FOUNDRISING

BOREHOLE REHABILITATION REPORT

2022 - JINJA CITY (UGA-3)

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IMPACT

FoundRising pursued three complete and total rehabilitation projects in Jinja District, approximately 49 miles north of the capital city of Uganda, Kampala. For reference, FoundRising tracks these rehab projects with the following names and codes:

- Rehab #3.005 –Lwalanda
- Rehab #3.006 – Kivubuka
- Rehab #3.007 –Akisofeli

Prior to any water project, FoundRising extensively surveys each community in need and strives to quantify the potential impact of each of our projects. During our surveys we calculate households in an area of a 1-kilometer radius of the water source site (this is the equivalent to approximately 0.62 miles). We estimate that a 1-kilometer radius is the general use area for the borehole (although it has often been found that some households can walk up to 5 kilometers, or 3 miles, to access a water source). Furthermore, a very important distinction to **note is that the average Ugandan household contains 10 persons**. Given these parameters, we estimate the human impact of these borehole projects to be as follows:

1. Lwalanda borehole 50 households / approximately 500 people
2. Musenze-Kivubuka 100 households / approximately 1,000 people
3. Akisofeli about 100 households / approximately 1,000 people

All together, we estimate this round of borehole rehabilitation projects to directly impact at least 2,500 people. A total rehabilitated borehole has a functional life of 20 - 30 years. Therefore, we estimate that these 3 projects will provide clean water access to at least 2,500 people until 2042 with minimal maintenance.

Health impact

Our main intervention in helping communities access clean and safe water and improved sanitation and hygiene practices is to reduce the incidence of water-related diseases, especially diarrhea, skin, and eye diseases. The mechanisms for interrupting disease transmission and improving people's health can be summarized as:

a) Provision of safe water.
b) Increasing water consumption.
c) Improving domestic hygiene practices.
d) Safe disposal of human feces.

Economic impact

The community members of Namizi and Kivubuka, for example, have been using substantial amount of their limited financial resources on buying water from nearby water tap owners. This amount is unquantifiable, but we will attempt to describe the situation as follows:

> *In certain areas in Uganda, there has been a recent development of untreated and unclean piped tap water. There are very few water treatment facilities in Uganda and some local entrepreneurs have taken it upon themselves to provide the efficiency of tapped water without the cleanliness of a deep borehole water source or a treated water facility. Many people using these water 'taps' use them for cooking or washing clothes and, in desperation, use them as drinking sources. In some villages, a household can pay for this untreated water to be piped to their house. Usually, these household utilize this convenience to charge their neighbors to use their tap.*

As an example, a community member surveyed near the Akisoferi borehole, Mr. Isabirye, told us that at his household of 13 people, he spends 2,000ugx (approx. $0.50) per visit to a local 'tap'. Yet with the frequency of water collection for his large household his monthly bill totals around 60,000ugx (around $16) per month. This may not sound like a substantial amount of money, but the average rural Ugandan earns around $1 per day – this man's water collection cost is 50% of his estimated earning per day. We believe that with the Akisoferi borehole being completely restored to normal functionality, he will be able to save this money and use it as capital in a local business.

Also, from our conversation with Mary Baanze a mother of 4 children, with the oldest child being disabled (who cannot walk and just crawls) explained to us that she spends 3,000ugx ($0.80) per day totaling to 90,000ugx ($24) on water because she must do a lot of washing at home to keep the disabled child clean.

In the community where the Lwalanda borehole is located, people have been having to travel far distances to collect clean water – as this borehole has been nonfunctional for some time. This community is primarily comprised of local farmers. With their local clean water source restored, the amount of time they are spending to travel to the next nearby water source will be greatly reduced thereby increasing their ability to work on their farm or other productive endeavors. These benefits cannot be precisely quantified, but the impact is tremendous.

Proportionately, these people are spending an extraordinary amount of their entire household income on water. Our boreholes deliver certified clean water, at no cost of use. We ask for monthly household contributions in the range of 2,000ugx (the equivalent to 1 visit to an unclean local tap). These contributions are saved for future minor repairs needed for optimal borehole performance.

