Maputo Fourth Learning Lab Report

Praia de Macaneta

21-22 May 2019

Compiled by

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ACRONYMS

AdeM	Water of the Region of Maputo
AIAS	Administration of Infrastructure for Water Supply and Sanitation
ARA Sul	Regional Administration of Waters in the South
CRA	Council for the Regulation of Water Supply
DNAAS	National Directorate of Water and Sanitation
DNGRH	National Directorate of Water Resources Management
MEDH	Ministry of Education and Human Development
FCFA	Future Climate for Africa
FIPAG	Water Supply Investment and Asset Fund
FRACTAL	Future Resilience for African CiTies And Lands
INAM	National Institute of Meteorology
DNA	National Water Directorate
LL	Learning Lab
MCTESTP Technician	Ministry of Technology Higher Education and Professional
ETA	Water treatment station
SMAE	Municipal Service of Water and Electricity
MITADER	Ministry of Land Environment and Rural Development
OCB	Community Neighborhood Organization
CMM	Maputo Municipal Council
MAEFP	Ministry of State Administration and Public Function
INGC	National Institute of Disaster Management

Contents

1. Welcome messages

by Teresa Chissequere

Teresa Chissequere declared the fourth Learning Lab open on behalf of Maputo City Council. She welcomed the entire FRACTAL project team who had traveled from different parts of the world to participate. She welcomed the FRACTAL project implementation partners, notably the University of Cape Town and Eduardo Mondlane University, and welcomed the representatives of various institutions dealing with climate change issues and the provision of water services. She explained that due to the geographical location of the city of Maputo the city faces challenges from climate change, thus obliging the government to take corrective actions to minimize negative impacts on residents.

She mentioned that the Maputo City Council is aware that these environmental challenges in the city have been causing health issues and food insecurity among its residents. The City is making efforts to implement policies, strategies and plans to reverse this scenario. In recent years the city and province of Maputo has been experiencing serious restrictions on drinking water supply. To respond to this scarcity, it has resorted to using groundwater in some areas of the city. In addition, the government has been conducting social media awareness campaigns on the need for the rational use of this precious liquid. She hoped that from this FRACTAL event, concrete ideas and proposals will emerge as to how Maputo should address the problems of water scarcity, sanitation and other issues in the city.

Teresa Chissequere opens the workshop

2. Impact of the FRACTAL project Maputo city

by Genito Maure

A presentation of the FRACTAL project was made by the Maputo FRACTAL PI, Genito Maure. He indicated that the presentation was not new for those who have participated in previous FRACTAL engagements in Maputo. He emphasised that one of FRACTAL's aims in Maputo is to bring together different water sectors and discuss the effects of climate change in these sectors, which is why there were representatives from academia, researchers, decision makers, and NGOs participating at the Learning Lab. From previous FRACTAL engagements held in Maputo a major constraint was found to be the lack of mainstreaming of climate change into the decision-making process, despite the existence of several studies at the city level. Poor inter-institutional coordination and poor knowledge sharing was also found to be an issue in the city.

FRACTAL Maputo Learning Landscape presented by Genito Maure

Genito also presented a figure describing the activities that took place in Maputo within the framework of the FRACTAL project from March 2016 to 2019.

The first steps towards the start of the FRACTAL project in Maputo came from a meeting that took place in April 2016 in Maputo City, between the team from Eduardo Mondlane University and the University of Cape Town, and the proposed work plan was drafted. Meetings followed with Maputo City Council which culminated in the signing of a memorandum of understanding between Maputo Municipal Council, University of Cape Town and Eduardo Mondlane University. In November 2016 the Maputo team

partcipated in FRACTAL's first annual meeting, where they joined the other cities that are part of the FRACTAL project. In March 2017, an embedded researcher was hired and a first Learning Lab was held. The embedded researcher is the link between the university and the Maputo municipality in the project activities. Learning Labs are places where different actors come together to discuss various subjects. Small Opportunity Grants (SOGs) and governance research took place in 2017, which aimed to carry out interviews with different climate, energy and water actors in their activities. 2017 ended with the FRACTAL Maputo team travelling to Cape Town to participate in another annual meeting.

February 2018 began with a City Dialogue, which brought together different water sector actors to discuss water issues and their relationship with the climate in Greater Maputo region. In the history of water meetings in Mozambique this was a first, and different from others and more productive. The first project magazine called city digest was published, which describes the other project activities in Maputo and other FRACTAL project cities.

