PROJECT FATSAKA (PHASE II)

Increasing long-term access to safe drinking water through community-led water source management in the Mahatalaky Rural Commune, southeast Madagascar

Final Report

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1. Summary

Over 65% of Madagascar's rural population lack access to safe drinking water (JMP, 2017). The health and economic impacts resulting from poor access to water, sanitation and hygiene (WASH) are substantial. Each year in Madagascar, 6,900 children die as a consequence of contaminated water (MINEAU, 2016). In addition, an estimated US$77 million are lost due to premature deaths caused by diarrhoeal disease (MINEAU, 2016); 90% of which are directly attributed to unsafe water or poor sanitation and hygiene (ibid.).

With around 97% of the rural population in the Anosy region living in poverty (World Bank 2018), high incidences of illness caused by lack of access to safe drinking water entrap communities, such as those living in the Mahatalaky Rural Commune (MRC), into perpetual cycles of disease and poverty. It is estimated that 12% of people in the Anosy region needlessly suffer from easily preventable diarrhoeal disease due to poor WASH habits and infrastructure (Healy, 2018). The tragic effects of this are exacerbated by the significantly increased costs and difficulty in accessing medical treatment. This is especially pertinent for many communities residing in geographic isolation, including those living in the MRC.

Over the past 18 months, Project Fatsaka Phase II has supported the most marginalised and vulnerable people living in the MRC to tackle the health-poverty trap caused by lack of access to safe drinking water. Since May 2017, Project Fatsaka has scaled up its innovative community-led, capacity building approach to rural water source rehabilitation to a further 15 communities. Across the project, all 15 communities received WASH sensitisations and continued follow-up support from the project's Community Liaison Officers (CLOs) to achieve their Community Action Plans (CAPs). Well committees were established and trained in well management, maintenance and repair, with local government successfully engaged to help motivate communities to take action to improve water resource management. Furthermore, training to conduct WASH education in schools was delivered to local teachers, along with IEC materials and classes for students in key WASH subjects.

Drawing upon previous learning through a comprehensive reassessment of the pilot phase, Phase II of Fatsaka has enhanced the project's approach, allowing SEED to continually respond to community needs and achieve greater impact. The final evaluation has shown encouraging results in the long-term impact of Fatsaka's approach. Overall, Phase II well usage has increased to 96% of households. Tested wells displayed improved water quality and all 15 wells have regained full functionality. Communities have demonstrated increased motivation, ability, and action to use and maintain their protected wells. Local Commune authorities have increased awareness of local well conditions and offered support to well committees in managing and maintaining wells. Combined, these results present promising indications of continued long-term access to safe drinking water by increasing local capacity to take ownership and responsibility of well management.

2. Key Terms

Key terms and Definitions

Key term	Definition for the purpose of this report
Functional well	A well that is sealed (i.e. concrete structure intact), and from which water can be drawn using the hand pump.
Improved water source	A water source that that is structurally protected from external contaminants, particularly faecal contamination. Examples include piped water into dwellings, protected springs, rainwater collection and protected dug wells (i.e. lined with concrete and fitted with a secure water lifting device such as a hand pump). All Project Fatsaka wells are protected dug wells.
Primary water source (PWS)	The main source of water used by a household for drinking and cooking.
Sole/exclusive use	Use of a specific water source for a specific function. For example, water from a well used solely for drinking and cooking or a river used exclusively as a bathing site.
Utilisation rate	The percentage of the sample population using the specified water source (i.e. the well, a river source, etc).
Well	Throughout this report the term "well" will refer exclusively to a protected dug well.

Drinking Water Quality and Risk

The WHO guidelines for drinking water quality (1997) classify the following thermotolerant (faecal) coliforms (or E. coli) counts in water supplies in increasing magnitudes of risk:

CFU per 100ml	Level of Risk
0	None: in conformity with WHO guidelines
1-10	Low risk
11-100	Intermediate risk
101-1000	High risk
>1000	Very high risk

3. Fatsaka's Approach to Rural Water Source Management

Project Rationale

Access to safe and reliable water sources is paramount to the health of people in the Mahatalaky Rural Commune (MRC), who are affected by erratic droughts, food insecurity and easily preventable diseases, which contribute to high incidences of child mortality and illness (Healy, 2018).

Since the 1990s, several international agencies have responded to water supply shortages by providing water infrastructure in the form of borehole or protected dug wells, but these interventions have proven insufficient. As infrastructure provision was not accompanied with post-construction support, rural communities lacked the means and know-how necessary to effectively maintain their wells. The absence of technical training, financing mechanisms and management systems, as well as an inexistent sense of community ownership over externally constructed infrastructure resulted in all targeted 15 wells included in Phase II falling into a state of disrepair over the past years.

Moreover, the lack of specialist knowledge and capacity to monitor rural water supply systems on behalf of local government produced low levels of regulatory engagement and institutional involvement. The communities were thus deficient in institutional support from the local Commune to confront the management and maintenance challenges for sustainable service delivery. The resulting dearth of regulatory oversight and technical support to carry out necessary well maintenance and repairs has led to over 10,000 people resorting back to contaminated river and surface waters for drinking and cooking.

Additionally, health outcomes across the MRC are further affected by poor drinking water practices and hygiene behaviours. Situated in a tropical rainforest climate, the MRC experiences sporadic bouts of heavy rainfall, producing an abundance of surface waters. Baseline assessments showed that a majority (61%) of households expressed a preference for using readily available surface waters over protected wells as their primary water source, due to convenience and comparatively shorter walking distances.

With the majority of the MRC's population living in extreme poverty and isolation (Healy, 2018), access to basic WASH infrastructure, especially latrines, remains insufficient. Nationally, only 10% have access to basic sanitation facilities, resulting in over 55% of Madagascar's rural population practising open defecation (OD) (JMP, 2017). Consequently, unimproved water sources, such as rivers and surface waters, are highly contaminated, carrying tremendous risks for public health. Water tests conducted during midterm data collection in September 2017 found alarmingly high faecal contamination in unimproved water sources, posing a 'very high risk' to human health as defined by the WHO (1997). Beyond contributing to high incidences of diarrhoeal disease, one of the most common causes of death for children under 5, contaminated water and poor sanitation also account for cyclical epidemics of the plague and the transmission of cholera, dysentery, hepatitis A and typhoid (WHO, 2017).

Project Approach

Recognising the dire need for community capacity building and institutional support to ensure sustainable access to safe drinking water, SEED has scaled-up its approach to a further 15 communities during its second phase. Project Fatsaka has taken a three-tier approach to rural water source rehabilitation to reduce the risk of waterborne illnesses in the MRC:

1) **Encouraging use of protected dug wells and safe drinking water practices by innovatively adopting the Community-led Total Sanitation (CLTS) methodology and WASH hygiene promotion activities.**
   By using CLTS-inspired shock triggering techniques, SEED highlighted the health implications of poor drinking water practices and raised awareness of the importance of repairing and maintaining community wells to access safe water from improved sources. Hygiene promotion activities, including WASH classes in schools, the development and distribution of IEC materials, community mobilisation meetings and gender-sensitive focus groups, further encouraged knowledge improvements on the benefits of safe drinking water and built local demand for community action to repair wells and regain access to safe water sources.