ACRONYMS AND ABBREVIATIONS

BH	Borehole
SWL	Static Water Level
DWL	Dynamic Water Level
PID	Pump installation depth (during test pumping)
DWD No.	Directorate of water development (identification) Number
Qair (m3/hr.)	Airlift discharge in Cubic meters per hour
Hand PID	Hand pump installation depth
HPMs	Hand pump Mechanics
S/C	Sub county

BOREHOLE NAMES & FOUNDRISING IDS

Source Name	**Found rising ID**	**District**	**GPS link**
Lwalanda	UGA 3.005	Jinja City	https://goo.gl/maps/UkGQ8vMD9NPbGPvH9
Musenze	UGA 3.006	Jinja City	https://goo.gl/maps/Zg5Dr6bmkqQFT54E9
Akisofeli	UGA.3.008	Jinja City	https://goo.gl/maps/Cyf93DE7drM6bJJi7

OPERATIONAL DEFINITIONS

Borehole Rehabilitation: refers to the processes through which boreholes that are nonfunctional or functional with difficulties due to reversible technical challenges can be brought back to functionality.

Fishing: This is defined as the removal of unwanted objects from an open borehole. These objects, also referred to as junk or fish, can include tools, equipment or broken pieces of drilling bits.

Operation and maintenance; refers to all the activities needed to run a water supply and sanitation scheme except for the construction of new facilities.

Operation refers to the direct access to the system by the user (e.g. operating a hand pump), to activities of any operational staff (e.g. caretakers), and to the rules or by-laws, which may be devised govern who may access the system, when and under what conditions.

Maintenance, on the other hand is to do with the technical activities, planned or reactive, which are needed to keep the system working. Maintenance requires skills, tool and spare parts.

Project Information

Foundrising Community Development commissioned TGS WATER LTD, to carry out Full rehabilitation of three Deep Boreholes installed with Hand Pumps in the communities of Kivubuka, Namizi central and Buleeba all in Jinja North division, Jinja city.

The project consists of the following: removing old pump parts, Flushing/blowing, reinforced concrete casting, installation of high quality and approved hand pump parts, Actual yield tests (test pumping) and Physical, Chemical water quality testing of three (3) Deep Boreholes.
This report presents the results of the test pumping, casting the platform and hand pump installation of the borehole.

Table 1: Shows Administrative location of the site

No	DWD No	UTM X	UTM Y	District	Sub County	Parish	Source Name
1	40848	517147	61970	Jinja City	Jinja North	Buwagi	Lwalanda
2	40849	520300	55120	Jinja City	Jinja North	Ivunamba	Musenze
3	8088	517591	57202	Jinja City	Jinja North	Namizi	Akisofeli

Summary table of activities

Table 2: Shows the main activities for this project.

Date started	Date Ended	Activity
25/03/2022		Project time
25/03/2022	25/03/2022	Fishing of Akisofeli borehole
01/04/2022	02/04/2022	Blowing and dismantling
03/04/2022	04/04/2022	Test pumping
06/04/2022	08/04/2022	Casting (including Curing the apron, channel and site clearance)
15/04/2022	15/04/2022	Installation of hand pumps
23/04/2022	03/05/2022	Brick fence construction
		Site clearing and leveling
10/05/2022	10/05/2022	Riveting of the plaque card and erecting signposts
		Seedlings' distribution

Result of blowing and dismantling of borehole.

The boreholes were blown to desilt and confirm current depth and confirm their quantity of water (yield) and the physical quality parameters like colour. All these were found in acceptable range of the yield required by the ministry of water and environment while showing clear discharge were thereafter dismantled. It should however be noted that the borehole of Akisofeli had its pipes and cylinder stuck inside and it required fishing. It was successfully fished and results shows this borehole had an unsafe open hole at 25.8M and this was the cause of the problem of pipes getting stuck because the boulders inside the borehole could hold the cylinder and pipes inside. And also the borehole of Lwalanda did not fully clear during blowing but when it was left to settle, it gave clear water during the constant three-hour test pumping.

Figure 1: Showing Fishing of Akisofeli borehole

Table3: Shows results of desilting (Blowing) with airlift and recommendations.