This was followed in May 2018 by the organization of the second Learning Laboratory and the first Municipal Training, which consisted of training the technicians of the municipality of Maputo on climate information and climate change. Later in 2018 the second Water City dialogue took place in September and the SOG was finalized.

In 2019 the FRACTAL team once again travelled to FRACTAL's annual meeting in Cape Town. A third Learning Lab was held in February with a final Learning Lab engagement in May.

3. Water, climate and governance - Lusaka and Windhoek learnings

This session was based on the presentation by the two other FRACTAL cities, Lusaka and Windhoek, on aspects of their learning process plans and involvement in the project.

The first presentation was made by the city of Windhoek, entitled Let's Talk FRACTAL, with a conversation between Ms. Mary-Anne Kahitu & Mr. Olavi Makuti from the City of Windhoek and Prof. John Mfune & Ms. Kornelia Iipinge from the University of Namibia.

Windhoek and Lusaka Talk Show

To begin with, it was framed in terms of the physical location and socioeconomic aspects of Namibia and Windhoek. They highlighted the engagement processes that took place in the city: the four Learning Labs; Councilors' Workshop: awareness on climate change and decision-making; Windhoek-Lusaka City Exchange Visit in Lusaka; Stakeholder workshop of the City of Windhoek's Integrated Climate Change Strategy and Action Plan; Transformational Leadership on Climate Change Training (TLCC); Windhoek Climate Risk Narratives & Infographics; Windhoek Talanoa Dialogue; City of Windhoek Strategic Executive TLCC Training; City Junior Councilors Awareness workshop on Climate Change; City of Windhoek Integrated Climate Change Strategy and Action Plan (ICCSAP). The stakeholder conversation was based on questions and answers and was centered around the activities mentioned above. To conclude they presented the challenges, opportunities and the next steps for the city.

Next the Lusaka team presented their experience. They were led by Brenda Mwalukanga, FRACTAL Embedded Researcher. She stated that prior to the start of the FRACTAL project in Lusaka, the team had to baseline institutions and other authors to understand the use of climate information in their sectors. It had been concluded that there was no collaboration between them on climate issues and that climate information was sector-centric.

She then summarized FRACTAL's learning journey in Lusaka, which consisted of using the Learning Lab approach to understand complex issues such as flooding, water security, unregulated water abstraction, poor water quality and low availability in peri-urban areas.

She also presented the Lusaka e-learning approach that FRACTAL used, which was based on: an ER Approach; Learning Labs; Current Focused Dialogues /Discussions; Trainings; Webinars; Conferences; Monthly Teleconferences using apps such as Zoom; and Breakfast Meetings. She also spoke about the timeline of the different events held in Lusaka from 2016 to 2019 and the different participants involved in these events. Finally, she spoke of the changes experienced, provided evidence from the Lusaka Water and Sewage Company, including lessons learned and future plans for the city.

Links:

Talk Show

Lusaka presentation

Windhoek presentation

4. Water, Climate and Governance - learning from Mozambique

A Water Sector Representatives Panel was set up to consider Water, Climate and Governance in Mozambique. The Panel included the National Directorate of Water Resources Management and the National Directorate of Water and Sanitation and Regional South Water Administration. There were presentations and debates on the following topics: Rational use of water; Wastewater Reuse as a Water Saving Tool - Challenges and Prospects for Mozambique; and the National Water Resources Development Plan.

The presentation on the theme 'Reuse of Treated Wastewater' was given by Eng. Daudo Carimo. He began by talking about the hydrological cycle and the different phases of water transformation so that we could understand how water reuse is carried out. He spoke of the revision of the Water Policy in Mozambique (approved in 2016), which aims to provide the desired water future as one where water is available in adequate quantity and quality for current and future generations, serving sustainable development, poverty reduction and the promotion of well-being and peace, and where the negative effects of flood and drought are minimized. He spoke in detail of the objective of the sixth Sustainable Development Goal (SDG) as being to ensure the availability and sustainable management of water and sanitation for all. This objective is reflected in Mozambique's 2016 Water Policy. Rational use by addressing that should be done using participatory and inclusive management of water resources in order to ensure their existence for future generations by ensuring the use of water from watersheds, aiming at the qualitative and quantitative optimization of water resources. He also spoke of the situation of urban land sanitation in Mozambique, quoting statistics that by 2017 the population of Mozambique was 28,861,863 with a national coverage of 58.1%. Those cities with a public water treatment network were Maputo and Beira.

