Maputo Third Learning Lab Report

Ponta de Ouro

5-6 February 2019

Compiled by

Hecralito Mucavele

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 Remarks

by Genito Maure

Genito Maure where he started by explaining the purpose of the Learning Lab, highlighting that it was an informal meeting and that each person could participate equally. He spoke about previous Learning Labs and the evolving of some participants ins previous labs and that some participants in this Lab would be new.

Dr Maure thanked everyone for the presence and participation and for having been able to travel more or less 120 km to the Ponta de Ouro and also thanked the presence of those who came from outside of Mozambique and that the trip took more or less 2000 to 5000 km until arriving in the city of Maputo. We welcomed all in name of Eduardo Mondlane University and also the name of the Maputo City Council as partners and on behalf of all those present opened the Learning Laboratory.

2. Introduction to Objectives and Goals of FRACTAL

by Genito Maure

In this session 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 the aims of FRACTAL is to bring together different water sectors and discuss the effects of climate change in these sectors, which is why there were several sectors from academia, researchers, decision-makers, NGOs in the Learning Lab. From the various engagements held in Maputo within the FRACTAL project, of the major constraints 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 of the city. Poor inter-institutional coordination and poor knowledge sharing was also found to be an issue in the City.

3. The Maputo Water Supply system: dam to distributor

by Piotr Wolski

This session was intended to discuss the history of the water cycle, from the cloud to the tap. This exercise tries to portray how the system works in general and give the perspective of the various forms of distribution, involving both physical and social components. In groups, participants tried to design the process of water distribution from the Pequenos Libombos Dam to the consumers in Maputo, Matola and Boane. Finally, a representative of each group presented the results of the activities, in plenary, as follows:

Group 1:

Figure 1: Group 1, Representation of water cycle from the Pequenos Libombos Dam to the consumers in Maputo, Matola and Boane.

For this group, the water cycle starts from the dam that receives water coming from the rainfall as drops. Afterwards, the dam water is sent to the Water Treatment Station (ETA). Here it is treated and pumped to conductors, for distribution, as drinking water. The distribution centers are located in Boane, Belo Horizonte, Matola Rio, Machava, Tsalala, Chamanculo, Maxaquene, Alto Mae, while the Laulane distribution center uses surface water. Here the group demonstrates the use of underground water from a grid of wells that is then raised to the reservoirs and distributed to consumers located in Vila Olímpica, Zona verde, Intaka, all located in the northern surroundings of the metropolitan area of Maputo City - this is where most of the new urban developments are taking place (Figure 1).

Group 2:

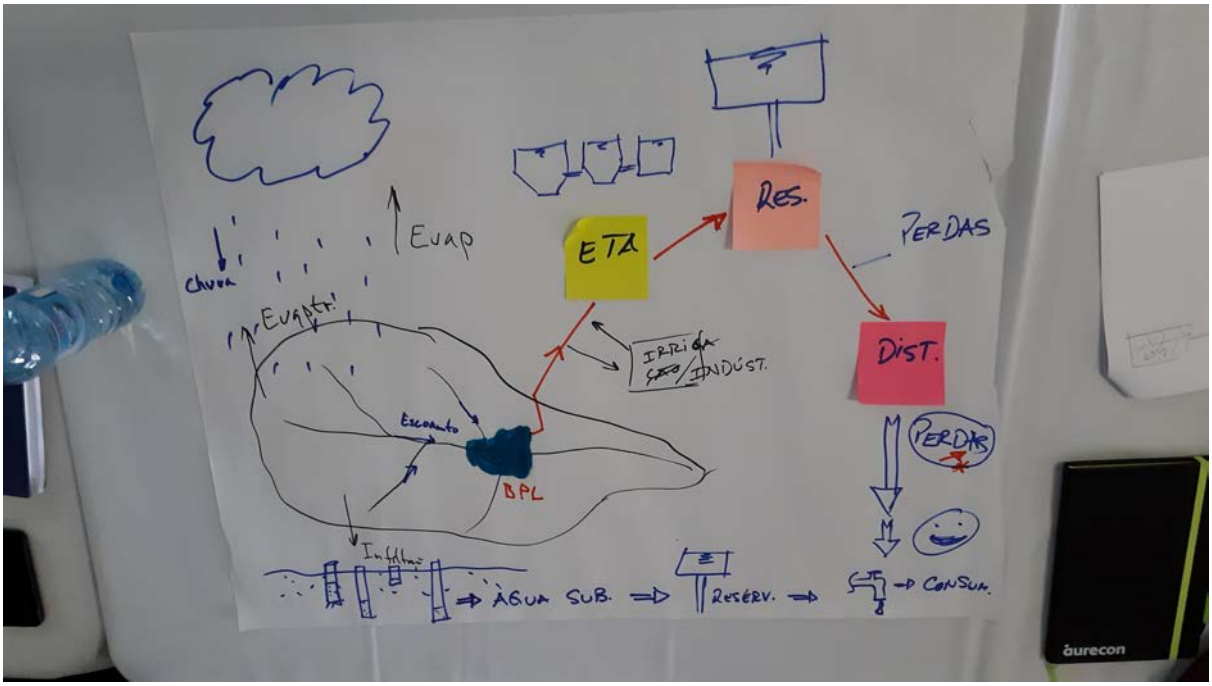


Figure 2: Group 2, Representation of water cycle from the Pequenos Libombos Dam to the consumers in Maputo, Matola and Boane.

The process begins by precipitation, evaporation before reaching the basin as well as evapotranspiration. In the sketch, they also included surface runoff, infiltration in the soil and subsoil to feed the aquifers, and a grid of wells. The surface water is stored in the small bogs dam after it is taken to the Water treatment station (ETA). In the process, water is used for irrigation and for the water industry from the dams. The water passes through reservoirs, stored and distributed to the region of Maputo. During the process, there are losses of water in the distribution network before it finally reaches consumers.

Group 3:

Here the process starts with precipitation, evaporation, evapotranspiration. Once water reaches the dam, it is used to irrigate the crops and provide water for consumption by animals before the remaining water reaches the ETA. A new item in the group is the electricity generation component, which is highlighted at the dam (Figure 3).

Figure 3: Group 3, Representation of water cycle from the Pequenos Libombos Dam to the consumers in Maputo, Matola and Boane.

Summary

In this activity it was verified that during the process the components involved in the process of the water cycle are of physical and social nature, the animals, humans, plants, relief, mountains, plains, catchment, interconnection between them.

The management of energy (electricity) production is also relevant because the water distribution system also needs energy (electricity) for its operation. During the process it must be ensured that the water that is generated is distributed to the consumers. There is the possibility that within the system water can be contaminated by fertilizers given the existence of agricultural activity near the dam.

