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Project Completion Report

Rural Access to New Opportunities for Health and Water Management

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RANOn'ala

Rural Access to New Opportunities for Health and Water Management

Madagascar

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CRS Project Summary

This final report summarizes the activities and results of the RANOn'ala project from October 2010 to September 2013. Achievements include:

- 81,620 people provided with sustainable access to water from an improved source.
- 10 functioning gravity-fed water supply systems constructed or rehabilitated
- 239 functioning boreholes with handpumps constructed or rehabilitated
- 17,858 households using latrines constructed by households/ communities without subsidies.
- 105 villages noted as Open Defecation Free
- Two sanimarkets were created and 30 masons/carpenters were trained
- 10 communes established Community Water & Sanitation Business Plans.
- 38% of households participate in water resources protection

Summary

The USAID-funded RANOn'ala project increased access to assured, economically viable and safe water and sanitation services to improve health and water resource management among rural households in three districts in the northeast of Madagascar.

Drinking Water - RANOn'ala assisted 10 communes in preparing Community Water and Sanitation Business Plans. Water supply technologies included the rehabilitation of community gravity flow water systems and the installation of manually drilled wells fitted with hand pumps. The piped schemes included several service options including private and social connections. As part of the project, 10 gravity-fed piped and 239 boreholes with handpump water supply systems were constructed as a result of the Public Private Partnership approach. An estimated 81,620 people have gained sustainable access to improved water supply over the 36-month lifespan of the project. A total of 1,000 Tulip filters were distributed.

Sanitation – 89,290 people are now using latrines constructed by households and communities without subsidies through RANOn'ala. 105 villages have been noted to be open defecation free (ODF). RANOn'ala allowed 816 people to become members of Savings and Internal Lending Communities (SILC) to enable them to obtain funding for sanitation products.

Hygiene and WASH Messaging - 450 community health workers were trained in three key WASH messages (properly handling, treating and storing drinking water, using an improved latrine, washing one's hands at key times). Numerous education materials were prepared and successfully used to deliver WASH messages that changed behaviors related to sanitation and hand washing with soap at critical moments.

Water Resources Management – All seven communes have a detailed inventory of threats and opportunities to their water resources as well as a water resources protection plan being implemented by its communities.

Total number of beneficiaries – RANOn'ala reached a total of 108,720 people.

A summary of the key achievements by RANOn'ala are shown in Table 1.

Table 1 - Summary of Key Achievements by RANOn'ala

Program Achievements	Project Goal	Number Reached	% of Goal Reached
Number of people having access to improved water infrastructure	75,000	81,620	109%
Number of improved gravity-flow water supply systems functioning	13	10	77%
Number of improved boreholes with manual pumps functioning	150	239	159%
Number of new private entrepreneurs providing water products and services	13	11	85%
Number of new private entrepreneurs providing sanitation products and services	8	11	138%
Commune Water & Sanitation Business Plans (CWSBPs) established	10	10	100%
Number of latrines constructed, renovated or upgraded by households/communities without subsidies	10,000	12,454	125%
Number of household in the target areas having access for the first time to a hygienic sanitation system as result of the USG assistance	10,400	17,858	172%
Percentage of people who gave up open defecation (Open Defecation Free).	1%	92%	9200%
Percentage of households practicing 3 key WASH messages	0%	9.6%	9.6%
Number of people participating in Saving and Internal Lending Community (SILC)	1,000	816	82%
Percentage of watersheds and water resources linked to RANOn'ala gravity-flow water supply systems with protection measures implemented by communities with protective measure in place	100%	100%	100%
Percentage of perimeters linked with RANOn'ALA boreholes with protective measures implemented by communities	100%	100%	100%
Percentage of households with a member or more involved in water resources management	27%	38%	141%
Total number of people reached by WASH components of the project	75,000	108,720	145%

DISCLAIMER: The views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Background

The project "Rural Access to New Opportunities for Health and Water Management", or RANOn'ala, was developed in response to an Annual Program Statement issued by the United States Agency International Development (USAID) Mission in Madagascar in January 2010. RANOn'ala was implemented by a consortium led by Catholic Relief Services (CRS) as the Prime Recipient and included Conservation International (CI), RTI International (RTI), and implementing partner Caritas Madagascar. Three critical service providers contributed to the implementation of the RANOn'ala Project. Human Network International (HNI) offered a wide range of ICT services that enhanced the consortium's monitoring and evaluation (M&E) capabilities, and provided new and creative ways for spreading information. Private sector partners BushProof and Sandandrano brought extensive expertise in the creation and maintenance of market-driven water and sanitation systems.

The RANOn'ala project built on the strategies of the USAID-funded RANO HP water and sanitation project, and introduced significant innovations for hygiene and sanitation solutions, market-based financing for water infrastructure, and used information and communication technologies (ICT) for information dissemination, monitoring, and evaluation. In addition, the targeted communes overlapped significantly with those benefiting from the USAID-funded Santenet2 and SALOHI projects, thereby achieving enhanced impact for those beneficiaries.

The RANOn'ala Cooperative Agreement was signed between CRS Madagascar and USAID on September 30, 2010. Four Modifications to the Cooperative Agreement were issued by USAID over the life of project. In May 2012, USAID notified RANOn'ala that it was not able to provide to RANOn'ala $1.87 million (approximately 27%) of the originally approved budget. USAID requested that RANOn'ala submit a proposal for a revision of the project based on the reduced budget. The RANOn'ala proposal was approved as an integral part of Modification Number 4 to the Cooperative Agreement on October 12, 2012.

The goal of the RANOn'ala project was for vulnerable and poor communities in the districts of Mananara, Mandritsara, and Soanierana Ivongo to have access to assured, economically viable and safe water and sanitation services for improved health and water resource management. The RANOn'ala approach included a strong mix of the hard and soft aspects of water supply and sanitation, with a focus on capacity-building, governance, sustainable financing mechanisms, capitalizing on the private sector, and leveraging resources. A key strategy for the RANOn'ala consortium was to foster dynamic public-private sector partnerships at the commune and community levels.

In implementing this range of approaches, RANOn'ala exchanged tools and best practices with the USAID-funded RANO HP project. The key strategy for both projects was to foster local public-private partnerships. Since the beginning of RANOn'ala, the two "RANO

projects" interacted and coordinated through regular meetings and joint reflective practice. Several tools developed through RANO HP were used by RANOn'ala and these included a variety of training curriculum and guidelines (developing the WASH sector at the commune level, developing CWSBP and WASH investment plans, implementing Community-Led Total Sanitation (CLTS), implementing SILC, sanitation marketing, engaging microfinance institutions), IEC materials (videos and posters), and water resource protection posters. RANOn'ala also used a variety of approaches already implemented by RANO HP, which took into account their lessons learned (governance strengthening, behavior change, improving access to funding, building WASH infrastructure).

It is also important to note that RANOn'ala fed the learning from its own experiences with RANO HP's tools back to RANO HP, and in doing so, helped contribute to the identification of best practices over a larger zone. RANOn'ala also shared what it had learned using new tools and approaches (including, for example, the Payment for Environmental Services approach, the supply and demand analysis and the use of ICT4D for monitoring and evaluation) with the RANO HP project team.

The communes targeted by the RANOn'ala project are among the most remote and vulnerable in the country, and include eastern coastal areas routinely ravaged by cyclones and floods. RANOn'ala worked in 10 communes located in the Mananara, Mandritsara, and Soanierana Ivongo districts in the Analanjirofo and Sofia regions in the northeast of Madagascar. The targeted areas also lied in the Makira forest corridor area and adjacent buffer zones.

Communications and Data Collection Platforms

RANOn'ala worked within the partner organizations, local WASH partners, service providers, WASH customers, and field staff to design and implement ICT services that:

- Enhance the organization's or private sector managers' ability to communicate with customers, staff, community based agents, and headquarters;
- Enable data collection via the most appropriate and cost-effective ICT platforms;
- Integrate mobile data collection with existing database applications; and
- Improve efficiency and reduce costs.

RANOn'ala customized data collection and communication services that allowed organizations and their staff to use portable data assistants (PDAs), smartphones, and standard cell phones to transmit data to central locations. These paperless ICT solutions allowed field workers to use simple text messaging to enter data into the organization's central database. The results were immediate, accurate and verifiable.

Program managers were able to use text messages to communicate to their field staff, located in very remote areas, with only phone connection. RANOn'ala used a program called Datawinners to allow all of this to happen. Field staffs were able to send data and

reports using simple mobile phones or a smartphones to their supervisors, at any time, without the need to have access to the internet. Program mangers receive the data in real time with the format they designed themselves. They were able to obtain more than 80% of their data every month, react very quickly and give new instructions or new recommendations to their field staff.

The private sector managers providing WASH services were also able to use text messages to communicate between customers and providers about availability and functionality of their services. RANOn'ala used Frontline SMS.

CRS Program Results

Final Activities Completed / Key Accomplishments

The project goal, three strategic objectives and respective activities are summarized below:

Goal: Vulnerable and poor communities in the districts of Mananara, Mandritsara, and Soanierana Ivongo have access to assured, economically viable and safe water and sanitation services for improved health and water resource management.

Strategic Objective 1: Access to water infrastructure at the commune level is improved

Populations in the target communities must have increased access to water in order to achieve the project goal. The RANOn'ala strategic approach included not only constructing and rehabilitating water supply systems, but improving communal governance around their design, financing and maintenance. Collaboration with the private sector and investing in sustainable, locally appropriate solutions were critical elements in the approach.

Intermediate Result 1.1: Communes collaborate with the private sector for improved management of water and sanitation infrastructure

The first Intermediate Result (IR) focused on the effective management and organization of water and sanitation services at the community level. By gauging the demand for water and sanitation infrastructure and services, and analyzing existing resources and capabilities, the solutions that emerged included the new construction or rehabilitation of existing gravity-flow water supply systems (GFWSS), installing boreholes through Madrill, a drilling technology developed in Madagascar, and jetting, installing wells with concrete lining, and fitting the boreholes and wells with a manual Canzee pump as well as assisted households and communities with obtaining latrine facilities.