He spoke about the overuse of drinking water in Mozambique, noting that among many sectors, agriculture and industry use the most water, using drinking water (with quality far above that which is ideal for use) and thereby contributing to the reduction of water availability for human consumption. He spoke of the Urban Sanitation Situation in the Country Drainage and Treatment base legislation (Water Policy 1991) on drainage and treatment of wastewater, and in Mozambique there is no specific regulation for the various use of wastewater and other treatments. Finally, he spoke of reuse, challenges and prospects in the domestic and industrial water sectors.

See: Reuse of Treated Wastewater

Mr. Isac Filomone from the National Directorate of Water Resources Management presented on the Mozambique National Water Resource Management Plan. He spoke about the pertinence of the Plan, the legal framework, its methodology, objectives and expected results. According to the speaker, the Plan has a vision of water management by 2040, that aims to ensure the sustainability and management of water resources, achieve socio-economic development and improve people's quality of life, ensuring stable and equitable water supply and building infrastructure, flood and drought structures. At present, the water deficit is caused by low rainfall in the South and Central regions of the country and by 2040, the water demand will be three times higher than the present. In the future, the water deficit will be caused by irrigation development, population growth and the consequent increase in water needs for human supply. Climate change and seasonal rainfall trends increase the damage caused by droughts and floods and structural and non-structural measures are needed to address the damage caused by drought and flood. It is estimated that 67% of the population is supplied with water from 19,000 underground water wells (Groundwater Research and Exploration Regulation - 2016) and that the total exploitable groundwater is 61,000 M m3 / year. Water quality in most basins is moderate. In some basins, such as the Zambezi and Pungwe, water quality has worsened due to mining activity and the presence of droppings. Finally, for the operationalization of the Plan the following steps must be followed: Prepare the Implementation and Institutional Arrangement Project; conduct the Feasibility Study, ensure Donor Agency Financing; proceed with Project Implementation is considered a risk for the implementation of the plan; Resource mobilization capacity; and as a proposed mitigation measure, the Institutional Reform to make administration and finance actions more flexible, mobilize financing and create a National Water Resources Development Fund (FNDRH).

See: Mozambique National Water Resource Management Plan

5. eSwatini and the Little Libombos water sharing agreement

There were presentations from Mr. Isac Filomone from the National Directorate of Water Resources Management (DNGRH), and by Mr. Joao Costa Neto from the National Water Administration (ARA-Sul). They talked about the various water sharing agreements in the small Libombos dam between Mozambique and Swaziland.

Isac Filomone presented on 'Cross-Border Cooperation On Water Resources: Umbeluzi Basin'. This focused on the shared river basins, the legal aspects in terms of legislation, regional cooperation and the challenges ahead. Although Mozambique shares a good number of rivers in southern Africa, this has implications given the downstream geographic location and dependence on upstream countries' water supply as well as a lack of water retention infrastructure. This factor implies: an increase in saline invasion in rivers; possibility of decreasing water quality due to upstream river pollution; vulnerability to extreme events (floods and droughts); lack of viability of projects due to dependence on water availability. Regarding the legal framework or legislation, there are several documents that have been prepared at national and regional level to minimize the impacts mentioned above, including: the SADC Revised Protocol on Shared Water Resources (2000); Regional Water Policy and Strategy (2005); Regional Strategic Action Plan (2016 - 2020) Master Plan for Regional Infrastructure Development (2013-2027). On Regional Cooperation for Sharing the Umbeluzi Watershed, the following agreements were signed: Umbeluzi Agreement (1976): Construction of M'njoli Dams in Eswatini and Small Libombos in Mozambique, 50% Black Umbeluzi to Construction of Njoli and BPL and 40% for White Umbeluzi, was carried out in 2005 and Joint Study of the Umbeluzi Basinthe development of the Joint Namaacha / Lomahasha Water Supply Project is underway) and the Mobilization of Funds for the revision of the Umbeluzi consisting of the Trading of 18 Mm3 to be supplied to Mozambique by eSwatini. In addition to the agreements with the Umbeluzi Basin, several agreements and studies have been signed for other Southern Africa River Basins where Mozambique shares rivers which are the Maputo, Incomati, Limpopo and Zambezi River Basins. The main challenges with regard to water resources management are the construction of hydraulic infrastructures to increase storage capacity and for socio-economic development (small, medium and large dams); the reduction of downstream dependence; the reduction of potential regional conflicts; to reduce vulnerability to floods and droughts, negotiate water sharing agreements to ensure water for development, as well as improve data and information sharing mechanisms; to consolidate or revise existing agreements; toensure compliance with signed agreements; and to undertake joint studies of the river basin.