It is important that unpolluted water reaches the consumer. It has been observed that that during the process of water flow, there is damage and sabotage of the network and consecutive losses of water and again contamination contributing to the emergence of water-borne diseases as well as economic and financial losses.

4. The Maputo Water Supply system: dam to distributor

by Dianne Scott & Genito Maure

In this session, based on the results obtained and presented in the previous session, the exercise consisted in identifying the different water institutions (water actors) who make decisions and water users, focusing on three aspects:

1. Decision making in the past,
2. Decision-making in the present, and
3. Operational and decision-making in the future / planning 5-10 years.

There are many stakeholders – but they do not take decisions by themselves.
Having many stakeholders means that some policies are not complied with.

Group 1:

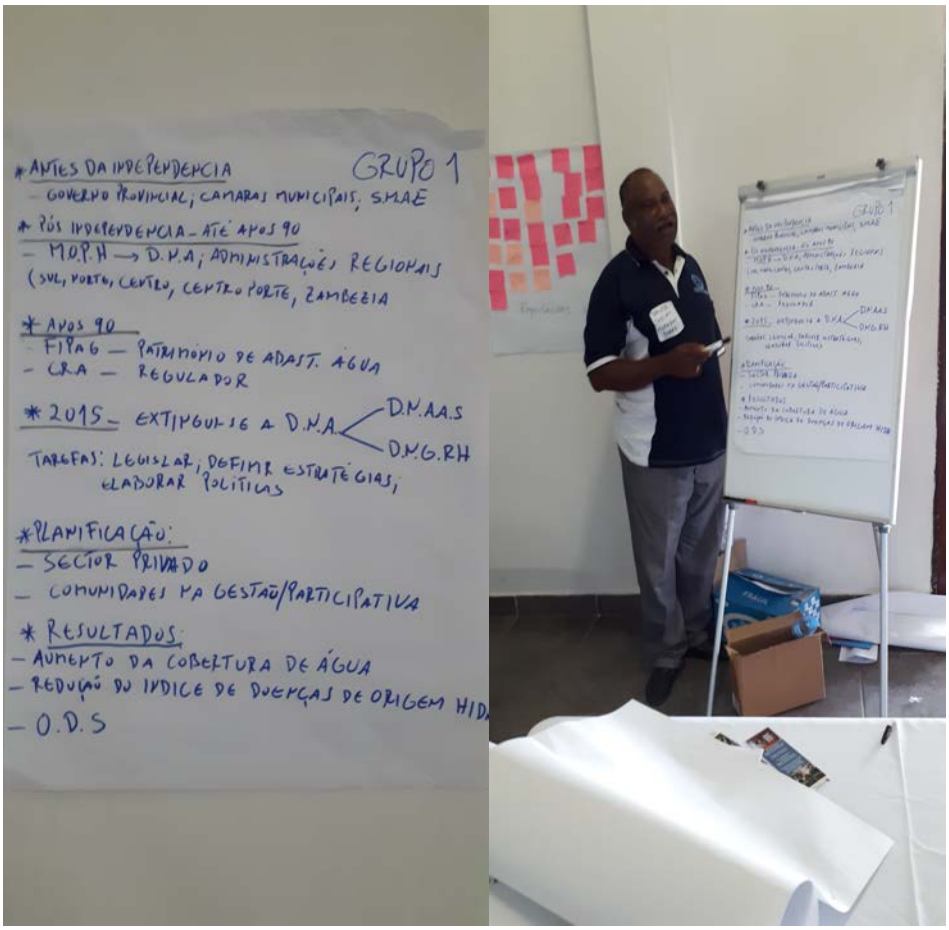


Figure 4: Group 1, Presentation of key actors in water decision-making in the past, present and future.

Prior to Mozambique's independence in 1975 decision-making in the water sector was once a province-wide responsibility as Mozambique was considered an overseas province of Portugal (the colonial government), and at the level of municipal chambers through municipal water and energy services (Figure 4).

After independence until the 1990s, decision-making was carried out at the national level by the Ministry of Public Works and Housing (MOPH), the National Water Directorate (DNA), and at the regional level by the North, Central and South regional administrations. 90 due to population growth management and decision-making in the water sector was made by FIPAG and CRA as regulator. in 2015 DNA is extinguished and the National Directorate for Water Supply and Sanitation (DNAAS) and the National Directorate of Water Resource Management (DNGRH) appear as decision-makers whose tasks are to legislate, define strategies and develop policies.

The planning includes the above sectors, the private sector, NGOs, participatory management communities. As a result, there is an increase in water coverage, a reduction in the index of water-borne diseases.

Group 2:
At present and operationally, FIPAG is a decision-making body that is a distributor of water at the urban level, ARA-Sul hydrological resource manager, AIAS distributor at the rural level, DNGRH strategic manager of water resources, AdeM distributor at urban level, CRA, as a regulator, also has private operators with water holes, and the latter work in coordination with the Water Research Institute (IIA) in the research, DNAAS and the National Institute of Calamities Management (INGC). In planning decision makers are MOPHRH and FPAG. (See Figure 5).

Group 3:
In the past the manager and decision maker in the water sector, was MOPH. Today this is called MOPHRH, through SMAE, DNA, ARA, DNAAS, FIPAG and AIAS.

The role of the National Water Council, made up of the technical committee of water, through finance, health, irrigation, environment and energy sectors, is highlighted here. Decision-making is made through legislation to highlight the Water Act of 199, water policies of 2007 and 2016 and National Strategy for the Management of Water Resources of 2018 (see Figure 6).

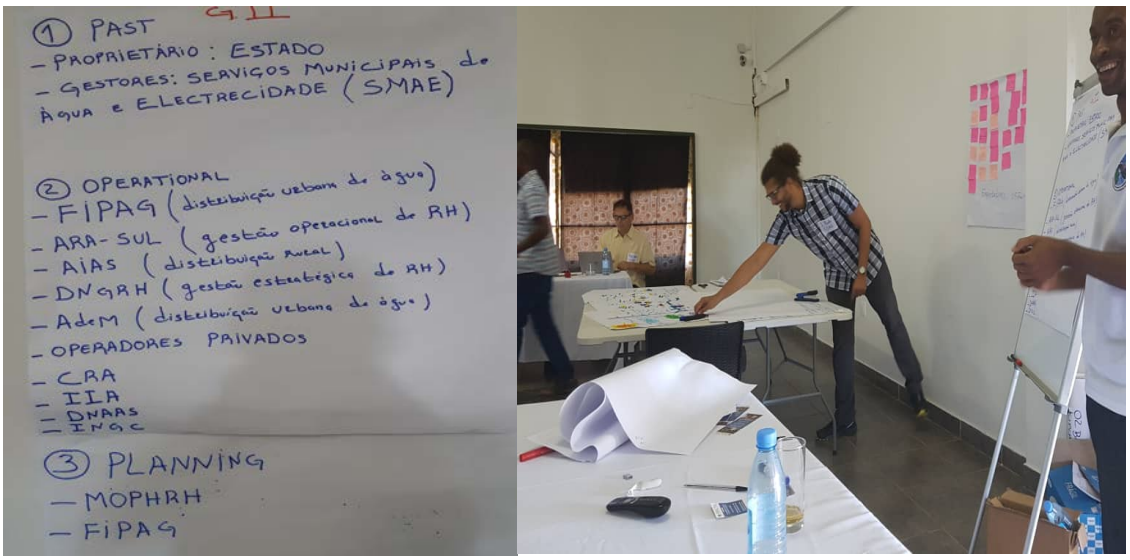


Figure 5: Group 2, Presentation of key actors in water decision-making in the past, present and future.