Develop business models and other tools for the successful management of water and sanitation infrastructure and services at commune and community levels
RANOn'ala conducted an assessment of existing governance and management systems, implicated stakeholders, and considered potential gender issues in the 10 target communes. This included a quantitative and qualitative inventory of existing natural water resources, water and sanitation infrastructure, and other existing operations and maintenance systems, as well as a supply-and-demand analysis for water and sanitation services. The assessment served as baseline information to help project staff and stakeholders better understand the local context and community assets.
RANOn'ala then worked with the mayors and WASH technical staff of the communes and communities to define a number of different business models for financing and maintaining water infrastructure to be adapted to the needs of specific communities. The models identified included non-governmental organization-supported (NGO) interventions and public-private partnerships (PPP).

Preparing the community for infrastructure construction entailed a series of community meetings to sensitize interested households about the benefits of the private sector service delivery model. Community meeting topics included the rights and responsibilities of households when using the system, the different levels of service options offered by the system and user water bills to be based on amount of water used as determined by metering.

RANOn'ala supported the communes to publish district-level call for bids to identify companies interested in managing and operating water supply systems that the project built or rehabilitated in 10 communes in the three project districts. The responses allowed the commune to form a short list of candidates to whom the project could then issue a limited call for bids to actually manage and operate the systems.

<u>The RANOn'ala Public-Private Partnership Approach</u>
Local authorities in the communes recognize the advantages of delegating the management of water supply services to private or semi-private sector partners, and are capable of identifying such partners. Communes applied principles of good governance in the water sector in establishing public-private partnerships. Local authorities in communes correctly assumed their role as the governing authority for public services related to water, hygiene and sanitation.

RANOn'ALA supported the communes to partner with local private entrepreneurs who show potential for managing water supply and sanitation infrastructure. These entrepreneurs understand the local context of procurement, logistics, transportation, willingness to pay, and the needs of the local population. Furthermore, local private entrepreneurs live in the commune where they work, ensuring accountability, and remain in the area for a long time, ensuring sustainability.

RANOn'ala hired four social organizers to coach WASH stakeholder committee members to act as counselors and resource persons, to share information, and support the steps necessary to establish public-private partnerships during the process of selecting and contracting private sector providers. The social organizers are based in each commune, and work independently with WASH stakeholders to support their commune with their daily tasks, and to monitor the application of good governance principles and compliance with Madagascar's water sector rules and regulations. This helps to ensure transparency and accountability in water supply services. Their coaching takes the form of discussions, advice, sharing of other communes' experiences related to calling for bids and signing contracts with the private sector, managing and maintaining WASH infrastructure and quality assurance, ensuring people receive quality services, and collecting taxes from water and sanitation users at Monoblocs.

Once a contract was signed and the management of water supply services was assumed by the private sector service provider, the social organizers continued to coach the WASH stakeholders, such as the mayors and other communal authorities, traditional leaders, private sector enterprises and others involved with WASH services, to clarify respective roles related to the reporting of water supply problems. The social organizers also trained communal authorities in how to request the water supply service provider to take action and how to send an official warning letter if the service provider's performance deteriorates. Each commune was trained to ensure repairs and cover the replacement of damaged parts as this typically is a joint effort between the commune, the private sector, and the community. The social organizers spent a full week in a commune before rotating to a different commune for another full week. This continued for about eight months only during the life of RANOn'ala.

JiRaMora- An Innovative Financing Mechanism

The JiRaMora business model is a three-prong approach to creating a sustainable water supply service to participating community members. Canzee hand pumps provided through RANOn'ala are maintained and repaired under a service contract with a private sector enterprise. The service fee is paid by water users through scheduled contract fee payments. The beneficiaries pay this fee from the savings generated by their renting rechargeable solar-powered lights instead of expensive and less polluting kerosene lamps, candles and disposable batteries used for flashlights and radios as well as outlets for people to charge their cell phones. The solar-powered products were provided by RANOn'ala.

Combining water with solar energy in one product package is crucial to this business model. Willingness to pay for drinking water is traditionally low in Madagascar but, in contrast, solar energy products are highly desirable. More importantly, the use of solar products creates savings to the extent that families expend less of their income on lighting and water, even after their contract fee has been paid. This model thus establishes a profitable, scalable micro-franchise business that tangibly reduces poverty by delivering safe water and renewable energy to low-income consumers.

Build governance capacity of key local stakeholders
The results of the assessments and inventories shaped the capacity building activities for local officials, private-sector partners, local WASH committees, and communities to ensure better management of water and sanitation infrastructure and services. Using tested modules from RANO HP and Santenet2, such as a multi-sectoral governance approach and a participatory mapping assessment tool, RANOn'ala conducted trainings for these key actors that focused on increasing local understanding of the legal framework governing the water and sanitation sector. As a result, water management committees were formed in each commune and community. They help collect and provide data necessary to draft Commune Water and Sanitation Business Plans (CWSBP) (see below), make inventory of available resources, understand the results of technical feasibility studies, prior to building or rehabilitating water supply systems, identify priorities for WASH services, and make necessary decisions. They also delegate management of water supply services as members of the bid commission of the commune WASH committee responsible of calling for bids. They are also responsible of environmental compliances. They plan investment and business in the WASH sector by identifying actions for achieving service coverage to all of the people, estimating cost of the required investment, and the local resources to be mobilized.

Support communes in the drafting of their Commune Water and Sanitation Business Plans
Once governance capacity has been built in local communities, RANOn'ala worked with communities to select appropriate business models, and develop Commune Water and Sanitation Business Plans (CWSBP). CWSBPs outline a strategy for increasing sustainable access to water and sanitation facilities and services at the commune and *fokontany* level, including the different human and financial resources required. RANOn'ala built on tools already developed for Santenet2 and RANO HP to facilitate this process.

Demonstration sites
As a first step to stimulating demand for water services, RANOn'ala established three commune-level water and sanitation demonstration sites in the strategic locations of Mananara, Imorona, Manompana, Marotandrano. The locations were selected because they are the largest towns in the target districts and they are the most accessible by visitors due to the presence of good roads. Mayors of nearby communes interested in obtaining their own water supply and sanitation services using one of the management model options could access the sites easily. The demonstration sites were used to promote the sharing of best practices, and to market and create demand for services in neighboring communes. The overall process for governance, investment, and construction or rehabilitation in these sites were the same as that used in other RANOn'ala sites, but project activities in these communes were accelerated so that the demonstration sites were ready to serve as models by the end of the first year.

The four communes have provided an opportunity for community members from the demonstration sites to share lessons learned and encourage their peers in neighboring

communities and communes to organize and give priority to water infrastructure projects. This was an integral part of the approach as it helped to increase demand, served as a model for best practices, and ultimately increased visibility and viability of water and sanitation infrastructure. RANOn'ala used these demonstrations sites to promote RANOn'ala market-driven water and sanitation systems.

This approach was also key to increasing community buy-in for water supply and sanitation services. Motivated communities with more advanced understanding and behaviors concerning improved health practices were identified as a result of their positive deviance in order to provide concrete examples of positive water and sanitation actions to other targeted communities. Community members from the areas chosen as demonstration sites were solicited to inform their peers in other communities and neighboring areas targeted by the project. These exchange visits provided real examples to the visitors that they could refer to, thus increasing their buy-in.

Final Results vs. Performance Indicators

- 10 communes have water and sanitation management committees (100% of the project target).
- 10 communes prepared their CWSBPs (100% of the project target).

Intermediate Result 1.2: Communities use sustainable models for investing in water and sanitation infrastructure

The second IR in support of SO 1 was aimed at facilitating access to financing for new and improved water and sanitation infrastructure, including long-term operations and maintenance. Initial efforts concentrated on the demonstration sites. As the project progressed, RANOn'ala project staff facilitated exchanges between communes through site visits to promote the different business models throughout the targeted areas. Additionally, local stakeholders participated in the DIORANO-WASH platform, the national platform for all water and sanitation stakeholders, through the decentralized district and regional structures to share best practices and lessons learned of water and sanitation project activities.

Assist communities in establishing management contracts with private-sector partners

As a first step, RANOn'ala sought local sponsors willing to participate in and finance water and sanitation infrastructure at the demonstration sites. Local sponsors are the entrepreneurs, private sector organizations or local NGOs from surrounding areas engaged to manage one or more water supply systems at the commune or community level. RANOn'ala highlighted the viability and importance of investments in water supply systems and sanitation facilities to communities and microfinance institutions (MFI). Later on, communities contributed labor and/or materials as a demonstration of their buy-in, motivation, and support.

The selection of local sponsors was conducted not by RANOn'ala but by bid committees (commissions) at the commune level, using a thorough, transparent process in accordance with their newly developed CWSBPs. The bid committee members were chosen from among those stakeholders nominated by participating communities. RANOn'ala trained the communes in the process of selecting local sponsors, one among several responsibilities that the communes legally bear, as the communes are *Maitre d'Ouvrage,* or owners of the water supply facilities. The central element of the process was a public invitation to bid on the opportunity to invest in, build and manage community water supply systems, using the optimum technologies chosen on the basis of feasibility studies and detailed designs.

It is notable that similar approaches are in use in Madagascar, specifically by the *Fonds d' Intervention pour le Développement* (FID) project financed by the World Bank and the Establishing Sustainable Mechanisms to Develop Access to Drinking Water and Sanitation in Rural Areas - Madagascar (MEDDEA) project financed by the European Commission.

In most cases, entrepreneurs signed contracts with communal water management committees at the commune-level to manage water systems. These water management committees were responsible for raising funds to pay for maintenance contracts with the private sector. To promote community participation, leadership, and decision-making, approaches developed by both RANO HP and RANOn'ala hygiene promotion teams were used to facilitate the prioritization of activities included in community action plans and CWSBPs. Once formed, water management committees engaged in a multiple-step process to understand the effects of poor sanitation and hygiene behaviors, and mobilized their respective communities to manage water-supply infrastructure and protect water resources.

Promote Savings and Internal Lending Communities

In order to assist the more vulnerable and isolated populations with savings and financial management skills to enable them to invest in water and sanitation activities and increase their resilience and purchasing power, RANOn'ala promoted the development of Savings and Internal Lending Communities (SILC).

SILC groups are self-selected groups of people who pool their money into a fund from which members can borrow. The money is paid back with interest, allowing the fund to grow. At the end of an 8-10 month cycle, the account is dissolved and each household receives the money it initially contributed plus a proportion of the income received through the borrowing activities. This lump sum provides a significant amount of money that members can then use as they want, without restriction. SILC groups are autonomous and self-managed groups created to help members achieve financial independence, and are very successful in empowering women. As all money saved and borrowed stays within the SILC group, there is no profit to be made by an outside agency.