See: Cross-Border Cooperation Water Resource Umbeluzi Basin

Mr. Joao Costa Neto presented on 'Maputo City, Water Management In A Context Of Drought'. He focused on the *context* of water scarcity in Maputo, gave a brief description of ARA-Sul, spoke about the Umbeluzi basin and Dam for Small Libombos, tools for Dam Management, WEAP: Operational and Strategic Models, Scenarios, future challenges and final considerations. He spoke about the causes that directly and indirectly contribute to water scarcity and restrictions in the city, which are linked to water management in the Umbeluzi Watershed and the Small Libombo Dam. He presented graphics models about the Temporal Evolution of Water Volume Stored in GLP, Water inflows to GLP in relation to causes of water scarcity in Maputo.

He described the characteristics of the Umbeluzi basin. The catchment area of the Umbeluzi River has an area of 5,600km² spread over three countries: 56% (23,140km) in Eswatini, 1% (80km²) in South Africa and 43% (2,380km²) in Mozambique. The river basin drains from altitudes of around 1,800m. From the border with Eswatini, the river basically runs northeast to the Tembe estuary, west of Matola, before entering Maputo Bay.

Similar to the previous presentation, he spoke of the existence of two main dams in this basin: Mnjoli (in Eswatini) – 170mm³ and Pequenos Libombos (in Mozambique) – 385mm³. The main uses of Umbeluzi are: irrigation of cane sugar fields in Eswatini; irrigation of banana and citrus fields in Mozambique; and water supply to the metropolitan area of Maputo. About the Agreement he said that in April and May 2019, following an offer made by King Mswati III to Mozambique during a visit by President Filipe Nyusi to Eswatini, about 18million m³ of water would be transferred from the Mnjoli (Eswatini) dam to the Little Libombos dam. This will help to alleviate water restrictions in Maputo in 2019.

About the Small Libombos Dam a brief description was made in terms of year of construction, location, length, maximum height, full capacity, purpose and Mini Hydroelectric Plant capacity. He also spoke of Tools For Dam Management (GLP), based on some of the tools. The following tools have been the most relevant: Guide Curves (rules of operation); Simulation Program for the Evolution of Water Reserves; and WEAP models. The tool used determines the likely duration in the current water reserves of the dam in a situation of very low or even zero water inflows and different scenarios. To finish he spoke to the challenges in the southern part of Mozambique, which is classified by several international organisations as being an area of risk for water scarcity. Managing this shortage will become more important in the future. The updating and in depth use of the water management tools of the Umbeluzi basin are the path to be followed by ARA-Sul for better management. This use requires better preparation of this institution.

See: Water Management in Context of Drought

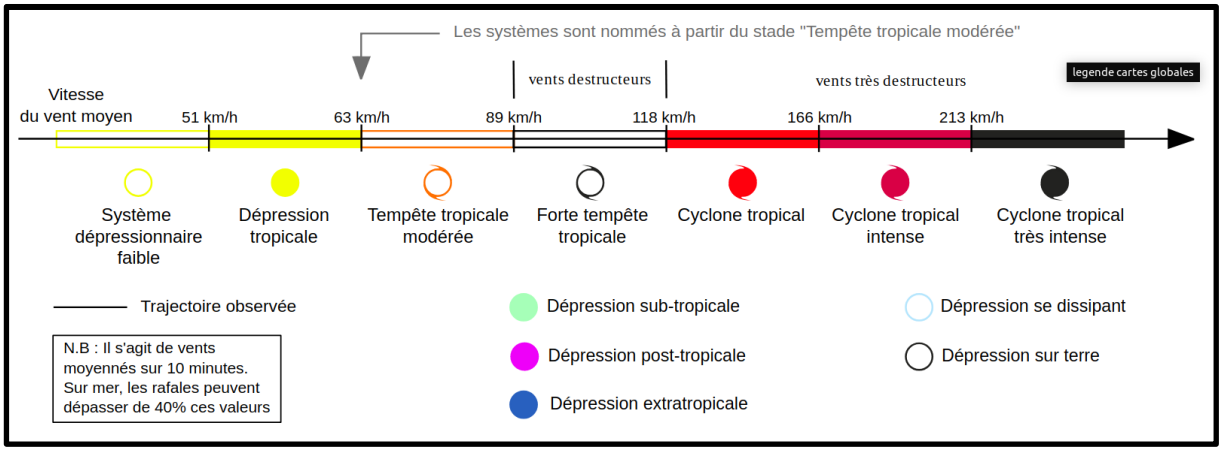
6. Climate information for water system planning and decision making

