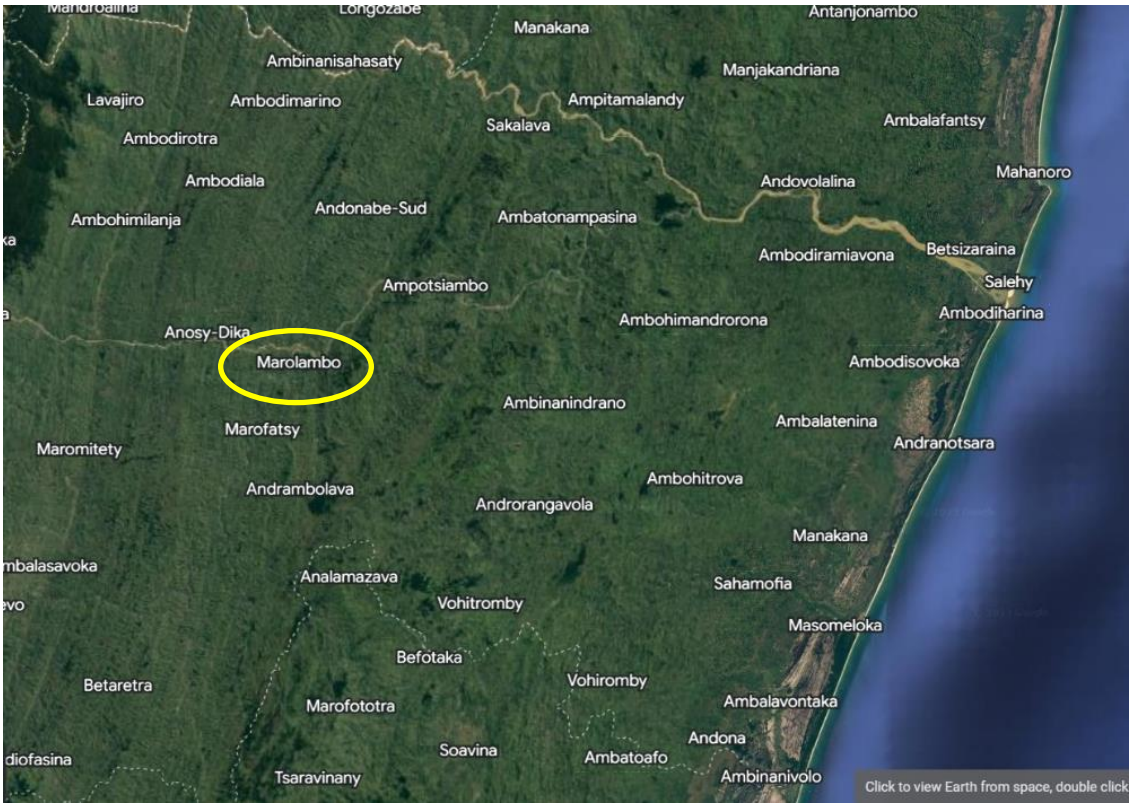
The Madagascar Water Project
Water For Everyone -Madagascar

Feasibility Study

Rehabilitation of the Marolambo Municipal Water System



May 2023

MISSION REPORT

RELATED TO A FEASIBILITY STUDY FOR A DRINKING WATER SUPPLY PROJECT

THE URBAN COMMUNE OF MAROLAMBO

Name & Surname	Position	Attribution
Hilaire RAZANADRAFELY		Mission Lead & External public relation
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Mission purpose	Feasibility study of water infrastructure in Marolambo commune
Mission duration	10 days
Safety issues to report	No incident to report
Security incident to report	No incident to report
Social incident to report	No incident to report
Allocated budget	

Deep gratitude to all the team that participated in the realization of the project, showed courage, unity and determination, despite the difficulties and risks taken especially during the trip by motorcycle on very difficult terrain.

Background

As a result of the collaboration between The Madagascar Water Project and Water Charity, the Water For Everyone – Madagascar Project (WFE) was launched in Madagascar in October 2022.

