Osiligi Charity Projects

Repair of broken hand pumps

in Kenya

FF 0559-44

2021 Interim Report

For the Eagle Foundation

Covering pump repairs during Jan - April 2021

Summary

This report outlines the progress made by the Osiligi charity for the 4 months from Jan – April 2021 on the restoration of hand-pumps in the rural district regions of Kenya. Despite the restrictions and impact from Covid-19, the Kenyan team has managed to repair, restore, recycle, or replace and install a total of 88 pumps, providing access to water to over 24,000 people in homesteads, schools and dispensaries (clinics). The cost to repair these 88 pumps was £20,000 (25,400 CHF) so an average cost of £227 (288 CHF) per pump or £0.8, Ksh125/- or 1.06 CHF per user. This was achieved from the finance donated by the Eagle Foundation.

Introduction

The aim of the project is to continue to repair, restore and replace non-functional hand-pumps and provide access to ground water for the rural communities in Kenya. The RWSN study from 2009 concluded that from the installed base of 12,000 hand pumps in Kenya, 3600 hand-pumps (30%) were broken (Appendix 3). So although the Osiligi charity has restored 1350 hand-pumps since 2015, there is still more work to do.

The Challenges of 2021 Covid-19 and travel.

It has not been possible for the UK management to travel to Kenya due to the Covid-19 restrictions on travel to and from Kenya. However, the Kenyan team (Peter, Esther, Victor, David, Dennis, Shadrack, Emmanuel) has risen to the challenge and continues to maintain and restore non-functioning pumps in the rural communities of Kenya.

Accessing and the cost of water.

A hand pump is a basic but effective method to access groundwater, but they do require periodic maintenance.

The Osiligi charity undertakes to work with local authorities and communities to restore a non-functioning hand-pump.

When a hand pump does fail, the rural community must find an alternative, and one they can afford.

Getting access to water from a neighbouring community hand pump will attract a fee, or they may have to resort to purchasing water. This can cost from 5 to 20 Ksh for 20L of water, weighing 20 Kg.

Crystal water, whatever that means will cost 160 Ksh (1.33 CHF, £1.06), so there doesn't appear to be a limit on the high price of water.

The villagers may have to travel to collect water from an open water source, a river, or a pond, somewhere near to their village. Travelling several kilometers carrying 20Kg of water over difficult terrain carries its own risk and takes time.