Final Results vs. Performance Indicators

- 11 new private entrepreneurs providing water products and services (85% of the project target).
- 11 new private entrepreneurs providing sanitary products and services (138% of the project target).
- 816 people participating in functioning Savings and Internal Lending Communities (SILC) (82% of the project target).

Intermediate Result 1.3: Household water supply access and coverage increased

The final IR in this strategic objective involved meeting the increased demand for water supply services by identifying and putting into place appropriate water technology, mobilizing the community to participate in this process, and promoting a shared responsibility with local government and the private sector. Community participation was a key component of these activities.

Prepare communities for construction

Using the CWSBP as a basis, RANOn'ala worked with communities to operationalize plans for community contributions and capacity-building, such as training water committees on water user fee collection systems. As part of the preparation, all communities made specific plans and commitments for operations and maintenance. It should be noted that none of the ten communes selected the community management business model so no local community members were trained in infrastructure maintenance.

Construct infrastructure for water supply

RANOn'ala constructed water supply infrastructure using proven, appropriate technologies (see I.R. 1.1) selected according to the specific conditions found in each commune. All water supplies were tested for microbial contamination before being opened to public use.

In communities without available surface water resources (i.e., streams), low-cost well drilling with locally manufactured water-lifting devices were the preferred technology. The combination of these technologies makes this the most economical option for improved water supply in Madagascar. Well drilling techniques included jetting and madrill, portable technologies that allow boreholes to be installed in the most inaccessible villages.

Each well was fitted with an easy to operate and maintain hand pumps. The Canzee pump was the primary water-lifting technologies used for boreholes. This pump is manufactured in Madagascar and approved in the national procedures manual. RANOn'ala respected the manufacturer's recommended ratio of 170 to 200 people per pump by installing more wells per capita than what is typically done in rural Madagascar. One private service provider manages anywhere from 20 to 25 wells and hand pumps.

Manually Drilled Wells Fitted with Handpumps

Two hundred and thirty manually drilled wells were installed in five communes in the Analanjirofo region. Manual well drilling technologies can be used in most soil types when the water table is above 30 meters. The drilling equipment is portable, allowing boreholes to be installed in even the most inaccessible villages. The wells were fitted with village-level operation and maintenance (VLOM) Canzee handpumps manufactured in Madagascar. There is a private service provider who manages the wells and hand pumps.

Gravity Flow Water Supply Systems

In communities where stream water was captured, RANOn'ala constructed or rehabilitated Gravity Flow Water Supply Systems (GFWSS). Mostly, these systems captured stream water from large watersheds with standing forests and distributed it by pipeline to downstream communities. The captured water was treated on-site with chlorine and met or exceeded national quality standards for potable water.

Electrochlorinators

RANOn'ala installed an electrochlorinator in each of the 10 gravity-fed water supply systems to treat the source water. These are simple devices powered by solar or electric generator energy that uses sea salt and fresh water to create a chlorine solution. The chlorine is then admitted into the water at the reservoir, thus providing potable drinking water to the beneficiaries.

RANOn'ala offered to the households three different service-level options to connect to their water supply system. A variety of service options encourages an increase in the quantity of water used daily, a practice that has been proven to significantly improve health.

The three connection types that were used by RANOn'ala included:

- A private household connection (*branchement prive* (BP)) to the water system. This connection is metered and the household water user fee is based on the amount of water used.

- A social connection (*branchement social* (BS)), in which a group of 3-10 households agree to share a semi-private connection situated close to their homes. This connection is metered and the fee, based on the total amount of water used, is divided among the users.

- A public connection through the installation of Monoblocs. Monoblocs are a single structure that provides access to drinking water, toilets and showers for men and women, and laundry facilities. Households and visitors not choosing to use the two higher service options have to pay a fee to access the facilities. The Monobloc is designed to guarantee safe and easy access and sufficient privacy for all, but in particular for women and girls.

Monobloc construction was cost-shared with private entrepreneurs managing the service as part of the GFWSS activities.

Typically, most communes constructed all three types of connections. However, some communes preferred social connections to private connections as this offers the collectors of water, typically women, the opportunity to socialize with their neighbors.

Public-Private Partnership Example - a Gravity-Flow Water Supply System

The commune of Mananara, a rural community of 14,000 people, provided the first opportunity for RANOn'ala to pilot its PPP approach to operate and manage piped water supply schemes. The community's water supply system had broken down long before RANOn'ala, to the point that one water tap served the entire town. A resident noted that in the past the water was dirty, that there were frequent break downs and that the pressure was low. In 2011, RANOn'ala financed 200,000 USD to rehabilitate the system and expand the distribution system to include private and social connections. A Monobloc was constructed to provide public water and sanitation access points.

RANOn'ala trained the community's bid committee in transparent public tendering processes. Several bidders submitted proposals in March 2011 and the committee chose EGC3s to run the newly rehabilitated and greatly expanded water system. The community uses a progressive pricing structure to differentiate the three service levels offered by the system. Water distributed via private household connections is priced at 0.50 USD (1,100Ar) per 1,000 liters, social connections are 0.30 USD (700Ar) per 1,000 liters and public connections are 0.43 USD (1000Ar) per 1,000 liters.

Water is treated at the source by sand filters, which are regularly scraped and cleaned. Water then flows by gravity to an elevated ferrocement or concrete reservoir tank, depending on the location, where it is batch chlorinated through the use of the electrochlorinators. Both private and social connections have water meters for billing purposes. An office is maintained and spare parts are kept readily available. System rehabilitation was completed quickly by the operator.

It is important to note that all project activities, including the infrastructure activities mentioned above, complied with USAID's umbrella Initial Environmental Examination (IEE). RANOn'ala also submitted an Environmental Monitoring and Mitigation Plan (EMMP) adapted as necessary from the EMMP already approved for the RANO HP project.

All activities under SO1, both direct and indirect, such as the creation and/or support of water management committees, the creation of CWSBPs, community member participation in inventories and assessments, capacity building of community members, the innovative JiRaMora approach, the participative preparation process and the implementation of infrastructure maintenance contracts, all contributed to community buy-in for WASH services.

Final Results vs. Performance Indicators

- 81,620 people access an improved water supply system (108% of the project target).
- 10 functioning improved gravity-flow water supply systems (77% of the project target).
- 239 functioning boreholes with manual pumps (159% of the project target).

Strategic Objective 2: Appropriate and diverse use of sustainable, safe water supply and sanitation services is increased

Once people have improved access to water in sufficient quantity and quality, they can use it to improve their overall health if they have the necessary understanding of good hygiene and sanitation practices, including the necessary sanitation infrastructure. Supporting communities to use their water and sanitation infrastructure in these ways was the second strategy and, once again, sustainable and locally appropriate approaches that support the local private sector were the cornerstone.

Intermediate Result 2.1: Communities and households adopt improved hygiene practices

The first IR of this SO capitalized on the new and improved water infrastructure by promoting appropriate hygiene behaviors. Given the critical role of women and children in promoting and practicing good hygiene in the household, RANOn'ala actively targeted women and involved both women's associations in activities to support this IR.

Increase awareness regarding positive hygiene practices

RANOn'ala collaborated with Santenet2 to train community health volunteers to promote hand washing, safe water storage, and proper use of hygienic latrines in households and communities. Hygiene awareness and education through social-marketing campaigns for behavior change were conducted using rural radio broadcasts, posters, printed materials, and included the use of information and communications technology (ICT).

Integration with Telecommunications – Mandroso Mobile Phone Project

RANOn'ala identified key hygiene messages, vetting them through a content committee consisting of traditional leaders, community health workers and several performers. Local populations in isolated communities were able to access a knowledge bank of information using a standard cell phone through Airtel cell phone service. The knowledge bank contains information on public health, WASH services and products, and water resources protection. The use of mobile phone applications provided free, on-demand access to this information for Airtel customers. Households were also able to use text messages to request additional information about WASH.

There are two ways for customers to access the information: Interactive Voice Responses (IVR) Service and SMS Service. IVR uses audio messages to convey the information. Customers dial a toll-free number to access pre-recorded instructions and choose from a list of options by selecting numbers on the keypad. The directory architecture is designed

for easy navigation. Within a few seconds – a maximum of three keystrokes – users arrive at the requested information. The voice messages are in Malagasy. Each is 10 to 12 sentences long and well adapted to low-literacy audiences. Users also learned how to ask questions, provide suggestions, and share answers using their mobile telephone.

With SMS, the local population dials the toll-free number to select the information to receive through text messages pre-approved by the panel of experts from the community that RANOn'ala coordinates with.

The target communities used both SMS and IVR, but SMS was used less than IVR. The reason is that people like to use more verbal communication than writing text message, probably due to old habit but most likely due to the low literacy rate.

Promote low-cost point-of-use technologies
The RANOn'ala local health volunteers trained households to use local materials to make low-cost hand washing dispenser stations (e.g. "tippy tap") and on the proper use of point of use (POU) water storage and treatment methods. Properly applied POU water treatment options have been shown to significantly reduce diarrheal disease and are inexpensive, portable, and easily adaptable to any environment. RANOn'ala promoted a variety of POU treatments including household filters, the Sur'Eau liquid chlorine solution, and boiling. POU treatments are appropriate for people who are not in proximity to an improved water supply, and for more vulnerable groups who are not able to pay for water.

Tulip Filter
The siphon ceramic water filter, also known as the Tulip filter, was initially provided to households through a rental program from the JiRaMORA managers. Some households purchased them for themselves. RANOn'ala eventually identified a dozen stores to sell the filters as a part of their WASH products.

Final Results vs. Performance Indicators

- 9.6% of households practice three key WASH messages (96% of the project target)
- 78% of households practice a recommended water treatment method (204% of the project target)
- 60% of households practice proper water storage (354% of the project target)

IR 2.2 Communities and households adopt improved, appropriate sanitation behaviors

Promote locally appropriate sanitation options
RANOn'ala implemented the Community-Led Total Sanitation (CLTS) approach in target communes. CLTS is a community-mobilization approach introduced in Madagascar in 2008 to promote latrine use through collective community action rather than targeting households individually. CLTS focuses on creating genuine demand for improved sanitation facilities through a series of activities.