The WFE Project aims to inventory existing water infrastructure, their state of functionality, population and health data in order to create sustainable solutions related to the

United Nations Sustainable Development Goal 6.1 : By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Madagascar Emergency Plan Priority 29 - Guarantee universal access to potable water

An assessment trip was conducted in the Marolambo District in December 2022. An evaluation of the water infrastructure, along with the demographic and health data showed the District of Marolambo is in serious need of an intervention in terms of drinking water supply.

A second field visit was made in May 2023 to conduct a feasibility study specifically for the rehabilitation of the existing water infrastructure in the urban Commune of Marolambo.

Assessment Activities Performed:

- Assessed the road conditions, currently and projected through the next year;
- Assessed appropriate transportation means for the transportation of materials and equipment in the near future;
- Making contact with local Transporters;
- Assessed the availability of location for storage of tools, equipment and materials;
- Assessed the availability of the team logistics needs;
- Assessed the possibility of MEDIVAC;
- Worked with the Engineering Consultants to make a complete and detailed evaluation of the entire existing water system from the start point (source) to the end points (water stations);
- Identified potential drilling locations as alternative options if needed for higher areas;
- Searched for alternative and new water sources that can be utilized with the existing sources to ensure a good year-round water supply;
- Evaluated the current water management and maintenance infrastructure and looked for possible improvements;
- Met with Elders, Mayor, and head of villages to discuss needs, potential plans, roles and responsibilities, the village's participation, and future water management needs;
- Collected additional demographic and health data for the Marolambo Commune;
- Identified potential location options for a new water distribution system, including the pipeline and water station locations.

Determine Specific Construction Needs for the Rehabilitation Program

- Masonry and plumbing works for the rehabilitation and reinforcement of the retention tanks;
- Masonry and plumbing works for the rehabilitation of the prefilter;
- Masonry and plumbing works for the rehabilitation of the filter;
- New installation and replacement of all pipes and hydraulic components in the distribution networks from the tanks to the standpipes;
- For technical reasons, the location of some existing stand posts may change and others will be removed;
- Masonry work for renovation or replacement of existing water stands;
- Creation of new network ends for extension;
- Repair of the main pipeline from the spring to the reservoirs (length ± 2km)
- Masonry and plumbing works for valve boxes and manholes;
- Changing the location and circuit of the supply pipeline;

- Creation of a management structure;
- Training and capacity building of the technicians and the manager.

The Engineering Consultants will issue a detailed technical plan for the rehabilitation of the entire system, including an estimated cost of the project.

Marolambo Water Infrastructure: Problems Identified

The current water system was built twenty years ago and is in the final stages of complete failure. Age, lack of proper maintenance, damage from human activity and weak management have all contributed to its demise. The photos below document its current condition.

Catchment: The catchment site is full of mud and debris from the floor to near the top of the dam. There is little space to collect water to feed the system and most flows over the of the dam.

The pre-filter is full of mud sludge and no longer works.

Catchment area filled with mud

Filter plugged and flowing improperly

Filter unit: The filter has three (3) sections, but it is not working properly because the mud sludge obstructs the water flow both inside and towards the main outlet.

Much of the water goes out through the overflow pipe instead of feeding the pipeline to the village.

Transit Pipeline: At least 17 water leaks have been observed between the filter and the holding tanks, resulting in loss of pressure. These leaks are caused by:

- Exposure of the pipeline on the surface making it vulnerable to damage;
- Unauthorized taps into the pipeline for personal use;
- Changes in pipe size in the same line;
- Improper repairs and poor maintenance and repairs.
- Buildings are constructed on top of the pipeline.

The figure below plots locations of leaks identified along the 2 ½ kilometer transit pipeline.

one of many leaks along the transit pipeline

construction on top of the pipeline

Holding Tanks: There are two tanks on the outskirts of the village of about 45m3 capacity, installed separately for water storage before distribution to public collection points. It has been observed that:

- Both tanks are dirty and are still not fully filled, which leads to a low water supply and questions about the water quality;
- One of the tanks is leaking.