This presentation was made by Dr. Izidine Pinto. He displayed an online climate change profile for Mozambique that has been created by the African Development Bank. This tool was designed to increase the capacity of African countries, using the information needed for decision-making and implementing high quality, scalable video design from the United States in African countries. The purpose of this scalable scaling is to make ADB decision-making in a number of ways, and hence the scales are tailored to support existing screening tools such as the Climate Safeguards System (CSS) and associated modules (such as Procedures Adaptation Review and Evaluation, Modules and Adaptation Plug Construction). The process is designed to provide data and interpretation of that data, which is useful for enabling decision-making at various decision levels, including the development of Country Strategy Papers, sectoral policies, analytical work, and decision-making at the decision-making level.

See:
https://zivahub.uct.ac.za/articles/National_Climate_Change_Profiles_Enhancing_the_capacity_of_African_countries_to_use_climate_information_to_inform_decision_making/7946000

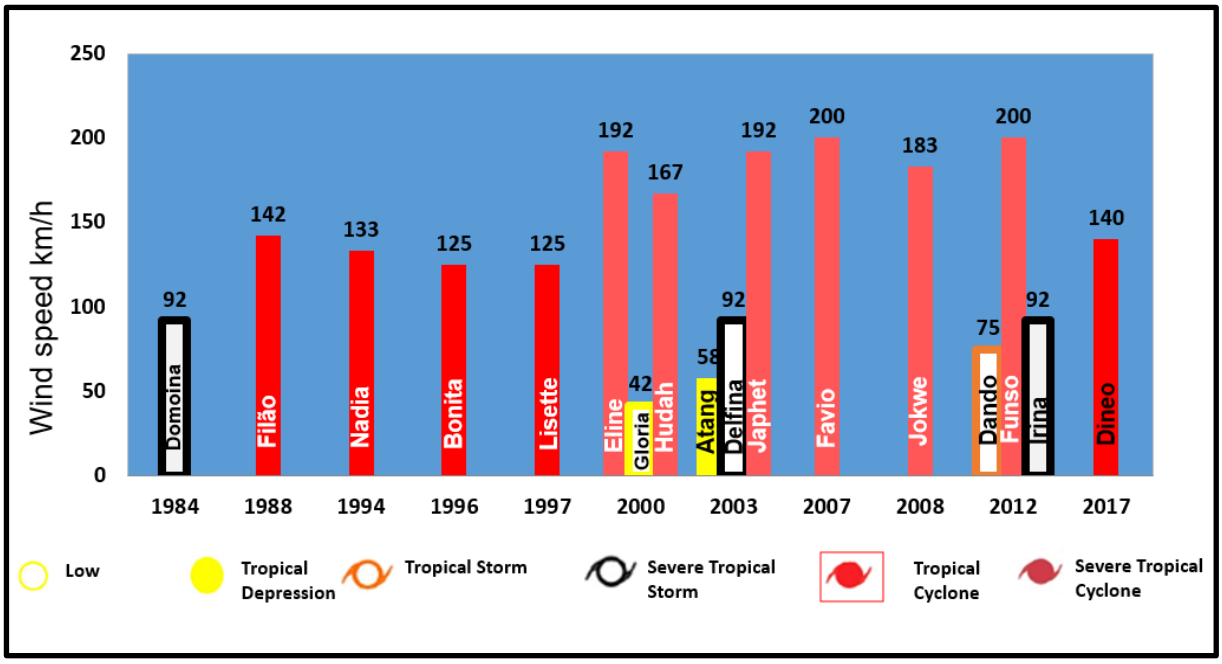
7. Cyclone Idai - Case Study for the Maputo Area

The panel for this presentation was composed of INAM speakers, INGC and Aurecon, and took into account the natural disaster that happened in Beira to make and study the Maputo area in order to minimize the risks and damage in the city if the same phenomenon occurs in this region. The beginning of the presentation was by Bernardino Nhantumbo, who explained how the concept of a cyclone is defined according to where it starts, the wind speed and the damage that occurs during its trajectory.