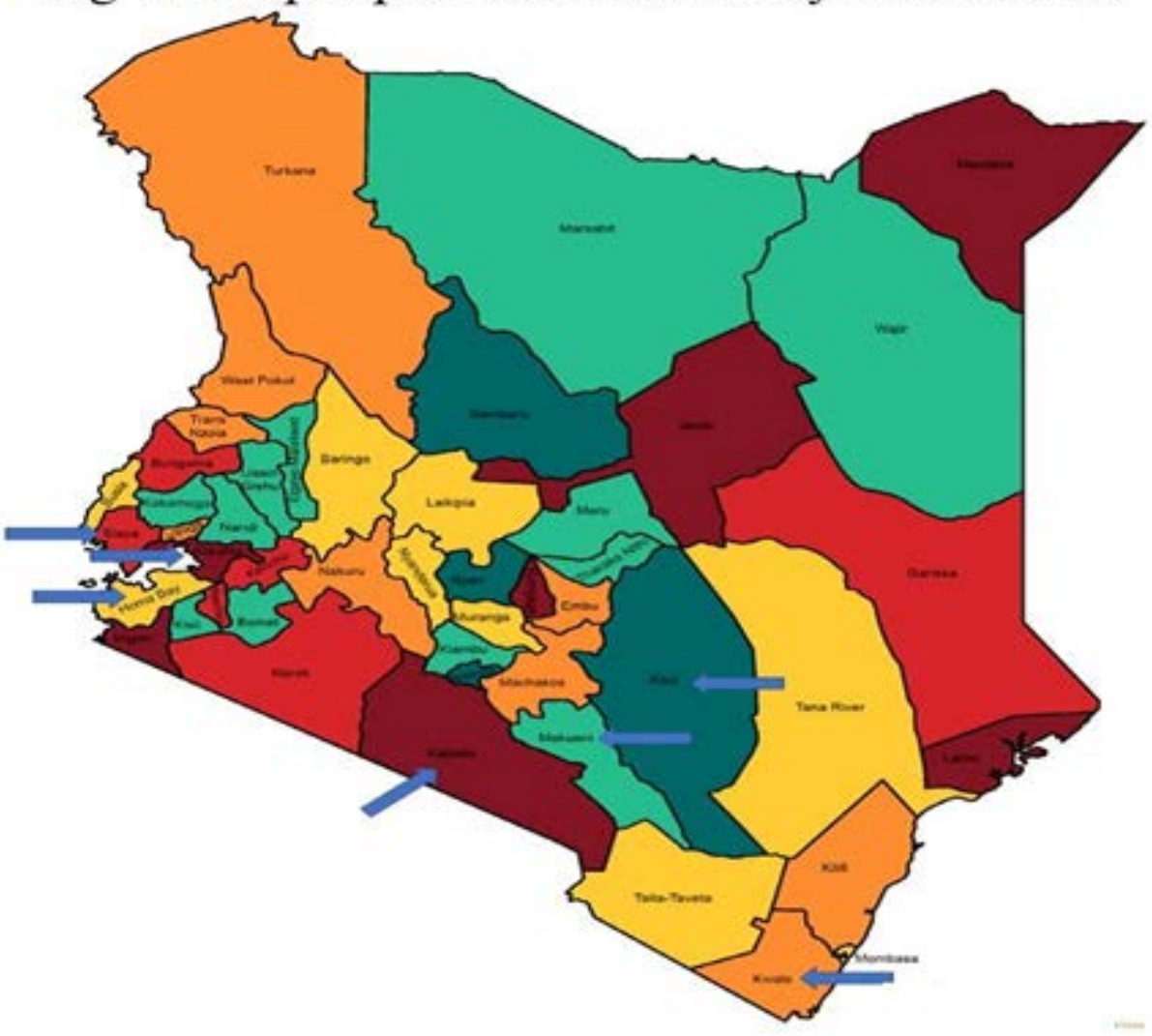
Children will miss out on their education. Women would not be able to find alternative work, creating a cycle of hardship.

Women and children do the collection of water, it is the division of labour,. From a river they risk drowning, or being attacked and there are health issues from water borne diseases, such as typhoid, cholera, dysentery and diarrhoea.

Locating the pumps to repair.

Figure 1 shows the areas in Kenya where the Osiligi charity is restoring hand-pumps. There is a Kenyan team member in the regions of; Kwale, Kisumu, Homa Bay, Kitui, Makindu in Makueni and Olitokitok in Kajiado. This covers the East, Central and West of the lower region of Kenya.

Fig 1 Pump repair areas shown by blue arrows



The team is not restricted to these regions and will work in a neighbouring area to assist in the restoration of a pump if required. They work with the local contacts, contractors, authorities, MCA's, Chiefs, and Leaders within the communities to help identify the location of a pump, prioritising in its repair, and in the management of their restoration. By offering to provide training and in the sharing of resources this contributes to the success of the project.

Why do we repair non-functional pumps?

Over 88 pumps have been restored using Eagle Foundation funding this year and this has provided access to water to over 24,000 people in the rural communities. The rural areas of Kenya rely on the water from hand pumps. People's health is impacted by where, and how clean, their water is. An open pond is always worse than water from a hand pump.

How many people have been helped?

Most villages will not know exactly how many people live in the surrounding community, especially if you include children. If you ask two people this question, you will get two different answers. Once a hand pump is restored in a local school, the local community can benefit, and also the neighbouring villages.

A borehole or well may serve a community of between 5 to 100 households. A school (primary & secondary), 250 - 1000 pupils, or more. Each family household may have grandparents, parents and children, and up to 5 to 10 people may live in a household. A conservative number of people served by a pump is between 50 to 2000 people. We estimate on average that the number of people helped is around 250 people per hand pump.