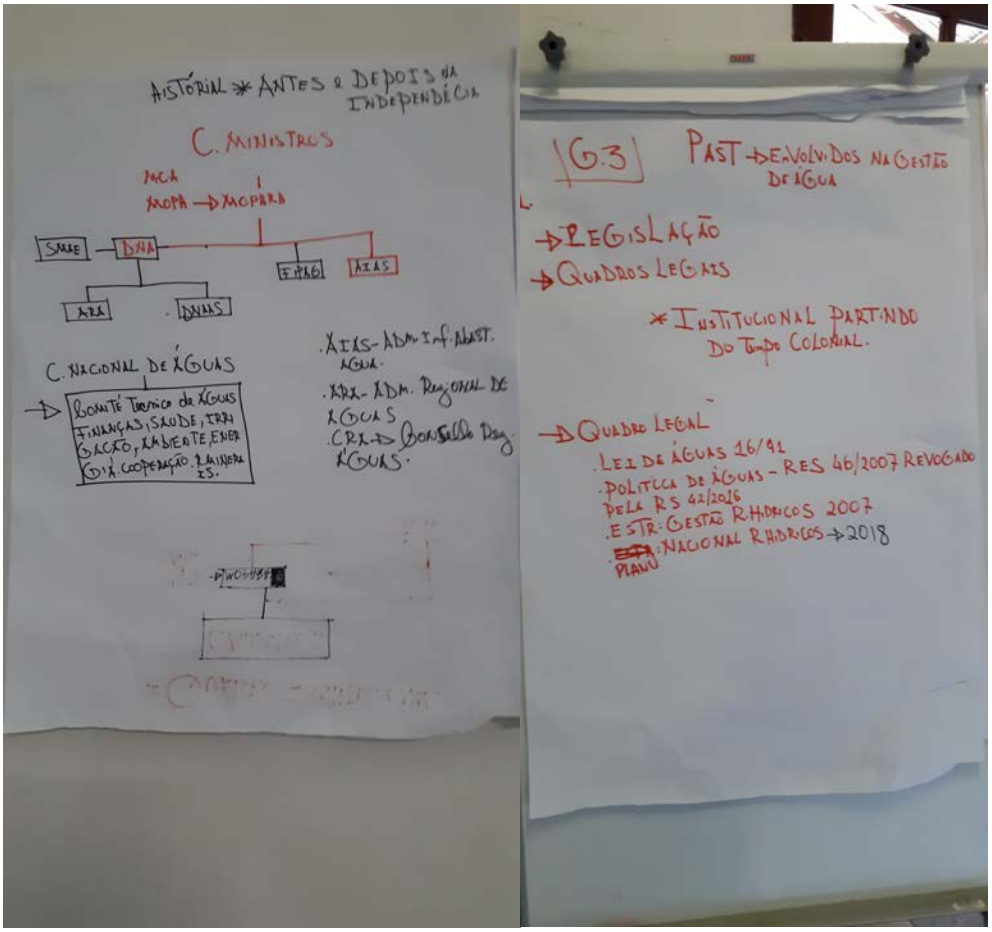


Figure 6: Group 3: Presentation of key actors in water decision-making in the past, present and future.

5. The Journey of the Drop of Water - Dam to distributor under climate change

by Piotr Wolski & Genito Maure

The objective of this session was to provide a quick recap of the climate narratives, focusing on the climate but not the Business-As-Usual and Transformative Decision-making sections. Each group had to answer the questions from the previous session to overlay the narrative onto their water drop journey, and to think about how this might change the process and functioning and answer in what decisions need to change and why. To facilitate the process, groups were asked to think of problems associated with water distribution that are a) non climate-related in cause b) have a climatic cause. The groups reported the following:

Group 1:
Non climatic problems
Increase in population
Obsolete infrastructure
Insufficient human resources
Lack of institutional capacity

Problems caused by Climatic factors
Change in precipitation patterns
Frequency of extreme events (example decrease or drastic increase of temperature and precipitation)
Consecutive days with high temperatures
The lack of supply of energy to the treatment stations and reservations.

Group 2:
Non climatic problems
Lack of operational capacity
Increased water demand
Lack of water supply infrastructure

Problems caused by Climatic factors
Climatic
Rain scarcity
Cyclones
Saline intrusion into coastal areas and waterways

Group 3:
Non climatic problems
Water pollution
Increase in consumption of water
Vandalization of the water network.

Problems caused by Climatic factors
Low precipitation
High water consumption due to temperature rise
increased evaporation and evapotranspiration

Group 4:
Non climatic problems
Poor use of existing policies and legislation
Low perception of the contingency plan applied at the time of emergency
Lack of institutional coordination

Problems caused by Climatic factors
Drought
Inundation
Temperature increase

Group 5
Non climatic problems
Poor sanitation and drainage
Lack of infrastructures for water retention
Water leaks and obsolete infrastructure

Problems caused by Climatic factors
Drier climate
Saline intrusion
Floods

Summarizing the above answers, Piotr said that we should look at these problems differently. If we ask ourselves why these problems happen, what would be the answer? If we look at cyclones - it is not like they have never happened before or there is no history of them. Cyclones were always happening, but now they bring more problems, damage since there are now extensive infrastructure that can be damaged, there are many more people in the cities. It has always been a problem but now a bigger problem for some reasons, e.g. because we have large number of people and larger expensive infrastructure that can break. From water point of view – we have a drainage system that is inadequate for the new size of the city and amount of water.

Droughts – is our system designed so that it can survive the drought? Droughts have also always been here but are now they are perhaps more frequent. Why haven't we designed our cities to cope with this?
Population growth was always predicted and yet the water supply system has become inadequate.
All these issues are all intertwined. The human, natural, cultural systems are intertwined. We are at the centre of this as we have to anticipate changes when we see effects.

A discussion was held with participants, and key points are summarized below.

Maputo has many days without water This water scarcity is only partly because of lack of rainfall. Because of the high demand, the water supply system that is supposed to provide for the demands of the city and its region cannot supply adequate amounts of water.