To respond to increased demand for sanitation triggered by CLTS, the project used a step-by-step approach to encourage households to improve sanitation and hygiene practices incrementally as they are capable. A variety of low-cost, appropriate toilet and bathing facilities were promoted to encourage communities and households to construct infrastructure based on their means and availability of local materials.

Informal networks of masons operating in each target commune and trained by RANOn'ala offered technical services to households, masons and carpenters on the construction of latrines as a response to CLTS. RANOn'ala trained 30 local masons and/or carpenters to fabricate and sell "SanPlat" hygienic latrine slabs and assisted households in constructing latrines using local materials. 205 facilitators of CLTS were trained at the district level. 105 villages out of 450 triggered were observed open defecation free (ODF). CLTS was effective in RANOn'ala as a community-owned cost-effective and sustainable approach that did not use subsidies and triggered self-motivated behavior change to end open defecation.

Encourage private sector investment in sanitation infrastructure
Latrines were not constructed using project funding. Instead, RANOn'ala encouraged households to build their own latrines, and provided technical assistance through health education sessions on appropriate pit dimensions and site location.

RANOn'ala trained three masons and/or carpenters per commune to produce hygienic household latrines using appropriate technologies. A starter kit of tools was provided to each mason and carpenter so that they can launch a small construction business. The trainings took place at demonstration sites.

SILC groups and those able to access loans were encouraged by RANOn'ala to invest in household latrine construction.

In addition to the previously-described Monobloc facilities, seven public toilet blocks, each with 2 to 3 individual toilets depending on the size of the community, with separate female and male facilities were built.

<u>Final Results vs. Performance Indicators</u>

- 17,858 households in the target areas have access for the first time to a hygienic sanitation system as a result of USG assistance (172% of the project target)
- 30 masons and carpenters provided sanitation products and services (100% of the project target)
- 92% of people have given up open defecation (509% of the project target)
- 14% of households having children under 5 years old have soap and water for handwashing during critical times (143% of the project target)
- 281 people trained in the rehabilitation, maintenance, and management of water

and sanitation infrastructures (141% of project target)

Note: The final results are much higher than initially targeted because RANOn'ala implemented projects in more villages than originally planned. Also, the endline survey shows that additional latrines were constructed between the time the field activities ended, and the data monitoring report was completed, (April 2013) and the time of the endline survey (November 2013).

Strategic Objective 3: Water resources are protected and managed in a sustainable fashion

Finally, no water and sanitation intervention will ultimately contribute to the long-term betterment of people's health and livelihoods unless the primary source of their water is protected. RANOn'ala worked with local communities to increase their understanding of the linkages between forest protection, water supply, and improved health.

Intermediate Result 3.1: Populations more fully appreciate water resource management

RANOn'ala increased local understanding of the environmental risks that come with the construction and operation of an improved water supply system. This empowered local WASH stakeholders to participate in the monitoring of environmental mitigation measures during and after infrastructure construction.

Initial threat and asset assessment

As part of the initial baseline assessment, RANOn'ala collected information on individual, household, and community practices and behaviors surrounding IWRM. The assessment was designed to reveal practices that may be specific to different gender and age groups. The assessment results were then used to identify threats to improved management of water resources as well as specific groups targeted for behavior change communication (BCC).

Within each commune, additional information was collected on the capacity of existing formal and informal community groups that play a role in promoting improved integrated water resources management (IWRM). Such groups include water-management committees, community forest management associations, national park and reserve surveillance committees, students and women's groups. As part of the assessment, existing environmental education materials and communication channels (e.g. local radio cover, mobile phone cover and quality) were reviewed, and the project worked with local partners to identify challenges that have arisen in previous campaigns to improve water resources management. The many challenges included:

- Working within a large-scale watershed that includes large rivers and lakes to address water resources protection is not feasible both technically and financially, especially by the local population, as most people cannot make the connection of how their activities affect water quantity and quality.

- Developing protection plans with only representatives of formal existing groups, such as vanilla growers associations, was not sufficient as there needs to be the involvement of the local population who have a stake in protecting the water resources.

The consequences of these challenges included:

- The establishment of fines for polluting water resources was not institutionalized and, therefore, not applied by the local population. There was no ownership of water resources protection.
- The burning of the forest continued and was not linked to protecting water resources.
- The water resources were not protected from traditional agriculture, tree harvesting for energy, and livestock activities thereby polluting water which should be used for the population.
- Use of water for hygiene, sanitation, laundry, bathing and other activities at the point of water collection increases the chance of water pollution.

RANOn'ala addressed these challenges by:

- Focusing on smaller watersheds and smaller water resources used by villagers
- Working with households directly linked to water resources supplying water infrastructures
- Inviting representatives from each village within each watershed to participate in the water resources protection discussions
- Involving representatives from informal groups and from households in the communities at all steps of developing the water resources protection plans

Provide environmental awareness education

RANOn'ala collaborated with the USAID-funded SALOHI and RANO HP projects to produce a series of Information Education, and Communication (IEC) and Behavior Change Communication (BCC) counseling cards and posters demonstrating environmentally safe and unsafe situations. These tools have colorful sketches depicting a variety of messages appropriate for each component of the system. Some existing relevant education materials were adapted to local dialects, while new materials that specifically focus on the links between forests and water were also developed.

RANOn'ala worked to strengthen existing water resources protection education programs run by the managers of the four protected areas in the intervention zone. Education activities targeted both adult and youth groups and specific community members with high potential to amplify education activities, such as school teachers, and prominent leaders of local associations and *fokontany*. RANOn'ala also worked with local radio stations to broadcast environmental programs and publicize the project's progress.

As previously mentioned, RANOn'ala brought opportunities to use mobile telephones to transmit water resources protection messages in ways that have not yet been widely used in remote rural locations in Madagascar. RANOn'ala partnered with ICT experts to create a "Watershed Directory" that contains the best information available highlighting the links between environmental practices and potable water quality. The directory was specifically adapted for low-literacy populations and feature materials and key messages in local dialects. In collaboration with Airtel, Madagascar's largest mobile-phone company,

Promote multiple uses of water
By raising awareness among the population about the many ways in which water can contribute to people's well-being, RANOn'ala helped build community commitment to manage their water resources in a sustainable manner.

As part of initial commune assessments, RANOn'ala identified how water (and certain other natural resources) are currently being used. Typical uses of water include livestock watering, gardening, composting, fish farming, and other non-agriculture livelihood activities, while other natural resources may be used for building construction and repairs, and handicrafts. RANOn'ala worked with local communities to identify other productive or income-generating activities, including composting and recycling, home gardening, and laundry services, to which water resources contribute and considered ways they can be promoted.

Coordinating with SALOHI, RANOn'ala also identified specific opportunities for groups to receive additional training related to agricultural production and marketing, small business and cooperative development, village savings and loans (also called Savings and Internal Lending Communities (SILC)), animal husbandry, human health and nutrition, infrastructure development, disaster management and mitigation, governance, and environmental management.

Final Results vs. Performance Indicators

- 38% of households having one or more members involved in water resources management (152% of the project target)
- 10 communes have a detailed inventory of threats and opportunities to protect their water resources (100% of the project target)

Intermediate Result 3.2: Key stakeholders engage in sustainable water resource management

Building upon the awareness raised among the general population, the final IR focused on ensuring that communities have the capacity and tools to effectively act on this knowledge. Key stakeholders were organized to manage and protect water and environmental resources and respond to potential threats to their management. In addition, they became familiar with and able to apply relevant laws to ensure successful stewardship.

RANOn'ala worked to foster a common understanding of the roles of various stakeholders in the public sector, private sector, NGOs, and local community groups. RANOn'ala worked with each commune to develop clear guidelines that define the role of each of stakeholder in the commune to achieve sustainable water resource management.

Communities were encouraged to develop *dina*, which are local bylaws developed and self-regulated by *fokontany*, that can act as a tool for self-enforcement of stewardship of water resources. In some communities *dina* already exist, in which case Ranon'ala focused on supporting their implementation and enforcement. In cases where communities do not already have *dina* regulating the management of water resources, RANOn'ala worked with *fokontany* to develop them and plan for their enforcement.

Train key stakeholders
RANOn'ala targeted community-based organizations (COBA) to improve local capacity to protect water resources and the habitats on which water resources depend.

RANOn'ala improved stakeholders' understanding of the laws and regulations concerning water and other natural resource use and their management. Once the initial assessment was completed, RANOn'ala designed and implemented training programs on water and natural resource management for the target groups. The training design was based on best practices that have been developed under USAID Environmental and Rural Development (Env/RD) programs through the Ecoregional Alliances as well as successful approaches used by protected area managers around the Mananara-Nord National Park, capitalizing on materials already produced.

In each commune targeted for infrastructure construction, RANOn'ala used the IEC and BCC tools to train WASH stakeholder groups in the mitigation measures outlined in the Environmental Screening Form (ESF) as approved by USAID for each commune. As part of the training, the project's field-based engineers lead stakeholders on a tour of each system component to discuss the practical measures that contractors take to mitigate excessive environmental disturbance at each location. Community health workers (CHW) and field agents also used these tools to sensitize households using the water supply systems.

Important target groups included existing and newly created water management committees and community forestry associations, or *Vondron'Olona Ifotony* (VOI). Target groups received training on laws and regulations concerning water use and management, as well as capacity-building support for these COBA. Training also covered forestry regulations, options for community management, and community support for appropriate small-scale water supply and water resources protection plans. Other topics included guidelines for habitat restoration, simple erosion control systems and techniques such as terracing of land, and conservation farming. SALOHI tools and strategies were also used to support this IR.

Local partner staff were also invited to participate in these trainings so that they can support and reinforce these messages in their ongoing interactions with local communities and local leaders.

Final Results vs. Performance Indicators

- 100% of RANOn'ala water supply infrastructure have a water resources protection plan implemented by communities (100% of the project target)
- 52 community organizations participate in water resources protection (260% of the project target)

LESSONS LEARNED

1. Local governance capacity building

   Mayors and local authorities changed completely their knowledge and behaviors about managing of water supply, sanitation and hygiene activities in their commune when their capacity is reinforced. They are now capable of carrying out most of their roles and responsibilities in managing these programs for their communities. They are capable of leading WASH meetings with stakeholders, participating in inventories of existing water resources, and planning and prioritizing water supply coverage for the population through their understanding of the Madagascar water law.