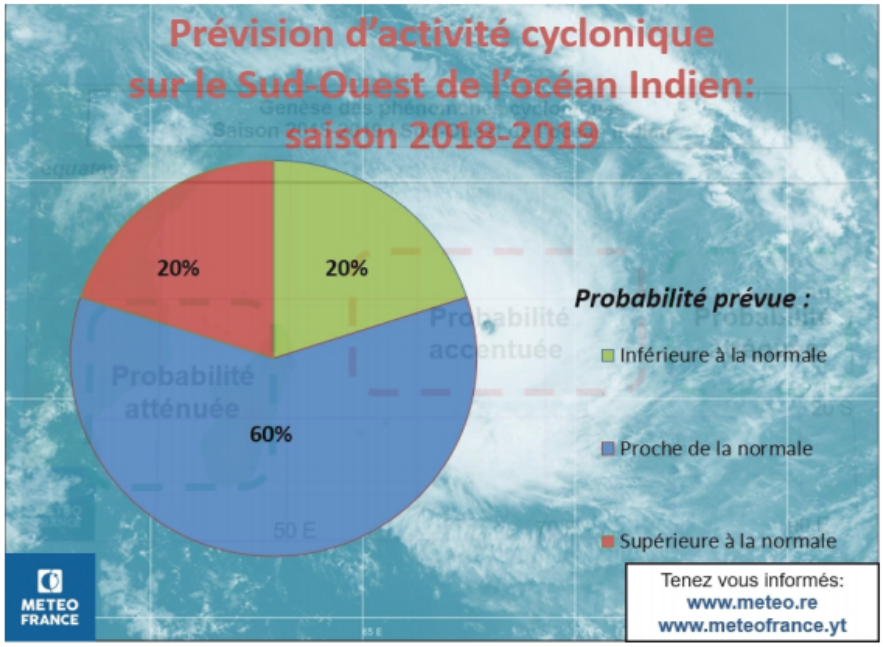
Different types of cyclones.

The speaker talked about the history of cyclones in Mozambique as well as their variability. In Mozambique, cyclonic activity began in 1984 and continued for 2-5 years until its most recent occurrence in 2019. Depending on their origin, their trajectory and behavior these cyclones have had different impacts between the least and most devastating.

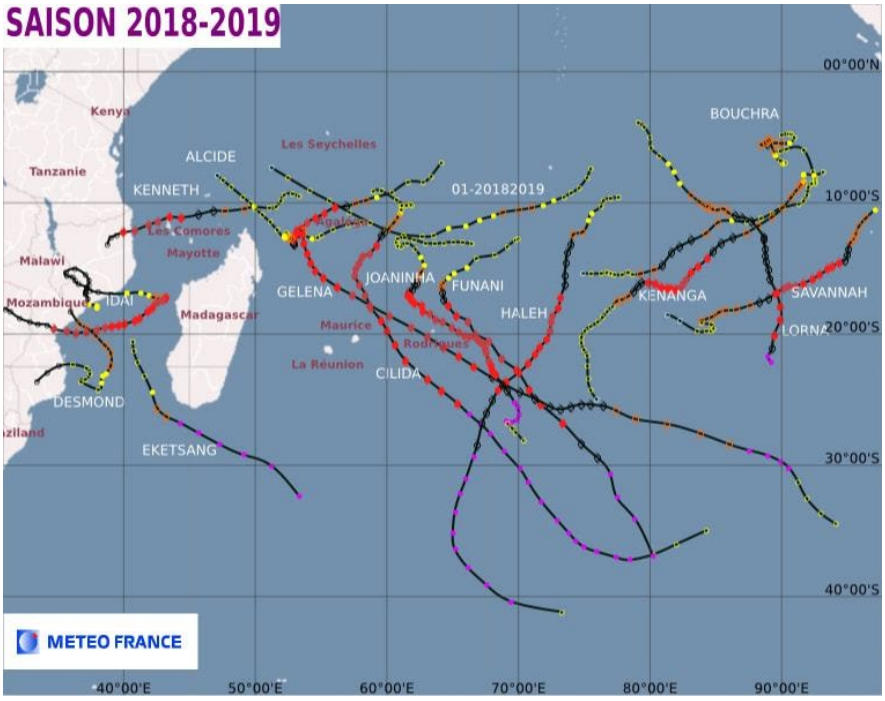


The history of activity and cyclonic variability in Mozambique.