Distribution System: The distribution pipeline network and forty-eight water stands are in an extreme state of disrepair. The pipeline has numerous leaks and only fifteen water stands are functional. The water flow is diminished, and at times the leaks shut down the entire network. Some of the causes are listed below:

- Unauthorized connections made for private use are abundant;
- Some water stands are broken and flow continuously, as do breaks in the pipelines;
- The municipality does not have a map of the pipeline network, making maintenance and repairs even more difficult.

Two unauthorized taps to the system:

Accessibility: Part of the village is too high to be serviced directly by the water system. Its elevation is higher than the source elevation so gravity feed does not work. The MWP will consider alternative sources, such as a new drill well, in the future.

Infrastructure Management: The water system is managed by the Commune, which does not have an established management structure. The Technicians in charge of maintenance and repairs lack training, tools and parts to perform the work. Unauthorized connections are, in general, acceptable to local officials.

The Catholic Mission has the only drilled water well (40 meters) in the District. They distribute and sell water through four water stands. The commercial model is described below:

Vendors pay the Mission a maintenance deposit of 20k ariary / month for the rights to sell water to the public for 200 ariary / 20 liter jug. The model seems to work.

Public Consultation Meeting: Meeting With Stakeholders

The Mayor called a meeting with the MWP, Village Chiefs and Village Elders. The objective of the meeting was to thank MWP for its initiative to help Marolambo, to inquire if the rehabilitation project will really happen and finally to express their will to support MWP in the realization of the project.

Questions asked by the Village Elders:

- Is the project really going to happen? [yes]
- Will you be upgrading the existing infrastructure or building a new system? [both]
- When will you return to conduct the work? [later this year]
- After the rehabilitation work, will the water quality be acceptable? [probably but may need chlorination]
- Have you any plans on local employment? [yes but temporary]

The Madagascar Water Project made a brief speech, talking in part about the following:

- Introducing the company;
- Explained that currently two phases have been completed including the feasibility study phase. Only the implementation phase remains if the result of the study is satisfactory and the budget is available;
- Problems identified during the field study were addressed during the meeting: pressure leaks due to the behavior of people, houses built on the cable passages, illicit connections, poor management of the infrastructure, and more;
- Urgent cleaning of the catchment area, filter and reservoir wasrecommended due to the dirtiness of the water currently being served to the population;
- Gave suggestion to remove unauthorized connections;
- Mentioned that for technical reasons, a part of the village (the upper part around the reservoir) will still not be able to benefit from the water distribution;
- MWP's expectations were already noted in case the project proceeds:
  - Beneficial contribution: construction assistance: digging ditches to bury the pipes, and other labor needs;
  - Land issues when installing the posts and pipes in case they pass through private property or cut through roads;
  - Reflect on the members of the management structure to be created at the end of the works.

Consultation meeting with MWP, Officials and Village Elders

Logistics

In an area where very little infrastructure exists, logistics are a major challenge. The national route has never been finished and is impassable after rains. Traffic is often restricted by the government to minimize further damage. Road travel is very unpredictable.

Road Travel: Well outfitted 4WD Trucks, 6WD Trucks and motorcycles are the type of road transport used between Mahanoro and Marolambo. The 4WD Trucks transport people and goods between Mahanoro and Ambinanindrano, while the 6 x 6 Trucks park in Ambinanindrano waiting for goods that the 4X4 transship to them for further transport to Marolambo. Motorcycles are used for small errands and emergency trips.

Modern Travel in Marolambo: difficult, unreliable and very expensive
……..but the fact that it exists makes this project possible!

Air Service: MAF, a Africa-wide faith-based charter aviation company, has a base in Antananarivo. They provide air services to remote locations with proper airports, including Marolambo, for NGO's, Mission Groups and others. They also provide medical evacuation services, not technically a Medivac for lack of medical personnel, if they have equipment available.

Conclusion

This is a high need – high reward project. The current water system is on the verge of failure and the existence of water-borne disease reflects the lack of access to clean water.

The Rehabilitation and upgrading of Marolambo Municipal Water System can be done at a reasonable cost of about $4.50 per beneficiary. The logistics challenges fall high on the difficulty spectrum, and it appears no one has been prepared to do it.

It is possible and if we want to get "water for everyone" this is a very good project to undertake. The district-wide assessment shows there are at least five more similar projects in need of rehabilitation.