   Even though the goal of RANOn'ala is to empower local authorities to be the governing authority in WASH sector, the limited capacity of communal authorities is still very obvious. The level of education of the majority of WASH stakeholders, including WASH committee members and commune staff, are a limiting factor. Members have difficulty following administrative procedures, including financial and accounting procedures, related to the effective implementation of water and sanitation policy, strategies, and activities. The capacity of communal authorities to mobilize available resources, both human and financial, still needs to be strengthened. This could potentially pose a problem if the commune is unsatisfied with the private sector water supply manager and has to negotiate with the manager or rebid the contract. These additional resources are also required for improving and expanding WASH coverage and for identifying and developing new financial and technical partnerships. Technical support in WASH governance from the regional director of water and sanitation is needed in permanence in order to be fully operational and to be able to assume their leadership role over the long term.

2. Public Private Partnerships (PPP) in WASH

   Putting in place PPP in WASH in rural area needs time and human and financial resources to support the training of the key stakeholders and to put the partnership into practice. The local population needs to understand the advantages of sustainable and functioning water supply and sanitation services and needs to be willing to pay for

these services. Enacting a PPP requires patience from the local community. All stakeholders need to understand the advantages and consequences of working with private sector enterprises so that they can engage in the public private sector model of infrastructure management, and have the confidence to choose another model most effective for the sustainability of their water supply and sanitation services.

A socio-economical analysis is important to understand if most conditions are in place to allow PPP to succeed. Successful PPPs occur when there is strong economic capacity of the population, a growing market economy, a funding mechanism available to pay for the private sector, and available human resources to work in the sector. PPP may not be the best option if these conditions do not exist.

The Ministry of Water and its regional directors play an important role as a mediator between all actors, to ensure compliance with the Malagasy water law, and national WASH policy and strategy. Successful PPPs occur when the regional director for water and sanitation is associated in all processes from the very beginning when establishing public private partnerships in WASH.

3. Development of the local private sector to increase service delivery
   Local private sector enterprises have been trained to manage their business, which includes technical WASH issues and proper accounting and financial management procedures. The training also included planning annual activities and budgets, and an exercise to close annual accounts in order to report data to the Ministry of Water necessary to monitor progress. Success of the local private sector depends on Ministry of Water support to the private sectors and monitoring progress of service provision coverage at the community level.

   New local entrepreneurs were more interested in the technical component of the training, instead of the management component of their services. There was less interest in business management, leadership training, analysis of demand for services and products on behalf of the local population, the establishment of a business plan, and the marketing and promotion of services and products that the project wished to provide. More creativity is needed in introducing these subjects to this audience.

   The lack of formal training of local entrepreneurs and community workers to increase their knowledge and capacity in managing WASH services limits their capacity to work in the WASH sector. Local government and its partners currently do not strongly support and fund these trainings and participation.

4. Supply Chain
   RANOn'ala piloted the establishment of a supply chain for new water treatment and water storage products, such as ceramic filters and jerricans with taps. Unfortunately, the willingness to pay is very low in many fokontany as household affordability is lower than the real price of the product from the supplier. Furthermore, the cost of

transportation makes these products more expensive. Subsequently these products are not attractive for sellers and anyone involved in the supply chain.

5. Access to funding
   The WASH private sector working in rural areas of Madagascar faces funding challenges. Microfinance institutions and banks do not consider WASH sector businesses as profitable businesses. RANOn'ala requested financial products offers from microfinance institutions and local banks based on WASH private sector business plans. Both parties were not impressed with the business plans and, therefore, are reluctant to offer financial products.

6. Construction of water supply infrastructure
   The capacity of the private sector to build quality infrastructure is a challenge for the governing authority. This poor capacity creates a delay in the delivery of construction services which has an effect on program progress. If communes were to partner with the private sector to build their infrastructure, this could make it difficult for them during the Public Private Partnership.

7. Mobilizing demand for key WASH related products and services
   Demand for key WASH related products and services have increased since the mobilization activities. However, balancing the costs of products and services with the willingness to pay of the local population is still a challenge. Most products with quality and most WASH spare parts are not made locally, therefore cost of transportation make them expensive.

8. Water resource protection
   Although households receive behavior change and water resources trainings and campaigns, it takes time for these messages to affect their actions. For instance, households usually have challenges with not building their latrines and not throwing their trash within the limit of protected areas around the boreholes and manual pumps. These actions continue to affect water quality.

9. Use of ICT in WASH service provision
   The RANOn'ala monitoring and evaluation system, including the information and communication technology (ICT) system, which WASH sector stakeholders were allowed to use is beneficial for tracking the progress of the project as well as for making information available to households.

RECOMMENDATIONS

1. It is recommended that USAID and its partners support the decentralization of governance in WASH, and the creation or updating of WASH regional and local development plans and investment plans. Decentralized capacities along with

necessary resources are key to increasing access to safe drinking water in Madagascar. Local authorities and communal stakeholders should be trained and supported in increasing their knowledge and practicing their role and responsibilities in water, sanitation, and hygiene service provision to communities. As it is continuous long-term training, resources should be made available to technically support the local stakeholders to provide these services to its population.

2. It is recommended that USAID and its partners support the development of private sector enterprises to engage in achieving the WASH sector goals. New private sector entrepreneurs should be encouraged to join the sector and efforts should be made to increase demand for professional water services in large rural towns where the model has proven to succeed. However, all private sector engagement in the sector should be facilitated through local government and a clear standardization policy outlining technical standards and acceptable pricing structures should be developed and endorsed by central government.

3. It is recommended that USAID and its partners fully support the availability of funds or subsidies to the private sector to contribute to achieving WASH goals. If possible, USAID and its partners are recommended to contract with financial institutions to obtain funding and incentives for the private sector.

4. It is recommended that USAID and its partners clearly articulate to rural communities the principles outlined in the Government of Madagascar Water Code, the benefits of potable water and proper sanitation, the differences in service levels as well as the rewards of working with the private sector through innovative ways such as short films, radio dramas, and SMS telephone messages. Where appropriate, it is recommended that the Ministry of Water and donors arrange study tours for local authorities to visit a town with an established PPP to see firsthand the levels of service and coverage that are achievable.

5. It is recommended that USAID and its partners increase efforts to increase the demand for improved water services more broadly in Madagascar. Information, Education, and Communication (IEC) campaigns targeting district and communal level authorities aimed at increasing demand for modern water services should be an integral part of any future bilaterally-funded rural water and sanitation projects. Campaigns should include outreach to communities to inform them of their rights and responsibilities in terms of accessing a potable water supply. Communication tools with information about WASH sector and the need to prioritize causes of sanitation and hygiene are recommended to be produced in large quantity and distributed to leaders. Campaigns to change norms and behaviors are recommended.

6. Large rural centers require water systems that offer multiple service options and pricing structures. Like their counterparts in urban areas, households in these communities have a high demand for private connections, or prefer to share a tap with their

neighbors rather than fetch water from a communal water point. Most defunct piped water supply networks in rural Madagascar do not include private or semi-private connections, and thus do not match the demands of the rapidly growing and ever more demanding population. Going forward, it is recommended that all piped water systems constructed in towns with a population of more than 2,000 people should have multiple service options that include private and semi-private options. These types of services encourage water use, which leads to healthier populations as well as increased profitability for the system manager. Reducing the time spent walking to and from a public tap stand will improve livelihoods opportunities, especially for women and girls.

7. It is recommended that USAID and its partners give high priority to developing models for providing modern water services. The public-private partnership model was well executed in RANOn'ala and more work is necessary in-country to further develop and expand the model through the Government-led sector programs. Focusing future investments in emerging rural centers offer a genuine opportunity for the country to significantly increase rural water coverage rates over the next decade. It is recommended that USIAD and its partners, especially the Ministry of Water, support the expansion of the Association of Private Sector Water Distributers.

8. The long-term viability of the public-private partnerships in rural areas posed a challenge. Therefore, it is recommended that USAID and its partners prioritize PPP interventions in areas where the population is denser and the local economy is more attractive to private operators. Assessing the degree of transparency in management and social accountability actors including the PPP Client and the Manager will remain a challenge. To this end, it is recommended to strengthen the relationships between the local authorities, the private sector manager and the subscribers. Conducting periodic evaluations and the use of the "Community Score Card" tool is also recommended.

9. More than 40 companies from across the country have manifested their interest in competing in a series of upcoming calls for proposals sponsored by the project. Companies new to the sector will require specialized training and ongoing support to assure professionalism. It is recommended that USAID and its partners build the capacity of the next generation of entrepreneurs within future bilaterally-funded water projects targeting rural areas. Competition in creating affordable locally made WASH products and spare parts is also recommended to decrease transportation cost, and to increase availability of WASH products and spare parts for the infrastructure.

10. It is recommended that USAID and its partners conduct follow-up evaluations of the public-private partnership approach, those that include a 10-year service contract, during the service contract period to assess: (1) the potential impacts to the projects of any disagreement between service providers and communes (2) water usage rate/revenue issues and (3) water customer satisfaction trends.

11. It is recommended that USAID and its partners develop a comprehensive credit system

for poor families to access loans for water supply and sanitation services at the national level with access in the poorest and most inaccessible regions.

12. It is recommended that USAID and its partners encourage and support where possible the self-supply industry that has developed in eastern Madagascar since it allows the opportunity for families to upgrade their services when they can afford to do so. The development or improvement of water supplies by households largely or wholly at their own cost is an approach that can help increase coverage in areas where it is not feasible or cost-effective to develop communal supplies.

13. It is recommended that USAID and its partners invest in reinforcing the capacity of human resources and work forces in the WASH sector. There is a need to make available at community level a whole range of capacity, from engineers to simple carpenters and masons and hydraulic technicians.

14. It is recommended that USAID and its partners invest more in making ICT solutions available and usable without too much assistance to improve communication and monitoring systems in the WASH sector.

15. It is recommended that USAID and its partners, including local government and its partners, strongly support and fund the training and participation of local entrepreneurs and community workers to increase their knowledge and capacity in managing WASH services as this will strengthen their capacity to work in the WASH sector.