2) **Supporting long-term community management and maintenance of wells by building local capacity through technical, financial and management training.**
   SEED built local capacity to ensure communities are able to access safe water sustainably in the future. After raising awareness and creating local demand to improve water supply conditions, communities were encouraged to elect well committees, which received extensive training on well management and maintenance. SEED delivered technical, financial and management training sessions, as well as monthly monitoring meetings to support committees in autonomously managing and maintaining their community wells. No longer needing external funding or support, communities have been empowered to independently find solutions to problems surrounding well water supply.

3) **Building the capacity of Commune authorities to carry out water source management requirements as outlined in national and regional legislation, thereby improving governance in rural water resource management.**
   SEED encouraged the local government (Commune) to support communities with well management and maintenance. Engagement meetings and training sessions for two Commune Agents over the past 18 months enabled the Commune to independently supervise and assist well committees beyond project close. The involvement of institutional authority figures through Commune Agents increases long-term accountability and transparency of rural community water supply management.

4. Activity Detail

Community Identification and Initial Meetings

SEED identified 15 communities with protected dug wells that required repairs. A thorough baseline assessment conducted in May 2017 established community needs, determined well conditions and evaluated drinking water practices. Initial meetings were conducted with community leaders from each village to ensure their involvement in project activities and gain permission to work in their community.

Community Triggering

Following successful application in Phase I, Fatsaka Phase II innovatively adapted the CLTS methodology to sensitise communities to the consequences of poor drinking water practices. The CLTS method uses crude language to shock communities into improving their drinking water practices during village meetings. An example of this methodology, known as the '*shit in a glass'* technique, involved dipping a strand of hair in excrement on the ground and then into a glass of water, demonstrating the dubious quality of seemingly clean water and the importance of using improved water sources. Furthermore, CLOs guided community members to draw connections between open defecation, water sources and diarrhoeal diseases. Participants mapped their villages and CLOs led transect walks between surface waters and open defecation sites, highlighting the movement of faecal matter.

CLTS shock methods proved successful in prompting community members to reconsider drinking water practices. During the first interim evaluation, over two-thirds (69%) of participants attending the session stated CLTS triggering motivated them to want to change their drinking-water practices. 69% asserted that they actively started to contribute to the improvement of their community well.

Left: A woman places a leaf that represents a water point on a drawn-out map of her community.
Right: a CLO gathers the community of Antavibe to demonstrate the 'shit in a glass' technique.

Well Committee Establishment and Community Action Plans (CAPs)

Once CLTS triggering sessions were complete, SEED organised village meetings, incentivising communities to assume collective responsibility of their wells and take action to regain access to safe drinking water. In line with Fatsaka*'s* focus on community involvement and ownership, community members were encouraged to discuss desired changes and develop CAPs for well management and maintenance. CAPs typically included well site cleaning schedules, the creation of a '*dina'* (local rules and procedures for well use), an agreement on suitable financial systems to meet required maintenance needs, and the construction of a fence to secure water source protection.

Following the development of CAPs, SEED facilitated the election of highly motivated community members to well committees. These members acted as agents of change, receiving monthly support and training from SEED to assume the responsibility of managing and maintaining community wells and overseeing CAP implementation. CLOs encouraged women, who tend to be the primary water collectors, to join well committees and become actively involved in the decision-making process.

Throughout the project cycle, SEED's CLOs conducted monthly monitoring visits, during which they supported and advised committees on how to overcome challenges associated with CAP implementation. In line with the project's CLTS-inspired methodology and emphasis on community engagement, SEED decided to discontinue working with two of the 15 communities who had consistently failed to participate in the project and follow through on their CAPs. By project end, the remaining 13 communities had successfully raised money for well repair purchases, cleaned and protected the well site with a fence, completed repairs and established a '*dina'* surrounding well usage.

Well Management and Maintenance Training

As part of Fatsaka's objective to ensure communities have the capacity to independently manage, maintain and repair their wells, SEED organised the following three training sessions for well committees in each village:

Session 1 included a role-defining activity, whereby community members negotiated the roles and responsibilities of their well committees. With SEED emphasising its role as an independent advisor and facilitator, community members themselves defined these roles and responsibilities, increasing stakeholder buy-in.

Session 2 comprised financial management and bookkeeping training. By assessing individual community needs, SEED offered recommendations on establishing suitable financial plans to meet maintenance needs. Well committees received training on hosting community meetings, registering well users and writing reports to update Fatsaka staff and local Commune agents. This training was designed to ensure that, despite low levels of literacy, well committee members could successfully document well observations, repairs, financial payments and community agreements. Committees with limited literacy were encouraged to develop their own symbols to depict the meaning of key reporting functions, such as through basic shapes.

Session 3 encompassed both theoretical and technical well repair training over a two-day period. All committee members attended the sessions, empowering female members to participate in an activity that would normally only involve men. Committee members were trained on conducting simple repairs, including fixing broken valves, cementing the wells' concrete structures and replacing the inner tubing when necessary.

Well Repairs and Water Treatment

After encouraging communities to follow and achieve their CAPs, SEED's construction team collaborated with well committees to carry out essential repairs. The repairs served the dual purpose of enabling access to safe drinking water and developing communities' skillsets in technical well repairs. By observing and actively learning from the maintenance process on their community well, committee members gained hands-on experience on how to conduct basic well repairs. All wells underwent major or minor repairs, assuring full functionality of all 13 wells by endline.

Following well repairs, all 13 wells were cleaned and treated by shock chlorination to ensure wells were free from contamination and posed no threat to human health. Shock chlorination treatment kills any unwanted bacteria and helps neutralise the iron-oxidising bacteria level, a non-harmful bacterium that oxidises ferrous iron and produces rust-coloured deposits that may damage the well. After emptying the chlorinated water from the wells, chlorine level tests were conducted to ensure well water was safe for consumption before the communities were able to use it. During the entire disinfection process, the well committees and community members were involved in helping to clean the inside of the well, emptying it, and guarding it during the shock chlorination.

This appeared to be an empowering experience for those involved, particularly for the well committees' technicians, as they were able to learn more about their wells, open them up and understand their mechanisms more thoroughly. Since disinfection, water-testing results have shown that this has been a promising factor in lowering and/or eliminating faecal bacteria in protected dug wells (see MEL section of this report).



Well committee member actively repairing and maintaining their community wells as part of SEED's practical training sessions

Cross-Community Learning Visits

Training sessions were accompanied by cross-community learning visits, during which well committees visited each other's well sites, discussed management practices, and shared experiences. These have proven effective, with several well committees demonstrating increased motivation to cooperate and support their neighbouring well committees. This was evidenced by the well committee of *Agnasa* buying cement and selling the remaining amount to *Ankazomasy I* after completing construction on their well. The heightened cooperation between villages to share experiences and request additional assistance will hopefully aid safeguarding of quality water supply throughout the MRC beyond project close.

Commune Liaison and Capacity Building

SEED's engagement with the local institution (Commune) has made significant progress in increasing governance in rural water resource management.