The important thing is that if the plan wasn't right to cope with the demand under current (or historical) climate, we don't want to repeat same problem now. We have to look ahead to the future. Awareness of Climate Change has to be at every stage of decision-making. Another participant noted that Climate Change is a reality and water scarcity is a reality, and any planning we do is still business-as-usual. We have to have a new vision which incorporates climate change into decision-making.

Another participant raised the question of being able to interpret these phenomena – people don't understand climate change information because it is too technical. We know that Boane, Matola and Maputo all depend on one source so why didn't government plan for these 3 cities. Why didn't we plan ahead? We make our plans when the problem has already arisen.

We have a lot of water but a lot of it is too salty so we should consider desalination for human consumption. Other countries that have no sea water have made their own plans.

With all these problems, we can identify the underlying factors, e.g. financing. If we had unlimited funding, we could do what want. There is also politics as well as many reasons why plans have not been implemented. One of these reasons is institutional fragmentation.

Day 2: February 6th 2019

6. Interactive recap of day 1

by Dr Mawanda Shaban

- He spoke of the effects of climate change, fractal design and hydrological cycle,
- The exercise of the water cycle and the impact on the climatic changes,
- New subjects related to water, the acronyms CRA and ETA,
- Climate change as a reality and the water cycle,
- He perceived different institutions related to the water sector,
- There was much talk about water supply and little about sanitation,
- Sectors of water supply and water cycle,
- Running water in the past, present and future
- work more on legislation,
- Fractal committed to the decision-making process,
- The design of the water distribution network,
- Past, present and future of decision-makers in the water sector,
- Water cycle and responsibilities of each sector in every process,
- Floods as a result of the climatic event

7. Case study: the Cape Town drought

by Dr Piotr Wolski

In this session we talked about the experience of Cape Town with regard to the problems of water scarcity, with the purpose of sharing this experience with the participants as the City of Maputo may experience the same problems. According to the speaker, the water crisis in Cape Town is a very relevant problem, being a big city, which did not expect a crisis. The water crisis in the city of Cape Town is different from the crisis in Maputo due to several natural physical factors but the constraints are similar. The importance is therefore to share the experience of the City of Cape Town with Mozambique (Figure 7a). Dr Wolski's presentation is available for download here.

Figure 7a: Dr Wolski presenting the experience of the CCT's drought

8. Climate information for water systems planning and decision making

by Piotr Wolski

In this session, the speaker focused on the physical context of the crisis in Cape Town, the level of collaboration with the City of Cape Town (CCT) in the management of water, and the water oscillations felt from 2008 to 2018.

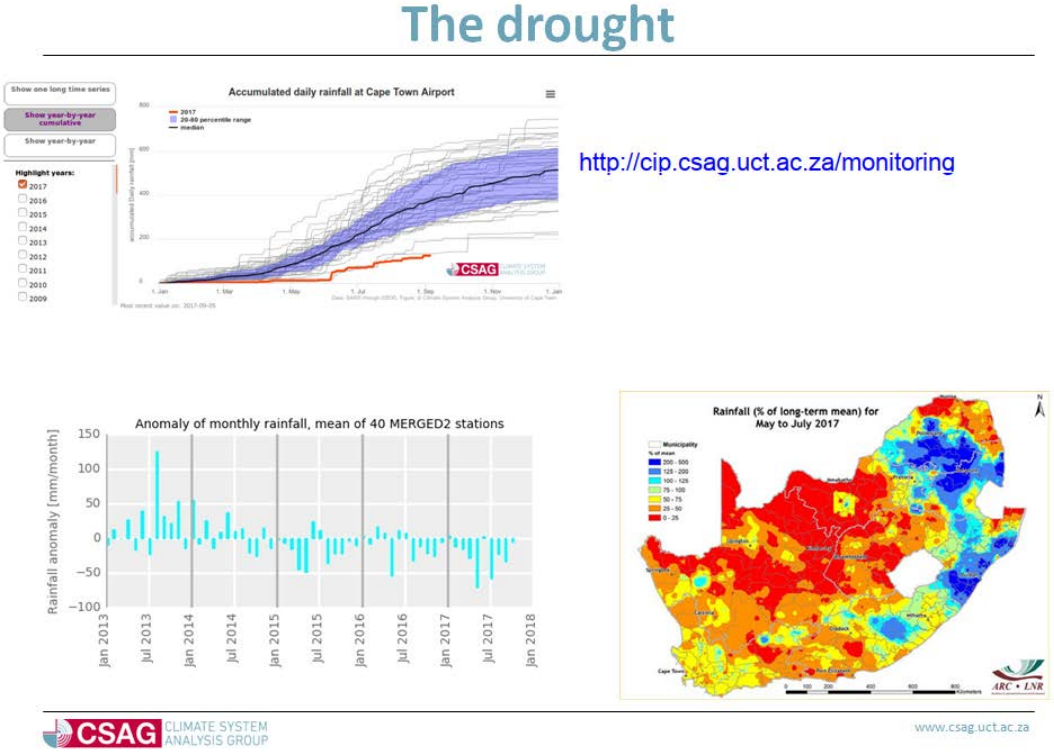


Figure 7b: Slide from the presentation illustrating the magnitude of the Cape Town drought

He described water supply system in Cape town that can feed 4000 million people and was designed at 98% assurance level, i.e. that should provide uninterrupted water supply 98 out of 100 years. He illustrated historical rainfall variability, and severity of the 2015-2017 drought (Fig. 7b). That drought was of a magnitude expected to occur 1 in 300, to 1 in 400 years, and thus it exceeded the coping capacity of the water supply system. He also presented future precipitation and temperature projections in Cape Town. Those projections indicate tendency for lower precipitation in Cape Town region. He distinguished between the drought, and the resulting water crisis, and spoke of factors that lead from one to the other. Those factors included delays in implementation of planned water supply system expansion, poor skill of seasonal forecast, poor response of water managers and decision-makers to emerging water shortage and late introduction of water restrictions.

At this point the speaker also spoke of some tools used in Cape Town for decision-making in the water sector, he also spoke about the role of scientific research in addressing the water crisis from a planning perspective. He spoke of the development of data access tools to provide information to the population about the current state of water resources and drought. He has stressed that such information is a necessary prerequisite to build a better understanding of the crisis, and thus creating a better response in adhering to restrictions and using water rationally.
Finally, Piotr has shown a rainfall monitoring web site similar to that one developed for Cape Town, set up for Maputo. The information presented in it (Figure 7c) clearly illustrated the current and ongoing drought (if there is one, of course).