From January to April 2021 the team has restored 88 hand pumps, serving +24,000 people, who now have a choice in their access to potable water, thanks to the sponsorship from the Eagle Foundation.

Water Quality

Access to water is obviously important to the rural communities but so is the source and the potential health risk to the community from water borne diseases. Testing the quality of water requires taking samples and monitoring throughout the year. It represents a further challenge and would require additional funding and resources. Fig 2 is an example of children collecting water from an open source.

The alternative water source was over 6 kilometres away.

The borehole or well is at least a better option.

The well will be uncontaminated If it is protected, fenced off from animals, and toilets and washing facilities are located away from the source.

Then there is the need to transport and store water into a suitable container and then store it at home.

All smiles, its water.

Now transport it

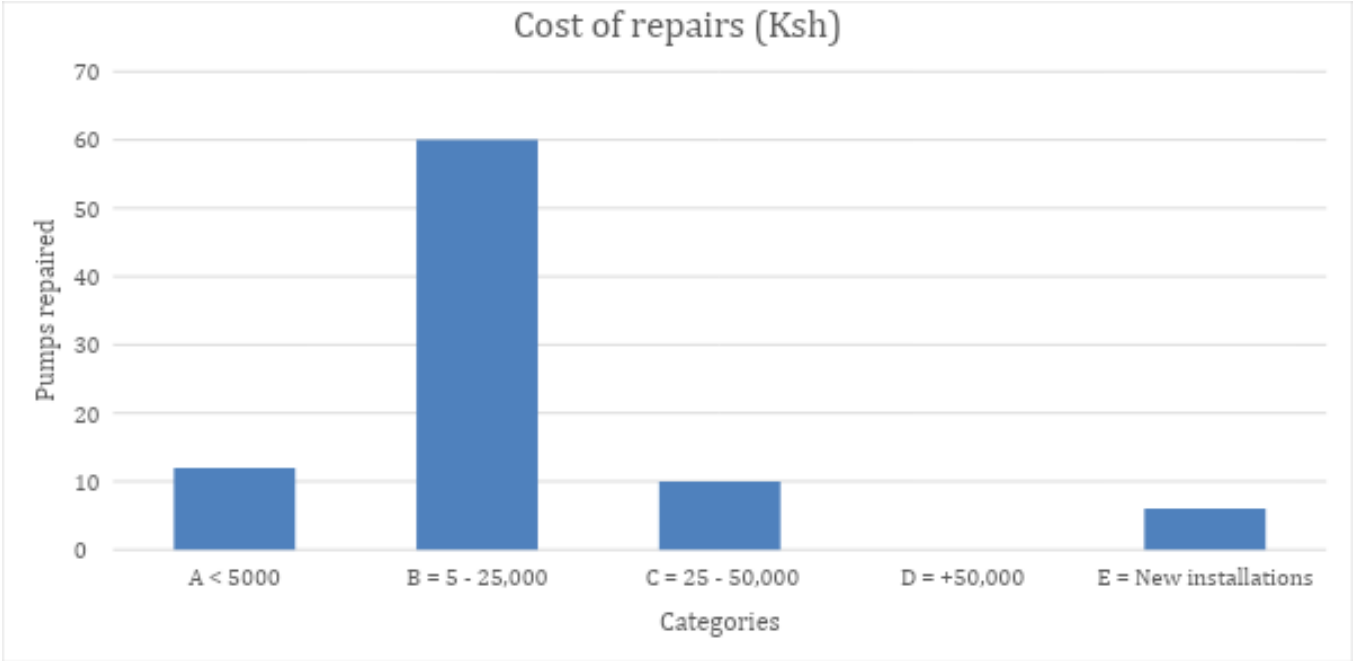
Yes its water

It’s still water.


Cleaning motor bikes in flood water, used for drinking

The cost of repair

The cost in restoring the 88 hand pumps does vary. A breakdown in cost for this 88 is shown below but this does not include the transport of materials and people to site, and their accommodation and meals.