The Commune has been highly receptive to assuming a greater role in monitoring and managing rural wells. This is evidenced by their efforts to implement the national Water Code: a national law consigning the sanitary maintenance of water infrastructure as a key responsibility of local authorities. With the assistance of SEED, the mayor has been particularly engaged, assigning two officials as Commune Agents to provide regulatory oversight and technical support to local well committees within the MRC. Since last March, these newly employed Commune Agents have received on-the-job training by SEED and conducted regular community follow-up visits with the Fatsaka team. The presence of institutional authorities during monitoring visits has added considerable momentum to the project, with communities demonstrating increased motivation to achieve their action plans.

Moreover, Commune agents successfully mobilised the two communities (*Esiasia* and *Marovato*) that had previously discontinued working with Project Fatsaka due to consistent failure to engage with the project. Motivated by institutional authority, the two communities demonstrated a renewed commitment to their action plans, successfully introducing monthly payments towards maintenance and cleaning up the area around the well site. This example shows that the combination of both bottom-up, community-led approaches, as well as top-down institutional pressure, is instrumental in motivating rural communities in managing and maintaining WASH infrastructure, thereby ensuring sustainable access to services.

By facilitating discussion around rural water management and building the capacity of authorities in well management and maintenance, SEED equipped local institutions to independently supervise and support well committees beyond project finish. The Commune authority's assumption of responsibility for community wells has added additional elements of long-term institutional accountability which will increase the likelihood of community wells being adequately managed in the future.

WASH in Schools

CLTS-inspired triggering and sensitisation activities expanded to WASH in Schools (WinS) classes, which were held in all four primary schools within Fatsaka's target area. These provided effective entry points within the wider community to improve hygiene practices. Children can act as effective agents of change in challenging deeply entrenched attitudes by advocating for improved WASH practices amongst their friends and family. To ensure that teachers were actively involved in lesson planning and delivery, SEED conducted two consecutive days of teacher training in February 2018. 26 teachers from all four schools *Beandry* (n=6), *Andramanaka* (n=7), *Tsialanga* (n=6) and *Tsagnoriha* (n=7) as well as the *Chef ZAP* (district educational authority) were present. Teacher training included:

- WASH sensitisation to ensure stakeholder buy-in
- Participatory discussion of teachers' role and responsibility in school-wide and student WASH practices
- Development of action plans to improve school health and hygiene
- Teacher training on WASH lesson delivery covering six key WASH modules, including: handwashing, latrine use, latrine maintenance, water treatment, safe water storage and safe water sources.

Following the teacher training, SEED's CLOs delivered six WASH lessons to 545 children across the four rural schools. Students learnt about the scientific explanations of disease transmission and were eager to participate in building handwashing stations. Prior to commencing any work in schools Fatsaka*'s* CLOs attended a *Working with Children* training session and signed a code of conduct, to ensure personnel's behaviour was in line with SEED's 'vulnerable adults and child policy'. Teachers, acting as the childrens' guardians, signed documents authorising SEED's activities in schools. All four target schools agreed to SEED's presence and signed this document (available on request).

To reinforce the importance of safe drinking water practices and well use beyond project close, SEED distributed IEC materials as visual learning aids and points of reference. Pictorial storybooks bearing project messages on the transmission of waterborne diseases and safe water sources have been developed and will be distributed to schools once the school year commences in November.

Children at Beandry School undergo WASH classes led by SEED CLO Giona (center).

Community Mobilisation for World Water Day (WWD)

In March 2018, SEED joined Water Aid's global campaign on safe water to advocate for community action to improve local well conditions. SEED organised a large-scale public event in the MRC to celebrate WWD and reinforced key project messages surrounding safe drinking water practices. Commune representatives and over 1,000 community members were present to participate in the day's activities, which included relay races, quizzes and handwashing competitions for school teams and well committees.

Left: Woman collects water from a river as the well was not functioning at baseline. Right: woman collects water from newly repaired and treated well.

4 Monitoring, Evaluation and Learning (MEL)

Consistent monitoring and evaluation throughout Fatsaka allowed SEED to track and measure changes from project start to finish. The information received was not only helpful to adapt ongoing project activities to meet beneficiary needs, but also to inform future SEED programs. Rigorous MEL on water quality, well functionality, drinking water practice levels and community action plans was conducted in 13 communities. This evaluation also encompassed WASH in Schools (WinS), where both teachers and students were surveyed.

As two communities did not actively participate in the project, their progression cannot be monitored on the same indicators as the other 13 communities, as these would have acted as outliers in the data. As such, any data collected from these communities has been excluded from this analysis and is displayed at the end of this section as a case study. The following analysis exposes Fatsaka's achievements, as well as its shortcomings, informing SEED's programmatic approach to rural water access.

Methodology

Data collection included household (HH) surveys *(n*=117), focus group discussions (FGDs) as well as interviews with community stakeholders. Surveys were conducted with primary water collectors and encompassed randomly selected HHs of each distance group (HHs located *close* - <5 minutes' walk from their local well*, medium* - 5-9 minutes' and *far* - >9 minutes'). Four focus groups were conducted with relevant stakeholders from randomly selected communities and one focus group was held with five community leaders who represented all five target *fokontany*. Additional surveys were conducted with teachers (*n*=15) before and after WinS training.

All surveys were led by trained enumerators using OpenDataKit (ODK) mobile survey forms. Surveys evaluated the participants' knowledge, attitudes and practices (KAP) regarding drinking water to measure their behaviour change. In order to reduce subject bias during surveys, participants were not presented with multiple-choice options and the enumerator was trained to select only the responses that the participants listed.

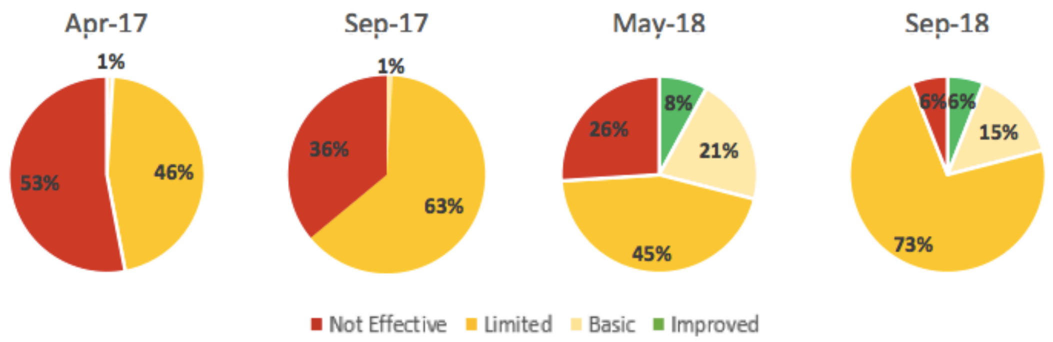
Drinking Water Practices (DWPs)

DWPs were measured using the adapted drinking water management practice level ladder originally developed by the IRC WASH (2016). The practice level ladder ranks HHs' drinking water practices into one of four levels: *not effective* (high risk to human health), *limited* (moderate risk), *basic* (low risk) and *improved* (no risk).