16. It is recommended that for future projects, USAID and its partners conduct more research on providing locally made products, and encourage local invention or innovation of a local product. This could make products more appealing and increase a household's willingness to pay as well as address the additional transportation costs associated with bringing in products from outside the area.

17. It is recommended that USAID and its partners advocate to the government to either subsidize or provide incentives to those banks and microfinance institutions willing to provide innovative offers of financial products to private sector enterprises investing in WASH. This financial support will help the private sector overcome the challenges of working in an environment characterized by high risks and low returns.

    At the same time, it is recommended that USAID and its partners advocate to the government to provide subsidies or incentives to institutions willing to offer financial, technical, social viability of services, and affordability of services to local communities and vulnerable households.

18. It is recommended that the regional director of water support communes and WASH stakeholders in managing their relationship with private sector enterprises. The capacity of communes should be reinforced in being more cautious about contracting

local partners to build large numbers of infrastructure. This scenario increases the volume of work incrementally over time and needs to keep pace with the enterprises' technical, administrative and financial capacity building.

19. It is recommended that USAID and its partners conduct IEC campaign using multiple channels to increase awareness about the importance and benefits of protecting water sources, targeting not only those living upstream within watersheds but those people living near groundwater sources. The campaigns should provide knowledge about the "do's and don'ts" affecting surface and groundwater resources. It is also recommended that *dina* should be established for people to agree on actions to be taken by the local community to protect their water sources.

20. It is recommended that USAID and its partners create a communication channel between upstream and downstream communities to agree on common water resources goals, and to support each other for their different interests in order to reach the goals. It is recommended that the downstream communities pay the upstream communities through water services costs to improve conditions at upstream level so that they not pollute the water resources (e.g., rivers) which the downstream communities use and to not divert it for other purposes. It is recommended that a contract be signed by each party involved in order to formalize the agreement according to the water laws.

21. It is recommended that communal authorities, specifically WASH committees, with support of DREAU should formalize the content of their water sources protection plan to become an official document that all parties need to abide (*arrêté communale*). It is also recommended that monitoring of what have been agreed to in the water resources protection plan be a part of the daily routine of communal mayors, WASH stakeholders, and DREAU.

22. It is recommended that USAID and its partners put in place a monitoring and evaluation system of water quality and water quantity in future programs. The results of the evaluation should be communicated to all communities involved. The monitoring and evaluation system should include the impact of the whole program around water resources in terms of benefits in income and in health. This will reinforce the positive and negative activities affecting water resources as presented in the various forms of messaging.

23. It is recommended that USAID and its partners further develop ICT WASH and water resources messaging systems in order to allow local community members to use it regularly. The technology is still cost prohibitive for poor rural communities and still requires assistance from high skilled technicians.

24. It is recommended that USAID and its partners provide support to the communes in future projects to address the remaining challenges facing water resources protection:
    - Link results of water quantity and quality monitoring with updating water resources protection plans
    - Fund activities to protect water resources and agree to the amount of funds each stakeholders must contribute
    - Improve the technical capacity of locals to protect water resources
    - Increase communities ownership of the ongoing water resources protection activities
    - Formalize the process of water protection plans so that it is implemented according to the water law.

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Annex 1 - RANOn'ala Project List of Acronyms

BCC	Behavior-Change Communication
CCN	Cooperating Country National
CI	Conservation International
CLTS	Community-Led Total Sanitation
COBA	Community-Based Organization
COP	Chief of Party
CRS	Catholic Relief Services United States Conference of Catholic Bishops
CRS/MG	CRS in Madagascar
CWSBP	Commune Water and Sanitation Business Plans
Env/RD	Environment and Rural Development
EMMP	Environmental Monitoring and Mitigation Plan
ERM	Environmental Resource Management
GFWSS	Gravity Flow Water Supply System
GOM	Government of Madagascar
HNI	Human Network International
HPN	Health, Population, and Nutrition
ICT	Information and Communication Technologies
IEC	Information, Education, and Communication
IEE	Initial Environmental Examination
IR	Intermediate Result
IWRM	Integrated Water-Resource Management
LOE	Level of Effort
LQAS	Lot Quality Assurance Sampling
M&E	Monitoring and Evaluation
ME&L	Monitoring, Evaluation and Learning
MBG	Missouri Botanical Garden
MFI	Microfinance Institution
MNP	Madagascar National Parks
MTE	Mid-Term Evaluation
MOW	Ministry of Water
NGO	Non Governmental Organization
NICRA	Negotiated Indirect Cost Rate Agreement
OFDA	Office of U.S Foreign Disaster Assistance
PCU	Program Coordination Unit
PHAST	Participatory Hygiene and Sanitation Transformation
POU	Point-of-Use
PMEP	Performance Monitoring and Evaluation Plan
PPP	Public-Private Partnership
RANO HP	Rural Access for New Opportunities for Health & Prosperity
RANOn'ala	Rural Access to New Opportunities for Health and Water Resource Management
RTI	RTI International
SALOHI	Strengthening and Accessing Livelihood Opportunities for Household Impact

Annex 2 - Highlights of Results from the Final ("Endline") Survey

A final, or "endline", survey of households was conducted during 2013. The survey included 342 households and 7,203 individuals. The results of the survey included the following:

Availability of Improved Drinking Water Sources
Coverage of improved access to water infrastructure has increased in the intervention areas of RANOn'ala. Compared to the initial situation in the project areas, the use by households of improved drinking water sources increased dramatically from 1% to 24%, but short of the 44% target. Similarly in terms of household members (as opposed to households), 81,620 people use an improved source and that the situation is much improved compared to the situation pre-project which was 23,217.

Use of Latrines
Between the beginning and the end of the project, the proportion of households using latrines stood at 92% versus 1% at the beginning of the project and exceeding the project goal of 18%. A total of 17,858 people now have access for the first time to a hygienic sanitation system.

Hand Washing with Soap
The proportion of households with children under five years old who have water and soap available to wash their hands with soap during the three critical times has increased from 9% to 14% between the beginning and the end of the project, exceeding the project goal of 10%. This is likely a result of the efforts in sensitization and in the implementation of improved access to water whether through private or social water connections.

Knowledge of WASH Messaging
Because of the sensitization activities, knowledge of WASH messages has increased in the intervention zone. The proportion of households practicing the three WASH messages went from 0% to 10% between the beginning and the end of the project. Only 17% of the mothers could quote the three key messages.

Time to Fetch Water
Adult women are the main collectors (82%) of household water. Comparing the beginning to the end of the project, the time spent to fetch water decreased from 27 minutes to 15 minutes meeting the project goal of 20 minutes or less. This difference is quite significant especially when you consider those who seek water make several trips a day.

Safe Storage of Drinking Water
The percentage of households that practice safe storage of drinking water increased significantly for the beginning of the project (15%) to the end of the project (60%) exceeding the project goal of 17%.

Amount of Water Used Per Capita Per Day
The final survey found that the average water usage was almost 16 liters per person per day, an increase from 14 liters at the beginning of the project.

Household Water Treatment
Treatment of water before consumption in the household increased from 29% at baseline to 44% at the end of the project.

Water Resources Protection
Seven communes where RANOn'ala built infrastructure have a detailed inventory of threats and opportunities to their water resources as well as a water resources protection plan being implemented by its communities.

The percentage of households with one or more members involved in water resources management increased from 8% at baseline to 38% at the end of the project.

The number of community organizations participating in water resources protection increased from 0 to 52.

Annex 3 - Table of Final Results versus Performance Indicators

Performance Indicators	Baseline Survey	Target	Endline Survey	Percentage of Target
SO 1: Access to water infrastructure at the commune level is improved				
Percentage of households having access to improved water points	1%	44%	48%	109%
IR 1.1: Communes collaborate with the private sector for improved management of water and sanitation infrastructure				
Number of communes having water and sanitation management committee	0	10	10	100%
Number of local authorities trained in water law	0	200	220	110%
Number of communes having business plan	0	10	10	100%
IR 1.2: Communities use sustainable models for investing in water and sanitation infrastructure				
Number of new private entrepreneurs providing water products and services	0	13	11	85%
Number of new private entrepreneurs supplying sanitary products and services	0	8	11	138%
Number of masons and carpenters providing sanitation products and services	0	30	30	100%
Number of people members of functional Savings Community and internal credit community.	0	1,000	816	82%
IR 1.3: Household water supply access and coverage increased				
Number of people having access to improved water infrastructure.	23,217	75,000	81,620	109%
Number of improved gravity flow water supply systems / AEPP	0	13	10	77%
Number of manual pumps	18	150	239	159%
SO 2: Appropriate and diverse use of sustainable, safe water supply and sanitation services is increased				
Percentage of households practicing 3 WASH key messages.	0%	10%	9.6%	96%
IR 2.1: Communities and households adopt improved hygiene practices				
Percentage of households practicing a recommended water treatment method.	0,4%	38%	78%	205%
Percentage of households practicing proper water storage.	15%	17%	60%	353%
IR 2.2: Communities and households adopt improved, appropriate sanitation behaviors				
Percentage of households having children under 5 years old who have given up open air defecation (Open Defecation Free)	0.9%	18%	92%	511%
Percentage of people who have given up open air defecation (Open Defecation Free).	1%	18%	92%	511%
Number of household in the target areas having access for the first time to a hygienic sanitation system as result of the USG assistance.	0	10,400	17,858	172%
Percentage of households having children under 5 years old and having soap and water for hand washing purpose during critical moments.	9%	10%	14%	140%

Performance Indicators	Baseline Survey	Target	Endline Survey	Percentage of Target
Number of people trained in rehabilitation, maintenance, and management of water and sanitation infrastructures	0	200	281	141%
SO3: Water resources are protected and managed in a sustainable fashion				
Percentage of watersheds and water resources linked to RANOn'ALA gravity-flow water supply systems with protection measures implemented by communities with protective measure in place.	0%	100%	100%	100%
Percentage of perimeters linked with RANOn'ALA boreholes with protective measures implemented by communities	0%	100%	100%	100%
IR 3.1: Populations more fully appreciate water resource management				
Percentage of households with a member or more involved in water resources management.	8%	25%	38%	152%
Number of communes having a detailed inventory related to the water resources protection and based on an initial assessment of threats and opportunities.	0	10	10	100%
IR 3.2: Key stakeholders engage in sustainable water resource management				
Percentage of RANOn'ALA infrastructures in 10 communes having a water resources protection plan implemented by communities	0%	100%	100%	100%
Number of community organization participating in water resources protection.	0	20	52	260%