This cost is split into 5 categories, A, B, C, D & E. 12 pumps were restored in the A category and these are basic repairs, seals, o-rings, bobbins, bearings and centralisers, that cost less than 5,000Ksh (41.56 CHF). With a fishing rod to remove the foot valve and access to spares parts, the community once trained can maintain their own hand-pump. 60 pumps in the B category were restored. These are more expensive to repair as more new parts may be needed such as broken rods and replacement valves which can cost up to 25,000Ksh (207.78 CHF). These repairs also can be undertaken by the community after training. 10 pumps in category C were restored and need even more extensive repairs, where risers may be leaking and have to be removed and replaced, which can cost up to 50,000Ksh (415.56 CHF). Often the pumps are broken and have been unused for long periods of time, vandalised, or damaged from heavy usage during a dry period.

D category is a completely new installation as the old one was obsolete or beyond economic repair. The E (6 pumps) category needed a more extensive repairs, such as additional civil work, having to employ a contractor to fish out broken pipes from the borehole, flush the bore-hole because it was blocked, a rig to remove a pump such as the India pumps. If a new pump is required, the old parts, if possible, are recycled.

Database – Geo-Mapping

We track the repaired pumps either through the village name or by the GPS coordinates - GPS coordinates being the best but not all of our contractors have suitable GPS equipped phones. Having village names or a list of GPS coordinates for the repaired pump, although helpful, is not ideal as it is difficult to know a pump's location from its coordinates. We have started to map the repaired pumps onto a Google maps database so that it is easy to see the locations on a map.
Hand Pumps Geomap Link

Community repairs.

Some examples of the team and the communities at work and 2 county reports Appendix 1 & 2.

Preparing for a visual inspection


Descending further.


Getting out.

A common fault, the foot valve not working.

And the reason why!

Some more examples are shown of the team working with the communities in the following photos:

Kyamatu COMMUNITY.

Kaliku COMMUNITY

Migwani community.

Tseikuru community

Mumoni community pump

Nguni COMMUNITY

Mulango community

Kalulu community

Manyula pump during repair

Osenai Pump. Pulling out of risers to repair a leaking pipe.

Olepolos Pump. Picture showing a woman being trained as the cylinder was pulled out for repair.

Rombo Pump. Technician and locals during repair of the pump.

Some examples of the data collected by the Regional Contact Person's (RCP) are shown in appendix 1 & 2 and spreadsheet EF pump data.

Appendix 1 – Kitui County Report.

RCP – Dennis Njogu

PUMP NAME	*NO 0F PEOPLE SERVED*	*GPS COORDINATES*	*WELL PARAMETERS*	*TYPE OF REPAIR*	*STATUS*
kyamatu	200	1.56126578° S, 38.3622657° E	19Feet of water 30feet deep	Bearing sets replaced plunger foot valve and u-seal replaced	Repaired working
kaliku	350	1.26123455° S, 38.3644567° E	16 feet of water 36 feet deep	Two pipes and two m/s rod replaced	Repaired and working
migwani	250	1.0999643° S, 38.035478° E	25feet of water 40 feet deep	One mild steel rod replaced, plunger and u seal replaced	Repaired and working
tseikuru	300	0.2797643° S, 38.2111973° E	15 feet water 30feet deep	Two broken pipes replaced foot valve and u seal replaced, plastic bearing sets fitted	Repaired and working
mumoni	400	0.5037654 S, 38.0208632 E	22 feet water 40 feet deep	Two pipe and two m/s rods changed due to wear and tear	Repaired and working
nguni	200	1.0938° S, 37.8725° E	12Feet of water 25feet deep	plunger foot valve and u-seal replaced	Repaired working
chuluni	350	1.5339° S, 38.1054° E	27 feet of water 36 feet deep	Fulcrum and hanger pin replaced	Repaired and working
mulango	250	1.4283° S, 37.9996° E	20 feet of water 34 feet deep	One mild steel rod replaced, plunger and u seal replaced	Repaired and working
kalulu	300	1.7852° S, 37.9361° E	18 feet water 35 feet deep	foot valve and u seal replaced, plastic bearing sets fitted	Repaired and working
mumoni	400	0.5037654 S, 38.0208632 E	22 feet water 40 feet deep	Two pipe and two m/s rods changed due to wear and tear	Repaired and working

Appendix 2 – Kajiado, Oloitoktok County Report.