Practice Level	Safe Drinking-water Management* **Taken and adapted from IRC WASH to fit project assessment needs*
Improved	Drinking water always comes from an improved source (piped or protected water source) and is: ● Collected safely ● Stored safely ● Water is always treated
Basic	Drinking water always comes from an improved source (piped or protected spring) and is: ● Collected safely ● Stored safely ● But not treated
Limited	Drinking water sometimes comes from an improved source (piped or protected spring), but is: ● Not treated ● Not collected safely ● Not stored safely
Not Effective	Drinking water comes from unimproved source - surface water, unprotected spring or well.

Over the past six months, SEED has seen an encouraging reduction in HHs categorised under the *not effective* DWP classification. This can be seen in Figure 1 at 6% at endline compared to 53% at baseline in April 2017.

Figure 1: Changes to HH drinking water practice levels as per adapted WASH ladder



Since April 2018, SEED has seen a deterioration of eight percentage-points in HHs achieving DWP levels of *improved* and *basic.* The primary reason for this decrease is the reduction in HHs treating their water before drinking it and storing their water safely (in a container with a cover or correctly fitting lid).

Another key component of HHs departing from the *not effective* DWP classification is the use of an improved source. As seen in Figure 2, HH well use has increased by 47 percentage points to 96% of HHs since baseline, contributing to the positive DWP change.

Figure 2: Well user rates by exclusive and non-exclusive use

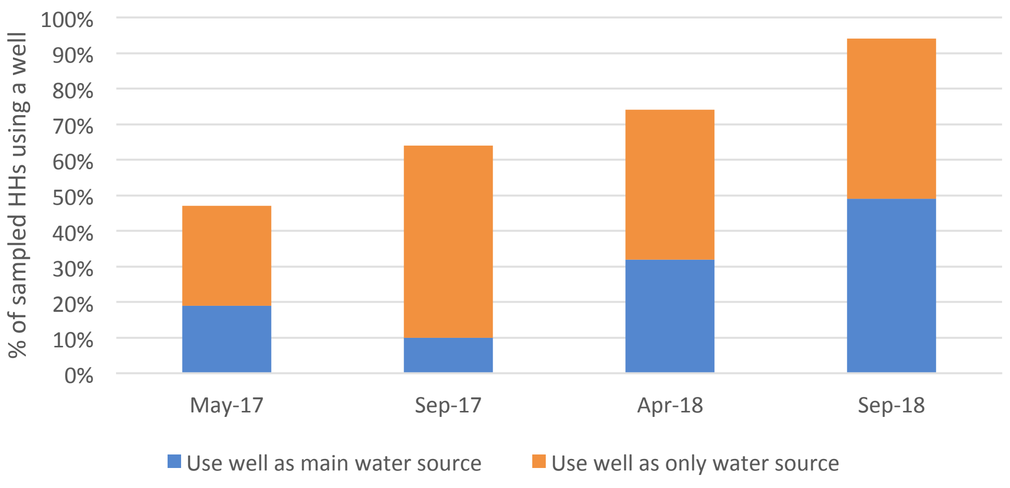


Figure 2 also separates well users into two factions: exclusive and non-exclusive. The rate of HHs using a well exclusively increased from 42% to 45% since April 2018, but still saw a decrease from September 2017 where 54% of sampled HHs claimed to use a well exclusively.

Unfortunately, exclusive well use is additionally hindered by natural factors. During endline data collection, 5/13 wells were dry at the time of observation, forcing beneficiaries to use alternative available surface water sources. Results from HH surveys revealed that 50% of HHs, who were using a non-improved water source for cooking and drinking, declared doing so because their local well is prone to drying. As such, the exclusive use of an improved water source remains a barrier against HHs achieving higher DWP levels.

Water Treatment

Despite efforts to increase rates of HHs treating water by conducting workshops at the HH and community level, SEED has seen a decrease in water treatment since baseline. Only 10% of HHs claimed to treat water, compared to 15% at baseline and 16% in April 2018. Results from focus groups suggest that community members felt well water did not require treatment, which may explain the decrease in water treatment since baseline. Whilst some participants in the FGDs claimed to sometimes or always boil water before drinking it, the majority stated that they preferred to drink it directly from the source. This was predominantly due to the desire to drink cold water. Furthermore, some respondents seemed to believe that surface water sources were clean if the water was taken in the early hours of the morning.

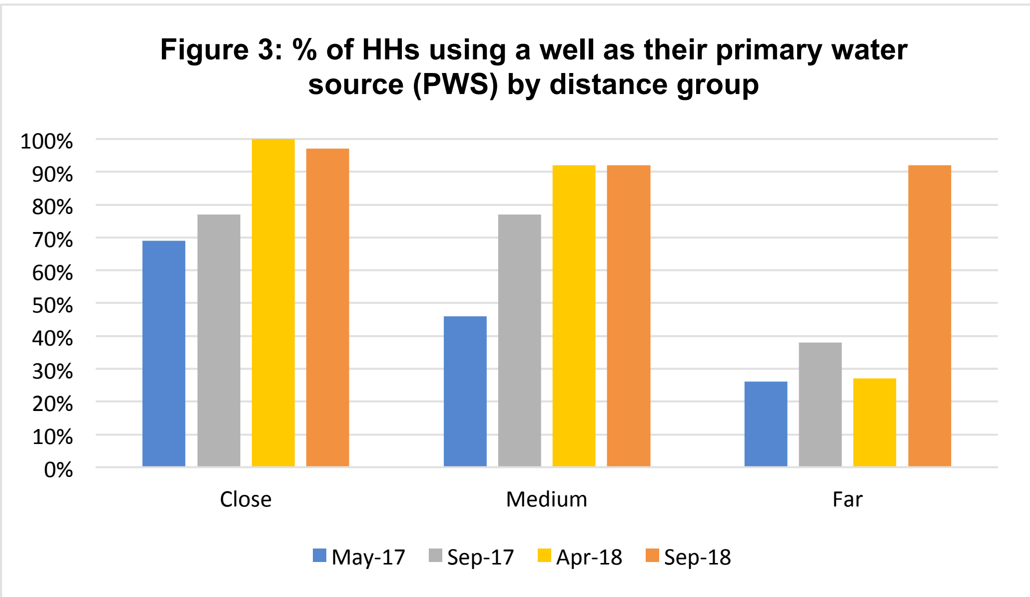
Some HHs who were not using a well at the time of data collection, due to wells being dry or dysfunctional, often claimed that they did not treat it due to limited access to *Sur'eau,* which is a local hypochlorite solution for water treatment. Access to *Sur'eau* remains limited in the MRC and, whilst most participants claimed to be willing to pay for it (91%), less than 10% were willing to pay the retail price of 600MGA. When discussed in FGDs respondents generally had positive feedback as *Sur'eau* enabled them to drink cold water, and when compared to boiling requires little labour. However, some participants claimed that they did not like the taste or smell and therefore would not be willing to use it. Despite low levels of water treatment, respondents in FGDs were able to explain how and why treatment is important in killing harmful bacteria, and hence demonstrated some level of understanding. However, beneficiaries evidently lack the motivation to effectively treat their water. Looking forward, SEED endeavours to develop activities that are more effective in encouraging beneficiaries to habitually treat water.