Prior to the occurrence of Cyclone Idai,, it was already anticipated for the 2018-2019 cyclonic season cyclonic activity normal (10 cyclones) in the southwest Indian Ocean (SWIO) and the likelihood of two (2) occurring in the Mozambique Channel.



By the end of April 2019 of the present cyclonic season 2018-19, 14 systems (plus 4 off-schedule) had already been registered in the southwest Indian Ocean (SWIO) and 3 systems (plus 1 off-schedule) on the Mozambique Channel.



On 2 March, a low-pressure system formed on the northern end of the Mozambique Channel and on 4 March, it evolved into the tropical depression stage, making a path to the Upper Zambezia region.

Cyclone winds associated with IDAI cyclone affected the southern region of Zambezia province, the entire Sofala coast and the northern coast of Inhambane province. Following the cyclone's trajectory, heavy rainfall (over 150mm in 24 hours) accompanied by severe thunderstorms affected the northern districts of Gaza and Inhambane provinces, all Sofala province and part of Manica province.

As impact strong winds destroyed various infrastructures, on 14 March INAM issued a warning of very strong winds (Stormy), with speeds up to 180km per hour, with gusts that could reach 220km per hour, generating the sea turmoil, with swell up to 10.0m between parallels 17 and 23 degrees south.

Various impacts and consequences included direct and indirect economic, social and environmental impacts during and after the occurrence of IDAI cyclone in the affected and affected regions. These include: full stoppage of activities at Porto da Beira; above-average river flows; destruction of natural barriers exacerbates the effect of extreme events; problems with poor sanitation exacerbated; and an environment favorable for hatching of waterborne diseases

The following presentation was made by INGC and Aurecon, which focused on talking about Cyclones Iai and Keneth regarding response preparedness, the impacts, coordination, phases, assessments, early recovery, response summary. They also spoke about strengths and weaknesses, challenges and reflections.

Speakers said that prior to the occurrence of the cyclones, prepared to respond by reporting a national emergency, issuing a red alert for both central and northern regions, declaring a curfew and all services were closed. Prior to the arrival of the cyclone, Basic goods for humanitarian assistance were pre-positioned at strategic locations, Response team was mobilized and deployed to Pemba city.