S/N	District	Sub-county	Parish	Source name	Qair (m^3/hr.)	Final depth (Feet)	Final depth (M)	Recommended for subsequent works?
1.	Jinja City	Jinja North	Buwagi	Lwalanda	0.62	229.569	70	Yes
2	Jinja City	Jinja North	Ivunamba	Musenze	4. 2	201. 7717	61. 5	Yes
3.	Jinja City	Jinja North	Namizi	Akisofeli	3.22	187.008	57	Yes



Figure 2: Blowing of Akisofeli, Lwalanda and Musenze boreholes

Result of the pumping tests

The main objective of the pumping tests is to determine the sustainable yield, optimum installation depth of the hand pump, the type of the installation materials and water sampling for physio chemical analyses. Therefore, for every successfully blown borehole, it is important to carry out pumping tests.

Test pumping activities were carried between 03/04/2022-04/04/2022. The boreholes were subjected to a short constant pumping rate of three (3) hours, and recovery test until a minimum of 70% was achieved. At the end of test pumping, a water samples were collected and for Physio-chemical quality analysis.

S/N	Village name	Source name	DWD No.	SWL (m)	DWL (m)	PID (m)	Constant rate test (l/hr.)	Recovery time (mins)	Recovery (%)
1.	Buleeba	Lwalanda	40848	16.31	29.26	33	840	14	97
2.	Kivubuka B	Musenze	40849	18.08	21.17	24	1790	7	90
3.	Namizi C	Akisofeli	8088	20.64	23.89	24	1328	60	70

Table4: Below shows parameters obtained in the field.

Casting and Installation of the hand pump

These boreholes were not operational for some time and community members were eager to have safe and clean water again, the team could not wait for water quality results to cast because the results take some weeks to be out. Therefore, they were casted and later installed but not connected to wait for the curing process of the apron, hand pumps were installed with stainless as guided by ministry of water and environment.

The most common method of disinfection is chlorination. The chlorine compound

most used is high strength calcium hypochlorite (HSCH) in powder or granular form which contains 60 to 80% available chlorine. All the three rehabilitated boreholes were disinfected.

Details of installation depth and materials are shown in Table 6 below. After installation FoundRising Community Development took an initiative to fence the borehole against animals and any other vandalism using brick fence and soak pit was dug to ensure wastewater management.

Figure 3: Showing Akisofeli borehole before and after rehabilitation

Figure 4: Showing Lwalanda borehole before and after ***rehabilitation***

S/n	Village name	Source name	DWD No	SWL (m)	DWL (m)	Hand PID (m)	No of pipes	Installation materials
1.	Buleeba	Lwalanda	40848	16.31	29.26	33	11	Stainless steel
2 .	Kivubuka B	Musenze	40849	18.08	21.17	24	8	Stainless steel
3 .	Namizi C	Akisofeli	8088	20.64	23.89	24	8	Stainless steel
S/n	**Village name**	**Source name**	**DWD No**	**SWL (m)**	**DWL (m)**	**Hand PID (m)**	**No of pipes**	**Installation materials**
1.	Buleeba	Lwalanda	40848	16.31	29.26	33	11	Stainless steel
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3 .	Namizi C	Akisofeli	8088	20.64	23.89	24	8	Stainless steel

Table 5: Shows the installation details (depths and materials

3. Lessons and experiences

- There is always a need to use well-experienced technicians when it comes to casting and ground parts installation in any borehole.
- Involvement of hand pump mechanics in all the activities improves their capacity on rehabilitation activities and in the long run improves on sustainability of point water sources.
- Some boreholes (Musenze and Lwalanda) were initially installed with plastic pipes that are currently not recommended by the government of Uganda because chances of breakdown are high compared to the high-quality stainless-steel pipes that we replaced with.

4. Challenges

- Unsafe open hole of Akisofeli borehole which led to pipes and cylinder getting stuck which called for fishing, this was another extra cost to Foundrising because it was not included in the previous contractor's quotation.
- Poor road network to the sites because work was done during rainy season.

5. Conclusion.

Boreholes are working well with no difficulties. For permanent pump installation for use, pump specification is recommended based on the yield drawdown characteristics at section, minimum 10m under pumping test data.