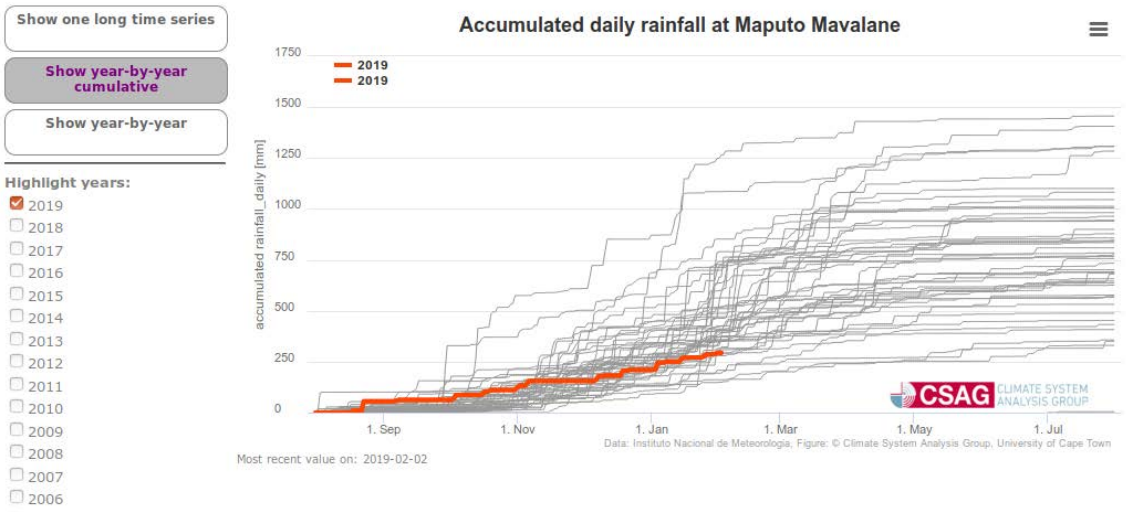


Figure 7c: Screenshot of a rainfall monitoring tool set up for Maputo

Dianne Scott presented some information of the Day Zero campaign of the city. Day Zero is defined as 'the day when the taps would stop flowing". This idea evoked the threat of the total breakdown of the water supply system. The campaign to talk about the end of water in the city as Day Zero resulted in many scientists and others writing about "water facts"; claims that the water was a common good and belonged to everyone; social activists fighting against water privatisation; municipal responses and public panic.

The responses of the CCT were:

Reinforcing the Water Demand Management (WDM) approach (water is a commodity not a public good); increasing tariffs; the lowering of water pressure; the installation of Water Management Devices – 6000 per month; publishing a Water By-Law Amendment to increase water tariffs which was rejected. It was predicted that by early April that the dam levels will drop to 13.5 m, and this was to be the date of Day Zero.

It was concluded that the greatest reduction in water use was when the CCT disaster plan was released and the Day Zero campaign began and not when restrictions were imposed.

9. Forums, Collaboration and Information Sharing

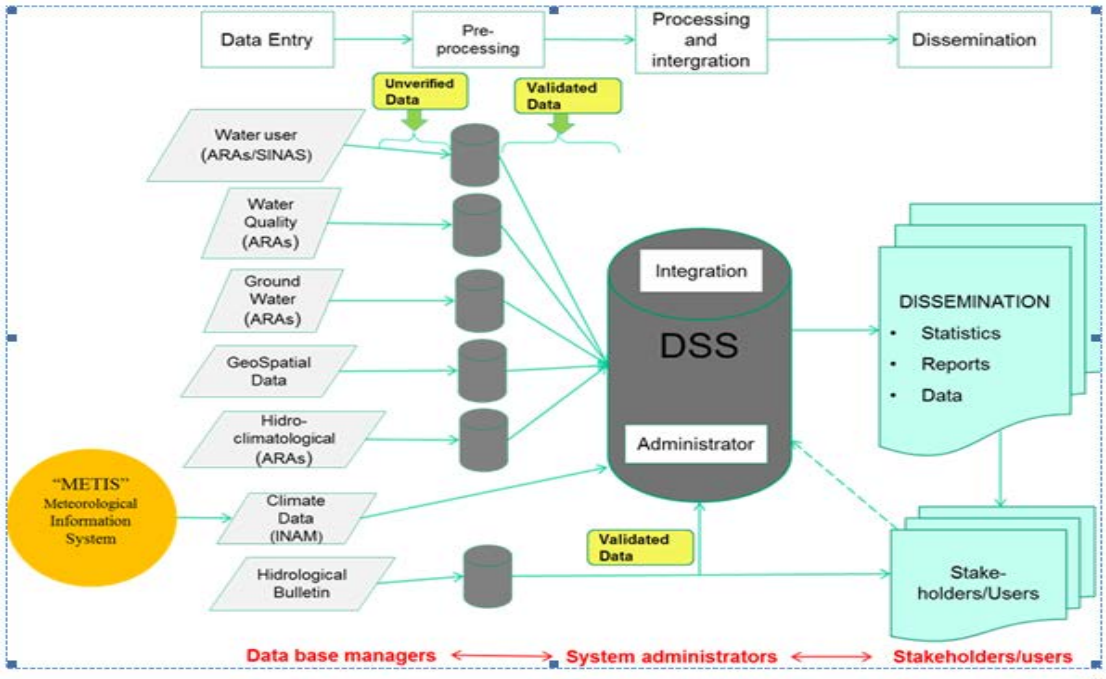
by Sergio Machava

Dr. Machave, a representative of the Water Research Institute of Mozambique, presented on the existing forums and information sharing in the water sector (Figure 8). See his full presentation here. The presentation concludes by stating that some information is unavailable, and that which is available is not shared among sectors. He also highlighted the poor knowledge sharing among sectors, and the need for better coordination. From the materials presented, some of the participants said they have never heard of some of

the forums and have never participated in any related event. Those who have participated in some of the meetings do not have a single report from the meeting; rather each of the participants drafts his/her own report to present at his/her institution.

Dr Machave presented a Decision-Support System model that could be following to archive and share information related to water (Figure 9).

Figure 8: Dr Sergio Machave presenting the sharing of information through existing forums.



:Figura 6.4-1> Diagrama esquemático para SGIA (Sistema de Gestão de Informação da Água)

Figure 9: Diagram showing a Decision Support System to collect information on water.

There are two main forums:

1. FNAC - Mozambican water platform (PLAMA). PLAMA meets quarterly. PLAMA organise an annual conference – it is a platform for water organisation
2. MASC - Another group that deals with issues related to the crisis

There was a lot of debate and discussion regarding the forums. It was reported that there are no minutes of these forums and those who attend need to share the minutes.

9.1. Discussion of Short-Term Solutions in the Water Sector.

by Genito Maure

Figure 10: Dr Maure discussing the short term solutions to water problems

This session was not foreseen in the programme and arose after the presentation of the previous session on water forums where it was more than clear that there is a lack of collaboration between the different water sectors. This fact that was quoted in the National Water Resources Management Strategy of 2018 that provides for long-term

solutions 2040. In this way the participants sought to know how FRACTAL can help solve these problems in the short term.