Distance to Well Use

***Since baseline** there has been a **260% increase** in far HHs **using a well** as their primary water source.*

Results from endline have shown a substantial increase in *far* HHs now using the well as their PWS. Since baseline there has been a 66-percentage point increase, from 26% to 92% by endline, which is a percentage increase of over 250% in far HHs using a well and a 260% overall increase since baseline. There was no statistical difference between well use amongst distance groups at endline (p >0.05) and when respondents were asked why they used their main water source of choice, only 20% stated doing so as it was 'close to the home'. In addition, only 2/7 HHs using surface water as their PWS stated doing so as it was close to their HH.

Surveys revealed that the most common reason to use a well was that it tasted good (66%), which was also a common theme throughout FGDs. Almost half of the well users stated they use wells because they believe the water is clean. The beneficiaries' understanding of well water's "cleanliness" compared to "dirtier" surface waters was demonstrated during FGDs respondents.



In contrast to this, the most common reason HHs were using a surface water source was that the local well was dry, followed by usage due to habit. All participants in the FGDs expressed that they preferred well water over surface waters, yet some claimed not using it because it was too far away from their HH.

Well Functionality and Community Action Plans

*All 13 communities now have **functional, fenced** and **treated wells.***

All 13 communities have achieved their community action plans: all wells have been fenced, cleaned, repaired and treated and now have functioning *dinas* and committees in place that govern their maintenance. During FGDs, well users spoke positively about the well committees, claiming that their local well committees were active in well management and collecting financial contributions for maintenance.

Contrary to this, well committees often complained about the lack of motivation amongst community members. In particular, they relayed their difficulties in mobilising the community for village meetings and well maintenance activities. During FGDs, all of the sampled well committee members (*n*=10) expressed that they felt well-equipped to continue maintaining and repairing the well post-project due to the management and maintenance training conducted by SEED. However, half expressed a need for added support in mobilising their community to participate in CAP activities. Well committees may still lack the confidence or skills to effectively mobilise, which is something that SEED foresaw as a potential obstacle to long-term sustainability. To counter this, SEED has connected each well committee with the two local Commune Agents who will be able to continue to support them after project close.

Water Testing Results

Five of the wells were dry during the time of data collection, making water testing for faecal coliform possible in only 8/13. SEED's water-quality metrics are aligned with the WHO guidelines for drinking-water quality (1997; see *2. Key Terms*). Two samples were tested from each source to measure thermotolerant coliform counts (TCC), an indicator of faecal contamination.

A Portable DelAgua testing kit tested for TCC through membrane filtration methodology. Once filtered, samples were incubated for 16-18 hours with membrane lauryl media at 44.5°C (+/- 0.5°C). TCC colonies present could be visually counted and quantified as colony forming units per 100ml (CFU/100ml).

The results from the eight well water tests were very reassuring, whereby six showed no presence of faecal bacteria (0CFU/100ml) otherwise classified as no risk to human health and hence are in line with WHO drinking water standards. One well had 1CFU/100ml, a low risk to human health, but unfortunately, one well test yielded an inconclusive result. The results are displayed in Figure 5 at the bottom of this section.

Six out of eight** tested wells were **free from faecal coliforms** and are in align with **WHO drinking water standards

Left: Figure 4: shows results from membrane filtration water testing of Ankazomasy II well with 0CFU/100ml

Figure 5: Endline summary of well status, including data for two surface water controls. Please note there is some data missing due to the wells being dry at the point of data collection

Location	**Functioning baseline**	**Functioning endline**	**Foul Odour**[1.]	**Turbidity (NTU)**[2.]	**CFU/100 ml (Baseline)**	**Level of risk (Sep-17)**	**CFU/100 ml (Sep-18)**	**Level of risk (Sep-18)**
Androtsy well	No	Yes	Yes	5	18	Intermediate	-	-
Ananalava well	No	Yes	No	5	8	Low	-	-
Emaharena well	Yes	Yes	No	5	1	Low	0	None
Fenosoa well	Yes	Yes	No	5	1	Low	0	None
Soananga well	Yes	Yes	No	5	7	Intermediate	1	Low
Vaharinoro (School well)	Yes	Yes	No	5	0	None	Inconclusive result	N/A
Antavibe well	Yes	Yes	No	5	0	None	0	None
Antahovary well	Yes	Yes	No	5	0	None	0	None
Endriasy well	Yes	Yes	No	5	0	None	0	None
Mananara Centre well	Yes	Yes	No	5	0	None	-	-
Tsagnoriha Centre (School well)	No	Yes	No	5	12	Intermediate	-	-
Ankanzomasy I well	No	Yes	No	5	83	Intermediate	-	-
Ankanzomasy II well	No	Yes	No	5	19	Intermediate	0	None
Soananga river	N/A	N/A	Yes	10	1680	Very High	-	-
Antavibe river	N/A	N/A			400	High		

The results demonstrate the efficacy of shock chlorination in eliminating (6/7 wells) or reducing (1/7 wells) faecal bacteria in protected dug wells. 1/7 wells have gone from posing an intermediate risk to human health to no risk by endline. One well has decreased from an intermediate risk to a low risk and two from a low risk to none. When maintained correctly, wells prove to be safe alternatives to very high-risk surface water sources in the MRC. However, due to increasingly recurrent droughts, many of the wells are becoming unreliable water sources during the months of September and October. In addition, results from water testing at midterm (September 2017) suggest that if not cared for adequately, well water, whilst still a safer option than surface water sources, can still be a risk to human health.

Financial Contributions

89% of households *stated that they* ***currently pay a monthly contribution*** *towards well maintenance.*

98% of well users stated that they had contributed financially to the well at some point and 93% of those who contribute do so monthly. FGDs revealed that different communities have had varying success with the collection of financial contributions, but a few overarching themes were present. All the communities represented in the FGDs claimed that well committees were collecting financial contributions. For the most part, only HHs that were paying these would use the well.

Dina

By endline almost all survey respondents (97%) knew that there was a *dina* for the well. A common theme expressed amongst FGDs was water collectors claiming to fear the *dina*, but well committees appeared to be unsure of how to address violations of the *dina*. It was apparent that well committees did not feel comfortable enforcing the *dina* as the communities are small and very familial. None of the communities that were part of FGDs had yet had to enforce their *dina*. However, well committee respondents stated that they felt more comfortable in directing issues via the Commune.

