk associated with ANA, was carried out using the following parameters of the insurance contract: a coverage limit of USD11,690,000, a ceding percentage of 0,53%, an attachment point of USD155,440,233 and an exhaustion point of USD2,359,518,806. The results indicate that the losses caused by ANA are lower than the Attachment Point set in the Madagascar insurance policy. As a result, no payout would have been due to the Government of Madagascar under the 2021/22 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 Madagascar for the impacts on communities and infrastructure caused by the tropical storm ANA.

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

[1] *Meteo France*
[2] *Bureau National de Gestion des Risques de Catastrophes Naturelles*
[3] *https://floodlist.com/africa/storm-ana-floods-madagascar-mozambique-malawi-zimbabwe-january-2022*

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.

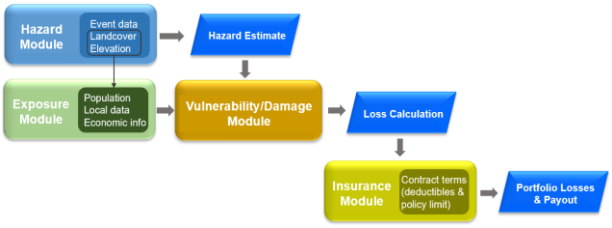
About TCE

The ARC Tropical Cyclone (TC) risk model is a parametric insurance product developed for the Southwest 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.

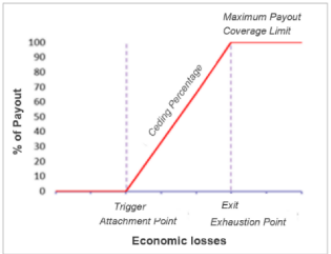
The Tropical Cyclone Explorer (TCE) software package is a dedicated interface, developed by the ARC to allow users to easily access all the model data and view the characteristics of the cyclone (trajectory, wind speed, storm surge heights, etc.), calculate the affected population as well as the economic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

Overview of the Tropical Cyclone 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))

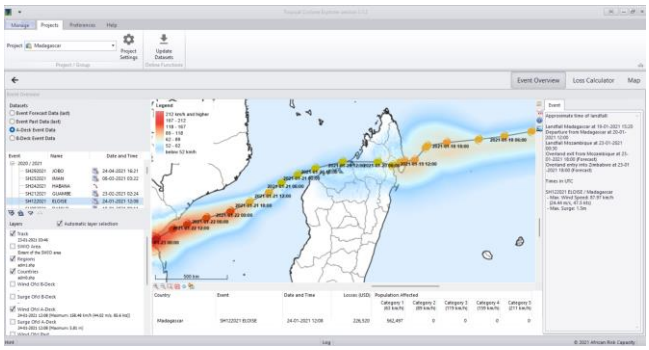
where:

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

Components of the TCE

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) are 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.