Annex 4 - RANOn'ala Water Projects

N°	LNGO partners	REGION	DISTRICT	COMMUNE	FOKONTANY/ SITE	GIS		Type of Infrastructure	Rehabilitation	New construction	Number of beneficiaries
						Longitude (S)	Latitude (E)				
1	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Sahave	S16°10'7.29"	EO49°45'56.57"	GFWSS	YES		649
					Antsirantenina				YES		913
					Madiotona				YES		502
					Antetezambe				YES		788
					Mahambolona				YES		477
					Antanambao				YES		3,400
					Mananara Centre				YES		4,000
					Androkaroka				YES		1,405
					Antanankoro				YES		1,650
					Ambitsika				YES		1,336
2	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Mahambolona	16.1855556	49.7841667	Canzee pumps		YES	504
3	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1832500	49.7800000	Canzee pumps		YES	
4	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Mahanoro	16.1641944	49.7589444	Canzee pumps		YES	328
5	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1637500	49.7570556	Canzee pumps		YES	
6	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1623056	49.7542778	Canzee pumps		YES	
7	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Analanampotsy	16.1712222	49.7549167	Canzee pumps		YES	1,354
8	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1722222	49.7556389	Canzee pumps		YES	
9	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1729167	49.7543611	Canzee pumps		YES	
10	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1729722	49.7555278	Canzee pumps		YES	
11	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1762222	49.7539167	Canzee pumps		YES	
12	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Aniribe	16.1357500	49.7153333	Canzee pumps		YES	793
13	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1315278	49.7136667	Canzee pumps		YES	
14	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1280278	49.7092222	Canzee pumps		YES	
15	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1275556	49.7083056	Canzee pumps		YES	
16	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1276111	49.7073889	Canzee pumps		YES	
17	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1248889	49.7038333	Canzee pumps		YES	
18	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1190278	49.7032500	Canzee pumps		YES	
19	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1162500	49.7034444	Canzee pumps		YES	
20	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Antanandava	16.1601667	49.7495000	Canzee pumps		YES	495
21	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1588611	49.7425000	Canzee pumps		YES	
22	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1587778	49.7411944	Canzee pumps		YES	
23	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1583889	49.7395278	Canzee pumps		YES	
24	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1575556	49.7390000	Canzee pumps		YES	
25	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Soavinarivo	16.1698889	49.7290000	Canzee pumps		YES	1,727
26	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1670000	49.7240278	Canzee pumps		YES	
27	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1676944	49.7229444	Canzee pumps		YES	
28	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1680000	49.7245000	Canzee pumps		YES	
29	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1683333	49.7251944	Canzee pumps		YES	
30	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1679722	49.7233056	Canzee pumps		YES	
31	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1672500	49.7192222	Canzee pumps		YES	
32	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1671944	49.7181111	Canzee pumps		YES	
33	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1675000	49.7171389	Canzee pumps		YES	
34	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1674444	49.7159167	Canzee pumps		YES	

Annex 4 - RANOn'ala Water Projects

N°	LNGO partners	REGION	DISTRICT	COMMUNE	FOKONTANY/ SITE	GIS		Type of Infrastructure	Rehabilitation	New construction	Number of beneficiaries
						Longitude (S)	Latitude (E)				
35	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1670278	49.7148611	Canzee pumps		YES	
36	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1666111	49.7128889	Canzee pumps		YES	
37	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1666389	49.7133889	Canzee pumps		YES	
38	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1684722	49.7220278	Canzee pumps		YES	
39	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.2026389	49.7511111	Canzee pumps		YES	
40	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1994167	49.7523333	Canzee pumps		YES	
41	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1957778	49.7533611	Canzee pumps		YES	
42	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1948333	49.7535556	Canzee pumps		YES	
43	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Ambodirotro	16.1926111	49.7548056	Canzee pumps		YES	1,396
44	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1919167	49.7552778	Canzee pumps		YES	
45	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1913056	49.7561111	Canzee pumps		YES	
46	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.1887222	49.7578333	Canzee pumps		YES	
47	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.15005556	49.72561111	Canzee pumps		YES	
48	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.14919444	49.72452778	Canzee pumps		YES	
49	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.14794444	49.72308333	Canzee pumps		YES	
50	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Tampolo	16.14655556	49.72191667	Canzee pumps		YES	1,050
51	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.14544444	49.721	Canzee pumps		YES	
52	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.13516944	49.72005278	Canzee pumps		YES	
53	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.15135	49.72751389	Canzee pumps		YES	
54	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.211	49.78777778	Canzee pumps		YES	
55	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.20936111	49.78675	Canzee pumps		YES	
56	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.20788889	49.78602778	Canzee pumps		YES	
57	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.20422222	49.78513889	Canzee pumps		YES	
58	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Ankorabe	16.19988889	49.832	Canzee pumps		YES	930
59	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.19988889	49.78197222	Canzee pumps		YES	
60	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.197275	49.78155	Canzee pumps		YES	
61	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.19275556	49.77990556	Canzee pumps		YES	
62	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Ambatomilona	16.22236111	49.81022222	Canzee pumps		YES	426
63	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.22166667	49.80952778	Canzee pumps		YES	
64	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21425	49.79372222	Canzee pumps		YES	
65	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21566667	49.79413889	Canzee pumps		YES	
66	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21878333	49.79730278	Canzee pumps		YES	
67	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21998889	49.79625833	Canzee pumps		YES	
68	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara	Ambatofitarafana	16.21846667	49.80113056	Canzee pumps		YES	1,151
69	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21966667	49.80097222	Canzee pumps		YES	
70	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21702778	49.79355556	Canzee pumps		YES	
71	Caritas Fénérive-Est	Analanjirofo	Mananara	Mananara		16.21730556	49.79516667	Canzee pumps		YES	
72	Caritas	Analanjirofo	Mananara	Imorona	Imorona	EO49°50'9.40"	S16°12'7.80"	GFWSS		YES	2,998
				Imorona	Vohitralanana					YES	1,753
72	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2421400	49.8394500	Canzee pumps		YES	
73	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2428900	49.8404800	Canzee pumps		YES	
74	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2433200	49.8404300	Canzee pumps		YES	
75	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2434900	49.8407900	Canzee pumps		YES	

Annex 4 - RANOn'ala Water Projects

N°	LNGO partners	REGION	DISTRICT	COMMUNE	FOKONTANY/ SITE	GIS		Type of Infrastructure	Rehabilitation	New construction	Number of beneficiaries
						Longitude (S)	Latitude (E)				
76	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona	Serananambe	16.2437600	49.8403800	Canzee pumps		YES	1,755
77	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2433300	49.8398400	Canzee pumps		YES	
78	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2428800	49.8389200	Canzee pumps		YES	
79	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2437300	49.8395000	Canzee pumps		YES	
80	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2440800	49.8393200	Canzee pumps		YES	
81	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2468300	49.8393700	Canzee pumps		YES	
82	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2477700	49.8396500	Canzee pumps		YES	
83	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona	Hoalampano	16.2679300	49.8383900	Canzee pumps		YES	528
84	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2684900	49.8387000	Canzee pumps		YES	
85	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2689100	49.8386800	Canzee pumps		YES	
86	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2678600	49.8387300	Canzee pumps		YES	
87	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.2670400	49.8388900	Canzee pumps		YES	
88	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona	Antsirakivolo	16.1862222	49.8200000	Canzee pumps		YES	743
89	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.1872778	49.8190278	Canzee pumps		YES	
90	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.1852778	49.8278333	Canzee pumps		YES	
91	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.1856389	49.8183889	Canzee pumps		YES	
92	Caritas Fénérive-Est	Analanjirofo	Mananara	Imorona		16.1818056	49.8118056	Canzee pumps		YES	
93	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Antanambe	49°49'59.80"E	16°26'5.40"S	GFWSS	YES		3,458
94	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Sahasoa	16.3454900	49.8124500	Canzee pumps		YES	1,203
95	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3452700	49.8119300	Canzee pumps		YES	
96	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3455900	49.8111860	Canzee pumps		YES	
97	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3463300	49.8107400	Canzee pumps		YES	
98	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3464100	49.8115200	Canzee pumps		YES	
99	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3470300	49.8113100	Canzee pumps		YES	
100	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3474900	49.8116400	Canzee pumps		YES	
101	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3471000	49.8122100	Canzee pumps		YES	
102	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3465600	49.8121900	Canzee pumps		YES	
103	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3459100	49.8124900	Canzee pumps		YES	
104	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3477900	49.8120500	Canzee pumps		YES	
105	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3485400	49.8118200	Canzee pumps		YES	
106	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3490600	49.8118100	Canzee pumps		YES	
107	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3494400	49.8117300	Canzee pumps		YES	
108	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3505300	49.8118000	Canzee pumps		YES	
109	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.3511500	49.8118700	Canzee pumps		YES	
110	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Vahibe	16.4186000	49.8278200	Canzee pumps		YES	742
111	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4187800	49.8272200	Canzee pumps		YES	
112	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4185800	49.8272700	Canzee pumps		YES	
113	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4187100	49.8254400	Canzee pumps		YES	
114	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Mandrisy	16.4751600	49.8490200	Canzee pumps		YES	851
115	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4763600	49.8489200	Canzee pumps		YES	
116	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4771600	49.8483500	Canzee pumps		YES	
117	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4790200	49.8469700	Canzee pumps		YES	
118	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4798100	49.8465000	Canzee pumps		YES	