The position of the facilitators was that those who have these solutions are the participants and that FRACTAL cannot interfere directly in their activities, but FRACTAL prepares the Learning Lab for the participants together and open their minds about the problems in the sectors and in a joint way help in some possible solutions.
For this purpose, participants were asked to work in groups to discuss short-term solutions in the water sector, taking into account the experience of each and taking into account also the presentation made by the representative of the Water Research Institute.

Group 1:

Figure 11: Group 1 presenting water problems, solutions and institutional responsibility

Problems	**Solutions**	**Responsibility**
Change Of Rainfall Regime	Mitigation And Adaptation Actions And Information For Planning Water Resources	INAM
Insufficiency Of Water Retention Infrastructures	Prioritization Of The Construction Of Hydraulic Infrastructures	MOPHRH
Irrational Use Of Water	Awareness And Education Programs	CMM/MEDH
Population Density	Improve Land Use Planning And Planning	MITADER/CMM
Urbanization Without Planning	Improve Land Use Planning And Planning	MITADER/CMM
Lack Of Authority To Implement Legislation	Taking Local Action With Community Involvement	MAEFP/CMM

Group 2:

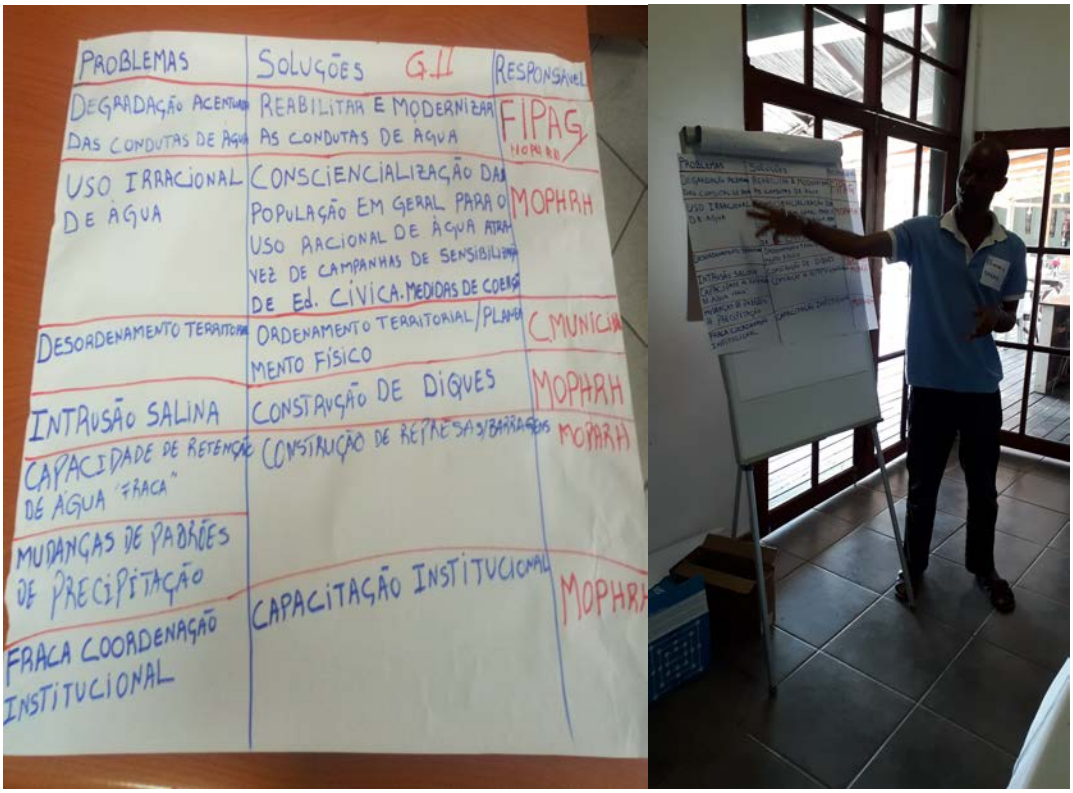


Figure 12: Group 2 presenting water problems, solutions and institutional responsibility

Problems	**Solutions**	**Responsibility**
Degradation Of Water Pipes	Rehabilitate And Modernize Water Pipes	MOPHRH/FIPAG
Irrational Use Of Water	Awareness Of The Population	MOPHRH
Territorial Disorder	Territorial Planning And Physical Planning	CMM
Salt Intrusion	Construction Of Barriers	MOPHRH
Poor Water Holding Capacity	Construction Of Dams And Dams	MOPHRH
Change Of Precipitation Patterns	Construction Of Dams And Dams	MOPHRH
Weak Institutional Coordination	Institutional Training	MOPHRH

Group 3:

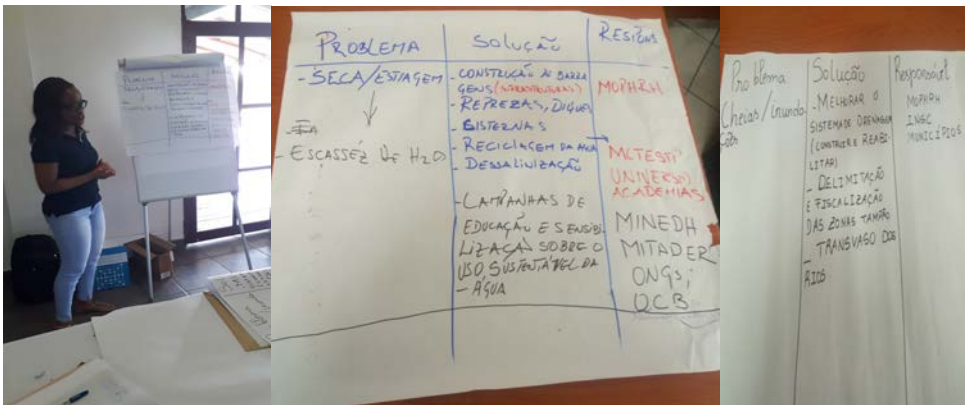


Figure 13: Group 3 presenting water problems, solutions and institutional responsibility

Problems	Solutions	Responsibility
Dry / Water shortage	• Construction Of Dams • Construction Of Cisterns • Water Recycling • Desalination • Education And Awareness Campaign • Sustainable Use Of Water	• MOPHRH • MCTESTP • Academy/Universities • MINEDH • MITADER • NGOs • OCB
Floods	• Improve drainage system • Delimitation and supervision of buffer zones	• MOPHRH • CMM • INGC

10. Reflections

Team Reflections after Day 1:

What we think is not so good

1. No solutions
2. Exercise has to be better structured
3. Time management
4. More participation needed
5. Some games should be quicker to manage time
6. We need better time management during the intervention of the participants
7. There needs to be more debate in relation to water and climate change
8. We need to document that there are policies, and they are not being implemented
9. The solution plans are not implemented
10. Bad perception of participants views of water sector
11. Lack of solutions in some cases
12. We need to correct the fact that government is applying for GCF projects
13. Lack of deep discussion of problems – only superficial - too fast

14. Time management for the discussion of the topics – time too short
15. More explanation needed about water losses
16. Would like governance to more explicitly discussed

The good things are:

1. Discussion is very rich
2. There is much sharing of knowledge
3. Lot of interaction
4. Sharing of experiences
5. Need to maintain river flow to stop salt water intrusions
6. Physical exercise good
7. "Mountain to distribution" exercise was good
8. They all learnt the water system, the actors involved and obtained a better understanding of climate change
9. Great debate taking place
10. Interactions between presenters and participants good
11. Sharing of ideas
12. Mapping of water cycle great learning
13. There is the opportunity to work with people from different sectors
14. I had to learn different things and had to meet different people
15. Good interaction between actors and participants
16. I like methodology of water cycle and group work
17. The details about the water distribution were clear
18. Floods, droughts and cyclones are not exactly a problem
19. Good discussion and group work
20. I like to know more about the hydrological management and like to learn more about the water cycle
21. We know more about the problems and solutions
22. Participation of the participants
23. Good group dynamic
24. Programme
25. Good facilitation
26. Relations between climate change and the water system
27. Learn about the water distribution to distribution – water cycle exercise was excellent
28. The lack of water supply can be socially constructed – all agreed
29. Good interactions between facilitators, participants and energisers

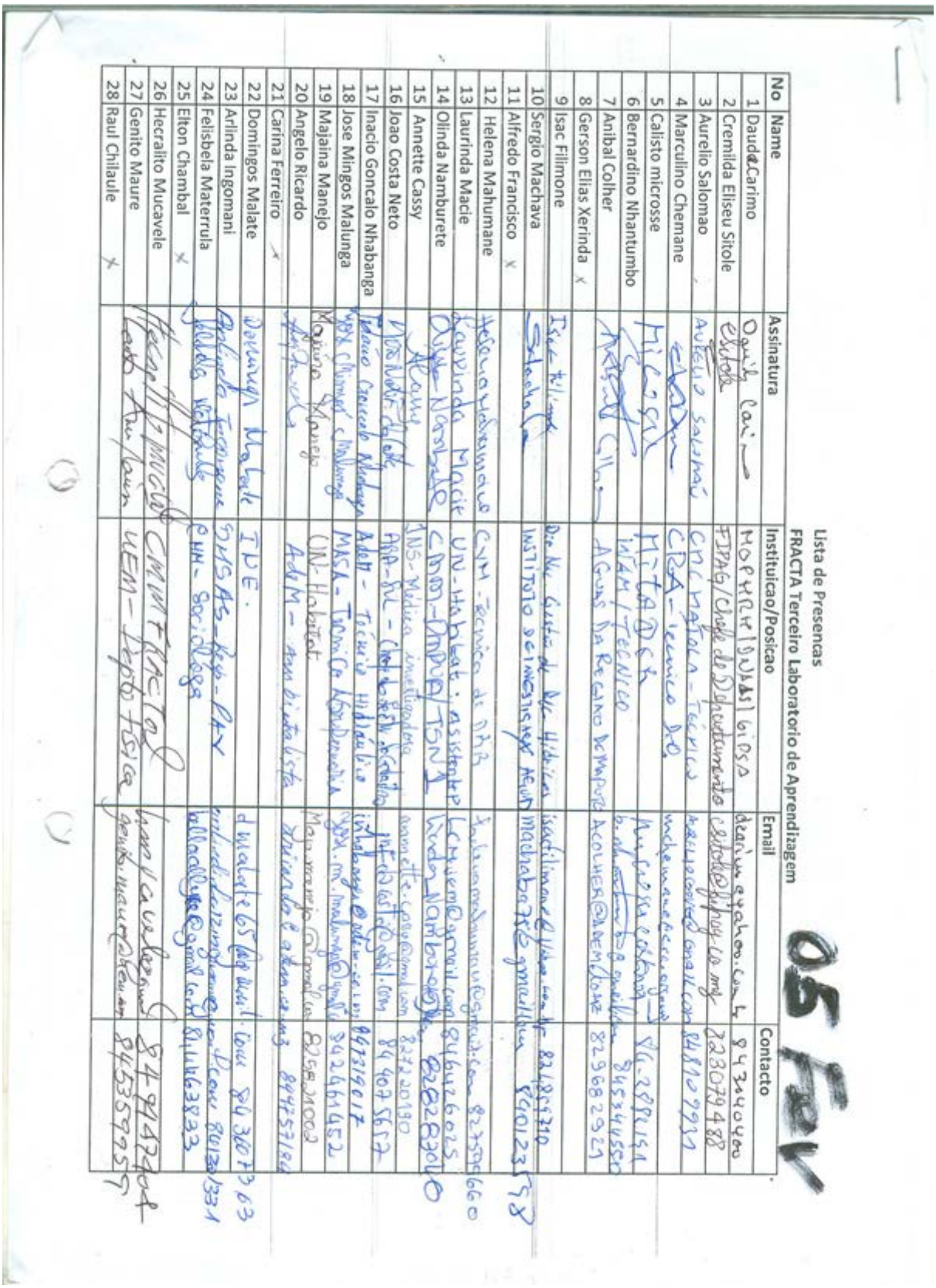
APPENDIX 1: AGENDA

Agenda

Future Resilience for African Cities and Lands (FRACTAL) Project
Maputo Third Learning Lab
Ponta de Ouro, Kaya Kweru Resort
February 2019, 05-06

Time	Session	Facilitator
DAY 00	**04 February afternoon departure to Ponta de Ouro**	**Hecralito**
DAY 1: February 05, 2019		
Morning: Opening Plenary session		
08:30-09:00	Registration & Tea/Coffee	
09:00-09:15	Official Welcome by Mr. Luis Nhaca, Maputo Council, City of Maputo	
09:15-10:00	Introductions & energizer	Mawanda Shaban
10:00-10:30	Setting the scene - FRACTAL update & objectives of the day	Genito Maure
10:30-11:00	Tea & Coffee	
11:00-13:00	Setting the Scene - The Maputo Water Supply system: dam to distributor	Genito Maure & Izidine Pinto
13:00-14:00	Lunch	
Afternoon:		
14:00-15:00	The Journey of the Drop of water - Business as usual: Dam to distributor	Dianne Scott & Genito Maure
15:00-15:30	Energizer	Mawanda Shaban
15:30-16:30	The Journey of the Drop of water - Dam to distributor under climate change	Piotr Wolski & Genito Maure
16:30-17:00	Day 1 reflections and closure	Mawanda Shaban
DAY 2: February 06, 2019		
08:30-09:00	Arrival, tea & coffee	
09:00-09:30	Interactive recap of day 1	Mawanda Shaban
09:30-10:30	Case study: the Cape Town drought	Piotr Wolski
10:30-11:00	Tea & Coffee	
11:00-13:00	Climate information for water systems planning and decision making	Piotr Wolski
13:00-14:00	Lunch	
14:00-15:00	Forums, Collaboration and Information Sharing	Sergio Machava
15:00-15:30	Looking forward; what's next and beyond	Genito Maure
15:30-16:00	Reflection, Evaluation & Closure	Genito Maure & Mawanda Shaban
17:00	Departure to Maputo	