CLTS-Inspired Triggering

97% of respondents *who were aware of their community action plan claimed to have* ***contributed to its achievement.***

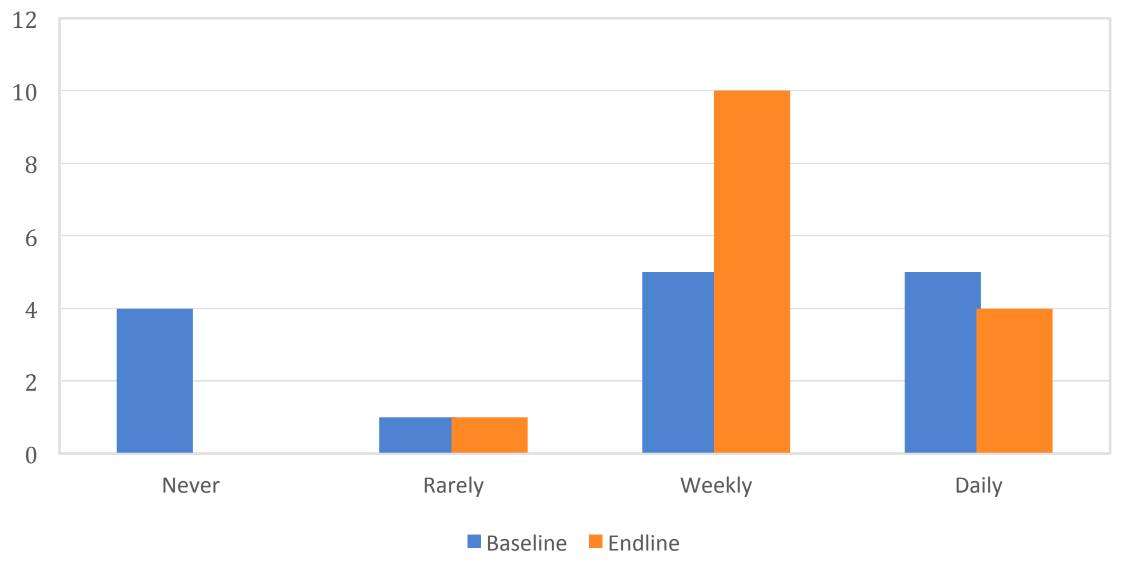
During midterm assessment in September 2017, SEED asked primary water collectors through HH surveys about their experiences of the CLTS-inspired methodology. SEED found that half of those who attended a triggering session in 2017 had changed their DWPs, which increased to 89% in 2018. Furthermore, 97% of respondents at endline who were aware of their CAP had claimed to have contributed towards it, compared to just 33% at midterm (September 2017). SEED has seen an augmentation in the percentage of triggering attendees changing their DWPs and the number of individuals contributing to CAPs since the midterm.

Teacher Training in WASH

26 teachers were trained to deliver WASH classes to students. A sample of 15 participated in KAP surveys, firstly at baseline before WASH teacher training sessions and again at endline post-WASH training. Results suggested that WASH subject matter knowledge increased and that beneficiaries developed more positive attitudes and practices of WASH. At baseline, 13/15 teachers claimed to wash their hands before eating and after defecating compared to 15/15 at endline. However, little change was seen in soap use (14/15 – baseline, 13/15 – endline) and their most recent handwashing occurrence (14/15 that day – baseline, 15/15 – endline).

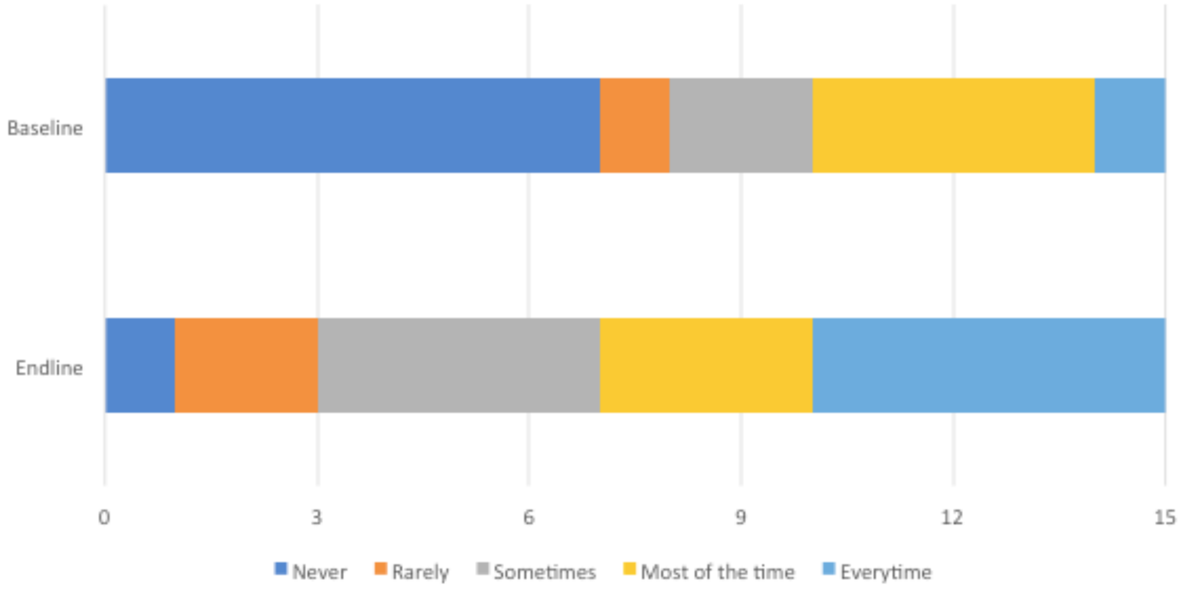
The main challenge of handwashing at home was the absence of nearby handwashing station. There was no change in preference of latrine use over OD (13/15), however, at baseline 4 respondents claimed to *rarely* or *never* openly defecate which increased to 6 at endline, demonstrating a promising change in OD habits. By endline, all respondents stated that if they had a friend or family member who was going to openly defecate, they would encourage them to use a latrine, compared to 13 at baseline. Additionally, scheduled latrine cleaning and maintenance have appeared to occur more regularly. 14 teachers were aware of a latrine cleaning and maintenance timetables at school by endline, compared to just ten at baseline. Of those 14 teachers, four had a daily routine and ten a weekly routine.

Figure 6: How often is the latrine cleaned and maintained?



Perhaps one of the most impressive results observed was the rise in teachers claiming to treat water before drinking it. The endline data collection saw a six person decrease in respondents *never* treating their water and a four person rise in those now treating water every time before drinking it, as shown in Figure x below. Furthermore, by endline, ten teachers stated that they had treated their drinking water within the past 48-hours compared to just seven at baseline.

Figure 7: How often teachers treat water before drinking (n=15)



Diarrhoea

Self-reported data and local hospital records showed low rates of diarrhoeal disease. However, during FGDs, participants explained that occurrences in diarrheal disease were higher before the construction of local wells. In 3/4 FGDs, participants revealed that, while local wells were broken, their children had experienced diarrhoea and/or stomach cramps. Four FGD respondents claimed that, during this time, they had to pay a sum between 3,000 – 60,000 MGA (£0.67 - £13.49) for their child's treatment. However, as seen in the September 2017 midterm assessment, it is not uncommon for parents to pay a sum of over 200,000 MGA (£44.96) for diarrhoea treatment (currency converted on Xe.com, 02.10.2018).

Moreover, one surface water user stated that her child had died due to diarrhoeal disease earlier in the year, further emphasising the severity of using an unprotected water source. As discussions held in FGDs offer a safe space for dialogue, they allow people to discuss taboo subjects more openly and honestly, which may explain why respondents from FGDs revealed that surface water use resulted in high rates of diarrhoea compared to the low rates yielded in self-reported HH surveys.