Annex 4 - RANOn'ala Water Projects

N°	LNGO partners	REGION	DISTRICT	COMMUNE	FOKONTANY/ SITE	GIS		Type of Infrastructure	Rehabilitation	New construction	Number of beneficiaries
						Longitude (S)	Latitude (E)				
119	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4782600	49.8264200	Canzee pumps		YES	
120	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.4777600	49.8280100	Canzee pumps		YES	
121	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Antanambao Mandrisy	16.5087900	49.8394900	Canzee pumps		YES	868
122	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5092200	49.8369800	Canzee pumps		YES	
123	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5108400	49.8369700	Canzee pumps		YES	
124	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5141600	49.8398700	Canzee pumps		YES	
125	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5149200	49.8401200	Canzee pumps		YES	
126	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5159100	49.8408200	Canzee pumps		YES	
127	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5186200	49.8421700	Canzee pumps		YES	
128	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5192200	49.8413100	Canzee pumps		YES	
129	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5200800	49.8417100	Canzee pumps		YES	
130	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5202500	49.8426000	Canzee pumps		YES	
131	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Manambato	16.5375556	49.8383611	Canzee pumps		YES	756
132	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5374444	49.8384722	Canzee pumps		YES	
133	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5376667	49.8376944	Canzee pumps		YES	
134	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5367778	49.8376667	Canzee pumps		YES	
135	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5365833	49.8387222	Canzee pumps		YES	
136	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5356111	49.8384722	Canzee pumps		YES	
137	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5344722	49.8381389	Canzee pumps		YES	
138	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5343333	49.8373056	Canzee pumps		YES	
139	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5331667	49.8364444	Canzee pumps		YES	
140	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5351111	49.8374722	Canzee pumps		YES	
141	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5348056	49.8365556	Canzee pumps		YES	
142	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5354722	49.8366389	Canzee pumps		YES	
143	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5361667	49.8360278	Canzee pumps		YES	
144	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5345400	49.8380900	Canzee pumps		YES	
145	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5331500	49.8364900	Canzee pumps		YES	
146	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Malotrandro	16.5657200	49.8358100	Canzee pumps		YES	957
147	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5678800	49.8351300	Canzee pumps		YES	
148	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5685300	49.8341700	Canzee pumps		YES	
149	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5685200	49.8341700	Canzee pumps		YES	
150	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5708900	49.8339900	Canzee pumps		YES	
151	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5850900	49.8207000	Canzee pumps		YES	
152	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5906700	49.8142900	Canzee pumps		YES	
153	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5936100	49.8110300	Canzee pumps		YES	
154	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5938700	49.8104000	Canzee pumps		YES	
155	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5948400	49.8108200	Canzee pumps		YES	
156	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5960100	49.8085300	Canzee pumps		YES	
157	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5964700	49.8078400	Canzee pumps		YES	
158	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5965700	49.8081200	Canzee pumps		YES	
159	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5968400	49.8078100	Canzee pumps		YES	
160	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.5977700	49.8056000	Canzee pumps		YES	
161	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6109100	49.8008700	Canzee pumps		YES	

Annex 4 - RANOn'ala Water Projects

N°	LNGO partners	REGION	DISTRICT	COMMUNE	FOKONTANY/ SITE	GIS		Type of Infrastructure	Rehabilitation	New construction	Number of beneficiaries
						Longitude (S)	Latitude (E)				
162	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe	Anove Nord	16.6115200	49.8005500	Canzee pumps		YES	766
163	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6102200	49.7978200	Canzee pumps		YES	
164	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6094500	49.7966800	Canzee pumps		YES	
165	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6080400	49.7969800	Canzee pumps		YES	
166	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6107000	49.7959500	Canzee pumps		YES	
167	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6118500	49.7997500	Canzee pumps		YES	
168	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6127800	49.8007900	Canzee pumps		YES	
169	Caritas Fénérive-Est	Analanjirofo	Mananara	Antanambe		16.6157200	49.8007900	Canzee pumps		YES	
170	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana	Moronivo	16.6203056	49.7433333	Canzee pumps		YES	2,989
171	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6189444	49.7438889	Canzee pumps		YES	
172	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6400556	49.7272778	Canzee pumps		YES	
173	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6400000	49.7280556	Canzee pumps		YES	
174	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6397222	49.7283333	Canzee pumps		YES	
175	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6402778	49.7288889	Canzee pumps		YES	
176	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana	Anove Sud	16.6232778	49.7969444	Canzee pumps		YES	2,050
177	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6236667	49.7968056	Canzee pumps		YES	
178	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6240556	49.7966111	Canzee pumps		YES	
179	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6243056	49.7964722	Canzee pumps		YES	
180	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6251389	49.7965278	Canzee pumps		YES	
181	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6262778	49.7955833	Canzee pumps		YES	
182	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6280833	49.7949722	Canzee pumps		YES	
183	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6340556	49.7941111	Canzee pumps		YES	
184	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6348889	49.7927778	Canzee pumps		YES	
185	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6370556	49.7916111	Canzee pumps		YES	
186	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6464444	49.7880833	Canzee pumps		YES	
187	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6443889	49.7885278	Canzee pumps		YES	
188	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6448611	49.7883611	Canzee pumps		YES	
189	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6484722	49.7870556	Canzee pumps		YES	
190	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6495833	49.7868333	Canzee pumps		YES	
191	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.6508333	49.7866389	Canzee pumps		YES	
192	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana	Sahabevava	16.7211667	49.7208889	Canzee pumps		YES	592
193	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7200278	49.7210278	Canzee pumps		YES	
194	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7168889	49.7206111	Canzee pumps		YES	
195	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7152778	49.7204444	Canzee pumps		YES	
196	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7142778	49.7202500	Canzee pumps		YES	
197	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7135000	49.7203333	Canzee pumps		YES	
198	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7128056	49.7204444	Canzee pumps		YES	
199	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana	Antanambao Ambodimanga	16.7511111	49.7238611	Canzee pumps		YES	2,977
200	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7501944	49.7239167	Canzee pumps		YES	
201	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7483889	49.7244444	Canzee pumps		YES	
202	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7475556	49.7250556	Canzee pumps		YES	
203	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7469722	49.7254167	Canzee pumps		YES	
204	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7718611	49.7062500	Canzee pumps		YES	

Annex 4 - RANOn'ala Water Projects

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						Longitude (S)	Latitude (E)				
205	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana	Antanambao Ambodimanga	16.7681944	49.7053056	Canzee pumps		YES	2,977
206	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7678333	49.7058611	Canzee pumps		YES	
207	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7684167	49.7043611	Canzee pumps		YES	
208	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7669444	49.7059722	Canzee pumps		YES	
209	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7661389	49.7067222	Canzee pumps		YES	
210	Caritas Fénérive-Est	Analanjirofo	Soanierana Ivongo	Manompana		16.7656667	49.7067222	Canzee pumps		YES	
211	Caritas Fénérive-Est	Analanjirofo	Mananara	Manompana	Manompana	49°44'56.80"E	16°41'21.00"S	GFWSS		YES	5,328
212	Caritas Fénérive-Est	Analanjirofo	Mananara	Antananivo	Antananivo	E49°43'11.30"	S16°17'6.65"	GFWSS		YES	3,678
213	Caritas Fénérive-Est	Analanjirofo	Mananara	Antananivo	Andratamarina	E49°43'48.24"	S16°18'26.70"			YES	1,047
214	Caritas Fénérive-Est	Analanjirofo	Mananara	Antananivo	Ambohitsara	E 49°41'34.3''	S 16°17'21.6''	GFWSS		YES	769
215	Caritas Fénérive-Est	Analanjirofo	Mananara	Antananivo	Antanamirantina	E 49°41'25.74"	S16°17'42.24"			YES	562
216	Caritas Fénérive-Est	Analanjirofo	Mananara	Sandrakatsy	Andravolasoa	E49°38'09,31"	S16°18'32,62"	GFWSS		YES	947
217	Caritas Fénérive-Est	Analanjirofo	Mananara	Sandrakatsy	Ifasina	E49°34'16,57"	S16°20'25,49"	GFWSS		YES	1,439
218	Caritas Fénérive-Est	Analanjirofo	Mananara	Sandrakatsy	Sandrakatsy	E49°36'48,81"	S16°20'29,64"	GFWSS		YES	7,127
219	Caritas Fénérive-Est	Analanjirofo	Mananara	Sandrakatsy	Varary	E49°38'36,93"	S16°21'51,49"			YES	1,161
220	Caritas Fénérive-Est	Analanjirofo	Mananara	Sandrakatsy	Andapatenina	E49°37'13,67"	S16°20'54,50"			YES	472
221	Caritas Maritandrano	Sofia	Maritandrano	Lampibe	Lampibe	E048°51'50.00"	S16° 6'41.00"	GFWSS		YES	2102
222	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'21.5"	49°39'15.3"	Canzee pumps		YES	2582
223	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'20.9"	49°39'15.1"	Canzee pumps		YES	
224	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'20.0"	49°39'11.0"	Canzee pumps		YES	
225	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'16.2"	49°39'10.3"	Canzee pumps		YES	
226	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'16.5"	49°39'09.0"	Canzee pumps		YES	
227	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'15.9"	49°39'06.9"	Canzee pumps		YES	
228	Caritas Maritandrano	Analanjirofo	Antanambaobe	Ambodisatrana	Ambodisatrana	16°16'15.0"	49°39'05.2"	Canzee pumps		YES	
229	Caritas Maritandrano	Analanjirofo	Antanambaobe	Antanetilava	Antanetilava	16°14'55.3"	49°40'31.1"	Canzee pumps		YES	1759
230	Caritas Maritandrano	Analanjirofo	Antanambaobe	Antanetilava	Antanetilava	16°14'49.6"	49°40'34.8"	Canzee pumps		YES	
231	Caritas Maritandrano	Analanjirofo	Antanambaobe	Antanetilava	Antanetilava	16°15'12.1"	49°40'16.2"	Canzee pumps		YES	
232	Caritas Maritandrano	Analanjirofo	Antanambaobe	Antanetilava	Antanetilava	16°14'49.8"	49°40'44.7"	Canzee pumps		YES	
233	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°14'08.1"	49°40'49.9"	Canzee pumps		YES	1387
234	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'42.0"	49°40'05.5"	Canzee pumps		YES	
235	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'46.1"	49°40'02.4"	Canzee pumps		YES	
236	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'47.1"	49°39'58.3"	Canzee pumps		YES	
237	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'50.0"	49°39'55.0"	Canzee pumps		YES	
238	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'52.8"	49°39'54.5"	Canzee pumps		YES	
239	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'57.8"	49°39'47.7"	Canzee pumps		YES	
240	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'43.4"	49°40'04.3"	Canzee pumps		YES	
241	Caritas Fénérive-Est	Analanjirofo	Antanambaobe	Antanambaobe	Antanambaobe	16°15'45.8"	49°40'05.5"	Canzee pumps		YES	