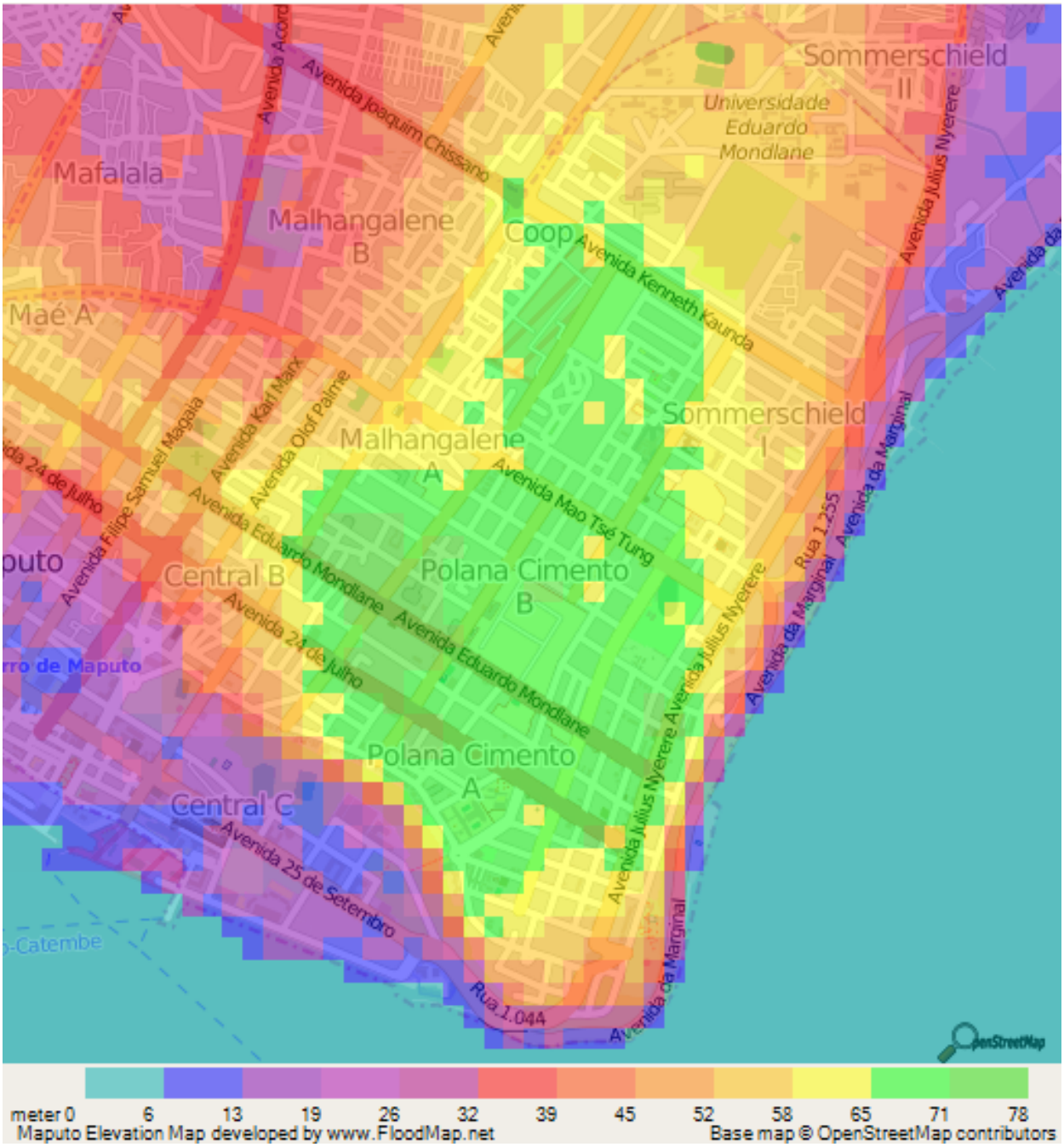
Of the impacts and consequences already mentioned above, which consisted of the shutdown of some activities, destruction of infrastructure, deaths, disappearances, occurrences of water diseases, destruction of cultivated crops. In terms of coordination before and after the occurrence, in order to give the humanitarian response in Mozambique, the response is led and coordinated by the Government through the National Institute of Disaster Management (INGC) and related emergency coordination mechanisms. This is supported by the Humanitarian Country Team (HCT), which is composed of UN agencies, international NGOs, Red Cross and donor representatives. The HCT is supported at the operational level by an Inter-Cluster Coordination Group (ICCG). As for the phases of operationalization, phase 1 was characterized by immediate life-saving operations consisting of search and rescue operations conducted by air, boat and road, including use of military and civilian assets, Focus on life-saving assistance packages, including food, shelter, water and medical assistance, standardized aerial

assessment in most affected areas. Phase 2 included a scaling up of the emergency response: continue life-saving assistance packages, including food, shelter, water, sanitation and hygiene (WASH) and medical assistance; cholera vaccination and malaria campaign; increasing focus on health, education, camp coordination & camp management; protection , nutrition and early recovery/livelihoods as well as return assistance; targeted assessments by air, boat and road to support implementation; and multi-sector rapid assessment finalized for TC Idai and Keneth. Phase 3 involved a continued scaling up of the response: full scale up across all sectors of response - moving to "hub and spoke" approach, particularly for hard to reach areas; identification of gaps in response; targeted and technical/cluster advises where needed (planned and ongoing); an early recovery planning for transition into stabilization phase.

Challenges constitute challenges: lack of access to funds to support the overall response; getting specific data to support decision-making; equipment and capacity building (logistics, information management, coordination, UNAPROC, CLGRC); involvement of the private sector for an adequate response; timely access to DRR Funds; both national and international.

Reflections included: reinforce the alignment of DRR issues in the main public policies; support and invest more in preparedness at all levels: national, regional, provincial and district levels; timely access to financial resources; and creation, training and capacity building for more INGC staff, at all levels, including the Local Committees for Disaster Risk Management (LCDRM: first responders to extreme events).

Finally, a group exercise followed by participants answering the following questions: In the event of intense rain what are the risk flooding areas of Maputo? What can be done to reduce the flood risk in order to help the population living in these areas? Is the Maputo drainage efficient? If no, what can be done to improve the drainage system in order to be able to accommodate the intense rain events?



Maputo Inundation Map