5 Phase I Review

As part of Phase II's objectives, SEED returned to the original 13 Phase I communities to assess their progress two years after project finish. This assessment was supplemented by SEED offering limited support to further develop community capacity in well maintenance and promote healthy WASH practices. The activities conducted during the first phase were similar to those completed in Phase II, although lacking Commune Authority involvement and conducted over a shorter time frame. Furthermore, learning acquired from Phase I has supported project development for the current phase.

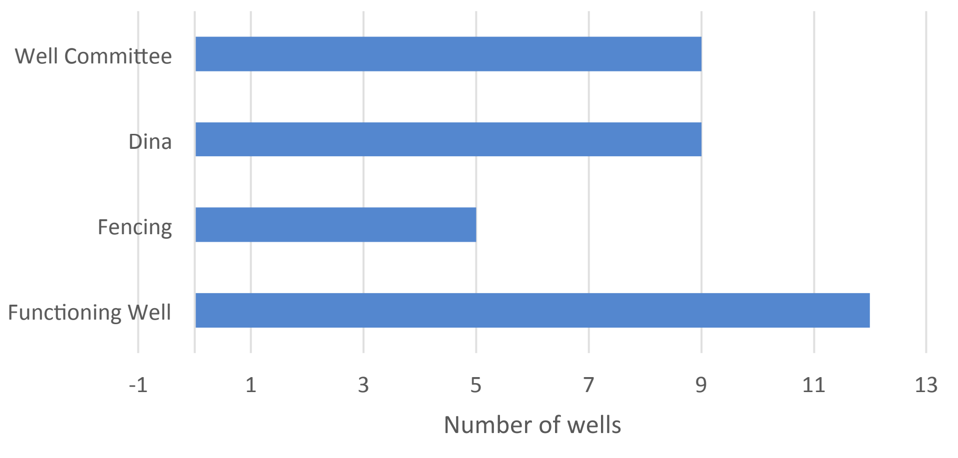
Methodology

The purpose of this evaluation is to provide robust information to stakeholders, disseminate learning for use in future SEED projects and to contribute to international best practice. A mixed methods study was completed to assess the progress of the 13 wells. This entailed a similar strategy to Phase II, which included; randomised HH surveys (*n*=117) with primary water collectors from the three distance groups defined earlier in this report, FGDs that were conducted with beneficiaries from each fokontany (*n=4*) and one with relevant community leaders and finally, water quality tests and well site visits. All surveys were conducted by trained CLOs using ODK mobile surveys.

Well Site Observations

Well site observations were conducted before any support was given to communities to observe the state of each well. During these visits, each well was assessed on indicators for the presence of: open defecation sites, litter, stagnant water, cracks and breaks in the well's concrete structure.

Figure 8: Well site observations



The results of site observations were mixed. Well functionality rates were high, with all but one well both operational and used by the beneficiaries. The well declared "unusable" by beneficiaries did, in fact, contain water but was difficult to pump. Fencing was present in only five of the 13 wells, exposing eight wells to contaminants such as animal excreta, rice paddy run-off and litter. The majority of communities had both an active *dina* and well committee established (9/13).

Well committees are expected to complete well repairs, manage financial contributions for well maintenance and undergo general well upkeep. Fatsaka would not be a sustainable model without the effort and investment of well committees. Despite this, FGDs indicated a need for a greater authority figure. Some respondents mentioned a distrust of the well committee and requested a more prominent presence from SEED. Two of the communities (both of whom had active well committees) deemed that the mere image of an external authority figure would enhance community motivation. While SEED is unable to commit to maintaining a presence within these communities, these comments do highlight a vacuum that SEED attempted to fill with the presence of the Commune Authorities in the Phase II wells.

Water Testing

Using the DelAgua Portable Water Testing Kit, SEED CLOs sampled well water quality on five different wells throughout the four *fokontany*. As the testing was conducted during the dry season, the sampling was limited to only wells containing water at that time, which may bias the quality of the results. Three out of five tested wells were found to have 0CFU/100ml and therefore pose no risk to human health and are in line with WHO drinking water standards (1997). One well had 1CFU/100ml and hence was deemed as being a low risk to human health. The well with the highest TCC counts, *Andriakana*, showed to be an intermediate risk but is currently unused by the community. When compared to highly contaminated surface water sources, these results are highly encouraging and reinforce the role protected dug wells play in rural communities accessing safe drinking water.

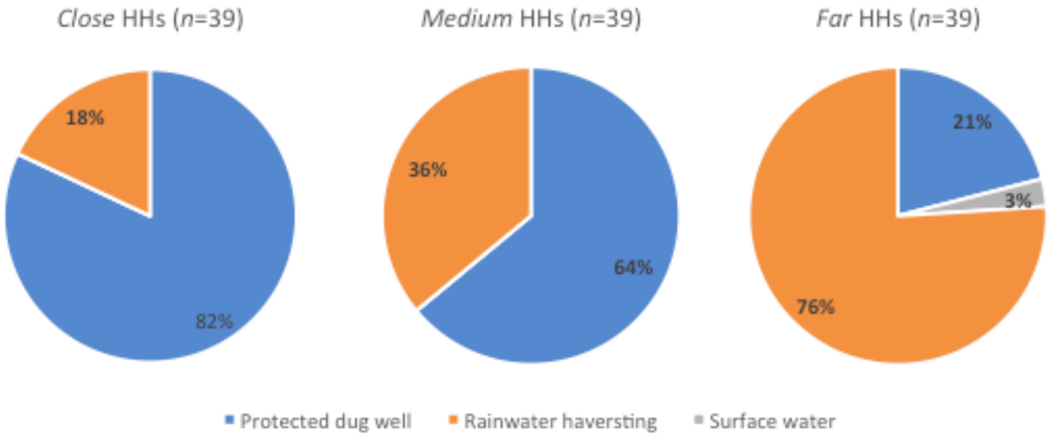
Figure 9: Water quality in tested Phase I wells.

Well	CFU / 100ml
Emanaka	1
Andriakana	31
Esoamieba	0
Androangalava	0
Mahatalaky	0

Well Use

As seen in Figure 11, 56% of all HHs surveyed used a protected water source as their PWS. Of those who used a protected dug well, nearly 70% did so exclusively. Results from FGDs supported this finding whereby respondents from all discussion groups revealed an understanding of the importance of well use. Primarily, participants were able to link wells to good health and dirty water to increased trips to the hospital. While this feedback is promising, further engagement is needed to reduce the number of people using traditional wells and surface water (see Figure 11).