RCP – David Githae

PUMP NAME	*PUMP TYPE*	*NO 0F PEOPLE SERVED*	*GPS COORDINATES*	*WELL PARAMETERS*	*TYPE OF REPAIR*	*STATUS*

MUNYULA PUMP	Afridev	300	$2^0$26’28’’S $36^0$57’10’’E	30M well depth 8M water column	cleaned cylinder, replaced bearings, hangrod, useal and centralizers	working
OSENAI PUMP	Afridev	150	$2^0$20’32’’S 37^0 28’33’’E	25M well depth 10M water column	Replaced, useal, bobbins, hangrod, rusty rods, bearings, 3 pipes and rod centralizers	working
OLEPOLOS PUMP	Afridev	220	$2^0$29’39’’S $36^0$49’09’’E	33M well depth 7M water column	Replaced broken foot valve, bearings bobbins, two bent rods and cleaned cylinder	working
ROMBO PUMP	Afridev	250	$2^0$36’28” S $37^0$38’32’’E	36M well depth 5.8 M water column	Pump concrete base was repaired, bearings and seal replaced and cylinder cleaned.	working

The data for all the 88 pumps repaired can be seen in this spreadsheet

Appendix 3

Handpump Data, Selected Countries in Sub-Saharan Africa **April 21, 2009**

Country	Informant	Estimated Rural Pop. (millions)[1]	Estimated Rural Coverage[1]	Estimated Rural Unserved[1]	Estimated % Served by Handpumps	Estimated Number using Handpumps	Total # Handpumps	# Functioning Handpumps	# Non-Funct. Handpumps	% Non-Functioning	Notes
Angola	Dauda	8.6	40%	5.2	90%	3.10	4,500	3,150	1,350	30%	UNICEF estimate
Benin	S Adokpo	3.7	60%	1.5	45%	1.00	6,700	5,200	1,500	22%	
Burkina Faso		10.5	44%	5.9	62%	2.86	22,400	16,800	5,600	25%	UNICEFCountry Profiles
Cameroon	J.Rihouey	7.7	41%	4.5	50%	1.58	9,000	6,750	2,250	25%	Estimate J. Rihouey
DRC	G. Kazad	35.3	29%	25.1	4%	0.41	1,500	500	1,000	67%	approx. 60% use springs
Ethiopia	B.Muluneh	58.7	11%	52.2	30%	1.94	30,046	19,667	10,379	35%	DHS 2000/HP # calculated
Côte d'Ivoire		9.2	74%	2.4	80%	5.45	19,500	6,825	12,675	65%	UNICEFCountry Profiles
Guinea		5.5	38%	3.4	85%	1.78	12,500	10,000	2,500	20%	UNICEFCountry Profiles
Kenya	P. Nduati	19.6	46%	10.6	15%	1.35	12,000	8,400	3,600	30%	DHS 2003/Estimates
Niger	I. Sanoussi	9.0	36%	5.8	56%	1.81	7,175	5,025	2,150	35%	Min. Hydraulics 2005 for # HP
Nigeria	B.Aleobua	65.3	49%	33.3	35%	11.20	80,000	40,000	40,000	50%	JMP and UNICEF sources/Est.
Sierra Leone		3.0	46%	1.6	55%	0.76	2,500	875	1,625	65%	Unicef summaries/Est./MICS2005
Uganda	S.Mutono	22.0	52%	10.6	60%	6.86	30,000	24,000	6,000	20%	
Totals		319	38%	197	45%	55.5	345,071	220,362	124,709	36%	

[1] = JMP 2004 (Joint Monitoring Program)

Est. = Estimates made where number of handpumps not clearly stated, but assumed to include both boreholes and protected wells.

HP # Calculated = Actual number of handpumps not inventoried, but number estimated by dividing total population served with hand pumps by 250 persons per hand pump. DHS = Demographic and Health Survey (year of survey in parenthesis)

UNICEF Country Profiles = Country Profiles for Water and Sanitation, West and Central Africa, UNICEF (2005)