APPENDIX 2: ATTENDANCE LIST



Lista de Presencas

FRACTA Terceiro Laboratorio de Aprendizagem

No	Name	Assinatura	Instituicao/Posicao	Email	Contacto
1	Daud&Carimo				
2	Cremilda Eliseu Sitole				
3	Aurelio Salomao				
4	Marculino Chemane				
5	Calisto microsse				
6	Bernardino Nhantumbo				
7	Anibal Colher				
8	Gerson Elias Xerinda	x			
9	Isac Filimone				
10	Sergio Machava				
11	Alfredo Francisco	x			
12	Helena Mahumane				
13	Laurinda Macie				
14	Olinda Namburete				
15	Annette Cassy				
16	Joao Costa Neto				
17	Inacio Goncalo Nhabanga				
18	Jose Mingos Malunga				
19	Majaina Manejo				
20	Angelo Ricardo				
21	Carina Ferreiro	x			
22	Domingos Malate				
23	Arlinda Ingomani				
24	Felisbela Materrula				
25	Elton Chambal	x			
26	Hecralito Mucavele				
27	Genito Maure				
28	Raul Chilaule	x			

29	Izidine Pinto	Izidine Pinto	UCT	izidine@csag.uct.ac.za	0223165492
30	Piotr Wolski	[illegible]	UCT	wolski@csag.uct.ac.za [illegible]	[illegible]
31	Dianne scott	Dianne Scott	UCT	dianne.scott, dbh@ [illegible] .com	0766[illegible]552
32	Paulo Lehener Júnior	[illegible]	AURECON	Paulo.LehenerJunior@ [illegible]	082855 (27 +)
33	Mwanda Shaban	[illegible]	Red Cross Red Crescent Climate Centre	Mwanda@climatecentre.org	844997790
34	Pedro Qeha				+256 772579644
35	Abel Mavie	Abel Mavie	TRADUTOR	abelmavie@gmail	8444038 78
36	CARLA H.D.P. [illegible]	[illegible]	[illegible]/ DINAB / DHC	CHARINA@GMAIL.COM	843098986
37					
38					
39					
40					

27, 4

DAY. 2

Lista de Presencas

FRACTA Terceiro Laboratorio de Aprendizagem

lo	Name	Assinatura	Instituicao/Posicao	Email	Contacto
1	Daudo Carimo	Daude Carimo	MOPHRH/DNAAS/GIPSA	dcarimo@yahoo.com.br	843040400
2	Cremilda Eliseu Sitole	CSitole	FIPAG-Chefe de Departamento	csitole@fipag.co.mz	823079488
3	Aurelio Salomao	Aurelio Salomão	CMCMATOLA - VPTU	[illegible]	849109537
4	Marculino Chemane	[illegible]	CRA/Tecnico D.O.	mchemane@cra.org.mz	823181480
5	Calisto microsse	Micosse	MITADER	[illegible]	[illegible]
6	Bernardino Nhantumbo	Bernardino	INAM	b.nhantumbo@gmail.com	845344550
7	Anibal Colher	Anibal Colher	ADEM	ACOLHER@ADEM.CO.MZ	829682921
8	Gerson Elias Xerinda				
9	Isac Filimone	Isac Filimone	Dir. Nac. Gest. Rec. Hídricos	isacfilimone@yahoo.com.br	824859710
10	Sergio Machava	[illegible]	IIA - MCTESTP	machabas@gmail.com	840123598
1	Alfredo Francisco				
2	Helena Mahumane	Helena Mahumane	CVM/Técnica DRR	helenamahumane@gmail.com	827599660
3	Laurinda Macie	Laurinda Macie	UN-Habitat	Lcm.vem@gmail.com	846426025
4	Olinda Namburete	[illegible]	INS	annnette.cassy@gmail.com	827220190
5	Annette Cassy	Olinda Namburete	CMM/DMPVA	Linda.Namburete@yahoo.com	[illegible]
6	Joao Costa Neto	[illegible]	AGP-DI/Chefe do Gabinete	infalcosta@gmail.com	894075657
7	Inacio Goncalo Nhabanga	Inácio Gonçalo Nhabanga	Adm. da Região de Maputo	inhabanga@adem.co.mz	847319017
8	Jose Mingos Malunga	José Mingos Malunga	MASA-INIR	jos.m.malunga@gmail.com	842461452
9	Majaina Manejo	Majaina Manejo	UN-Habitat	[illegible]@gmail.com	8258[illegible]2
0	Angelo Ricardo	[illegible]	AdeM	aricardo@adem.co.mz	844757184
1	Carina Ferreiro				
2	Domingos Malate	Domingos Malate	INE	dmalate65@gmail.com	843607736
3	Arlinda Ingomani	Arlinda Ingomani	DMSAS-DSP	[illegible]@gmail.com	84[illegible]
4	Felisbela Materrula	Felisbela Materrula	CMM-DMPVA	bellally@gmail.com	844463833
5	Elton Chambal				
6	Hecralito Mucavele	Hecralito Mucavele	FRACTAL	[illegible]@gmail.com	849447404
7	Genito Maure	[illegible]	UEM - PI FRACTAL	genito.maure@uem.mz	845359959
8	Raul Chilaule				
29	Izidine Pinto	Izidine Pinto	UCT		0766463542
30	Piotr Wolski	[illegible]	UCT		
31	Dianne scott	DScott	UCT		
32	Paulo Lehener Júnior	[illegible]	AURECON	PAULO.LEHENERJUNIOR@AURECONGROUP.COM	844997790
33	Mwanda Shaban	[illegible]	RCCC	Mawanda@climatecentre.org	+256772579641
34	Pedro Qeha				
35	Abel Mavie	[illegible]	TRANSLATOR	abelmavie@gmail.com	844403878
36	Carla Marina D.P. Araújo	[illegible]	DINAB/DMC/MITADER	C.MARINA@YMAIL.COM	843098486