Figure 10: Water source user rate by distance group



The results in Figure 10 suggest that the use of a surface (unprotected) water source is linked to the distance a HH is located from their local well. HHs located *close* to a well had a user rate of 82%, compared to 64% of *medium* HHs and just 21% of *far*. This correlation was found to be statistically significant (p-value=0.000) by using a Fisher's exact test**.**

Figure 11: Percentage of HHs using a well as their PWS

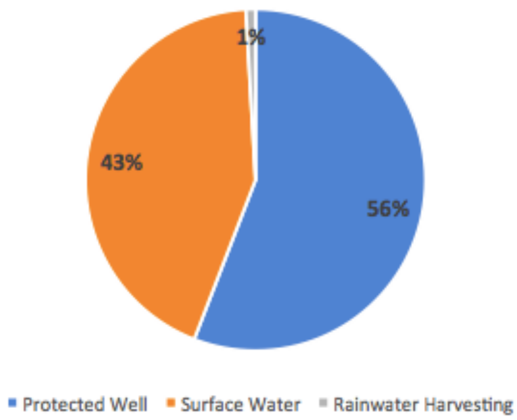
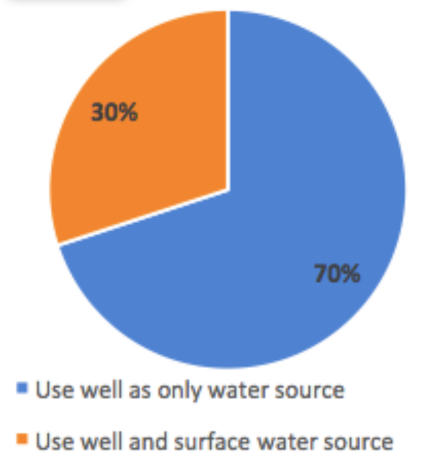
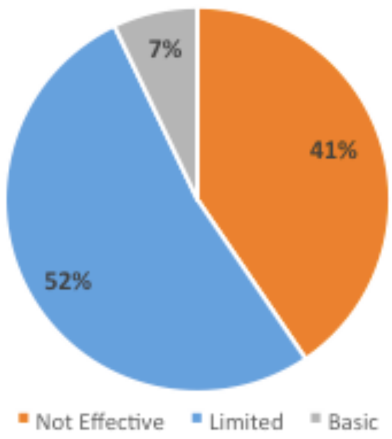


Figure 12: Well user rates by exclusive and Chart Title n-exclusive use



Drinking Water Practices

Figure 13: HH drinking water practice levels as per adapted WASH ladder



In addition, SEED examined DWP levels of HHs. Figure 13 shows that half of those surveyed contained a *limited* practice level and none of those surveyed had an *improved* status. Similarly, to Phase II communities, water treatment, or lack thereof, was the greatest barrier that well users faced in achieving an *improved* DWP level. When asked about their reasoning for not treating water before drinking, beneficiaries responded that it was too time consuming. All participants did, however, demonstrate an understanding of why they should treat their drinking water.

Financial Contributions

A key aspect of Fatsaka*'s* sustainability is the communities' ability to make regular financial contributions to well maintenance. 58% of those surveyed were asked to contribute financially at some point. 54% of those have been requested to do so monthly and 40% whenever the well broke. Additionally, 58% of those surveyed had financially contributed at some point. However, the number of ongoing contributions was much lower. Some focus group participants explained this decline is due to payments stopping when the well breaks. However, this is not always the case; one FGD held with beneficiaries from *Androangalava* well do not pay monthly contributions, as their well has never broken. Currently, the well committee has a repair reserve of 46,000MGA. In one community, members explained they are only willing to contribute to their well committee when their well is broken. As such, SEED has found that Phase I communities often are unwilling to make monthly contributions towards well management and maintenance. Alternative financial management plans need to be explored to better suit the specific needs of each community.

6 Conclusion and Future Action

Over two project phases, SEED has piloted and scaled-up Project Fatsaka's innovative approach to rural well rehabilitation. The project's approach has encompassed efforts to support communities in regaining and sustaining access to rural wells through local capacity building. In addition, the adaptation of CLTS methodology and adoption of hygiene promotion activities have stimulated improved drinking water practices and behaviour change. Institutional engagement and involvement in the latter phase of the project included a top-down approach to support bottom-up local leadership efforts of well committees. Endowed with capacity building techniques, communities in the MRC are capable of maintaining and managing their local wells long past project finish.

Consistent monitoring and evaluation over Phase II resulted in a project that established functional wells with improved water quality and increased community motivation and ability in using and maintaining their wells. Well use has risen from 47% to 94%, which is a percentage change of 96%. Of the wells tested, six resulted in no presence of faecal contamination and one had low risks to human health. Participating communities have assumed ownership and responsibility of their wells and are now invested in managing and maintaining them to ensure long-term access to a safe water source. This has been evidenced by collective action in the form of all wells being fenced, cleaned, repaired and treated and all communities establishing functioning *dinas* and well committees.

The capacity building training sessions delivered by SEED Madagascar to well committee members have provided skills, knowledge and structures to ensure communities no longer rely on external support or funding for future maintenance needs. Long-term sustainability of community wells is aided by increased governance in rural water resource management. With the local Commune carrying out well management activities and assuming accountability over rural well infrastructure, locally led well committees are provided with an external outlet for support and a source of motivation for well maintenance.

Project activities have ceased and a thorough handover with the Commune has been completed. The lessons learnt during the two phases of Fatsaka will be disseminated throughout academic spheres and inform a potential third phase aimed to further governance in rural water resources management. A research paper discussing strategic recommendations on Fatsaka's innovative adaptation of the CLTS methodology to rural drinking water practices will be completed by December 2018.

Community health and quality of life are dependent on effective management of safe water sources. For communities of the MRC, safe water access can be assured through maintenance of local wells. Since May 2017, Project Fatsaka Phase II has made significant strides in increasing sustainable long-term well use across the MRC. With renewed access to safe water in rural community wells, over 10,000 beneficiaries are provided with an opportunity to escape the health-related poverty trap associated with unsafe drinking water.

7 Case Studies

Case Study A: *Esiasia* and *Maravato* wells

Left: Water committee members from Esiasia *during a focus discussing their newly renovated well.*
Right: Maravato *well after well repair and treatment completed.*

In February 2018, a difficult decision was made to discontinue working with two of the target communities, *Esiasia* and *Maravato*, as they repeatedly failed to engage with the project and fulfil their Community Action Plan obligations. However, SEED continued to offer support to these communities, if requested. Upon learning of the lack of community engagement with the project, the Commune decided to hold village meetings alongside SEED's CLOs to encourage community members to raise money for well repairs and take action on CAPs. The involvement of an institutional authority proved to be effective, as the communities subsequently raised a collective 100,000 MGA for their well repairs. Both established well committees and cleaned and fenced the well areas within two months. Following these developments, SEED reinstated full project support to assist both communities with well management, repairs, and shock chlorination water treatment of their wells.

Well user rates increased dramatically from 0% at baseline to 100% for by endline and, during FGDs, beneficiaries of *Esiasia* well emphasised the significance the well has in their community. This case study demonstrates the vital impact local institution involvement can have in encouraging communities to improve drinking water practices and take action in well management and maintenance, such as raising community funds for well infrastructure.

Table 14 below shows water testing results yielded from these two communities.

Location	Functioning baseline	Functioning endline	Foul Odour[1.]	Turbidity (NTU)[2.]	CFU/100ml (Baseline)	Level of risk (Sep-17)	CFU/100ml (Sep-18)	Level of risk (Sep-18)
Esiasia well	No	Yes	Yes	5	96	Intermediate	0	None
Marovato well	No	Yes	-	-	-	-	-	-

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