



WATER COLLECTION FOR
SUSTAINABILITY (PILOT PHASE) –
UPDATE 2019-2020
Ongutoi Health Centre

ABSTRACT

With the current challenges of COVID-19 and the corresponding issues of face to face meeting and travel. This document will provide an overall summary of the progress achieved in Rotary year 2019-2020. Further, a brief synopsis of next steps forward will be provided.

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Ongutoi Health Centre Water Collection for Sustainability COVID-19 Update

Introduction:

I was looking forward to being able to provide an on the ground update of progress at the end of this month however, the current COVID-19 challenges have interrupted my travel for the next while. Although this is a disappointment, I am pleased to say that the planned elements for Rotary year 2019-2020 have been completed and we are on our way to achieving our goal for Rotary year 2020-2021.

This is not a comprehensive outline of the project and undoubtedly will leave some questions unanswered. My contact details are at the end of this update and I am happy to respond any questions arising from this outline.

Further if your club is meeting virtually at this time and would like a full club update, I would be more than happy to accommodate any request now or in the future.

Rotary year 2019 – 2020 Objectives & Accomplishments:

In essence, the objective for Rotary year 2019-2020 was to execute the initial expansion phases for the water collection platform at the Ongutoi Water Collection for Sustainability pilot location. Given the excellent current rainy season we have experienced, while we had been projecting a rainwater collection potential of 112,500 liters of water per rainy season, we were able to collect and store 118,000 liters of water in the initial 120 days. As a result, we needed to address both concerns of storage capacity and water collection potential.

This is essential as based upon our minimum water consumption projections for the three stages of growth, the following table will outline the requirements;

Drip irrigation only occurs during the two dry seasons, and dry seasons are projected to have a duration of 120 days. There are 6 irrigation zones in the current 3 acres with 788 trees planted. 2 zones will be irrigated every day allowing for all 6 zones to be irrigated in a 3-day cycle. The stated water requirements are stated on a per tree basis.

Seedling (0 – 1 year)

- Minimum water requirement, 1.25 liters of water every 3 days
- Total projected consumption – 44,718.31 litres

Juvenile (1 – 3 years)

- Minimum water requirement, 2.5 liters of water every 3 days
- Total projected consumption – 89,436.62 litres



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Mature (3 + years)

- Minimum water requirement, 6.0 liters of water every 3 days
- Total projected consumption – 214,647 litres

NB: In order to ensure a redundant water supply at maturity all extensions illustrated in Figure 1 will be required

While our water collection projections are based upon successful water collection at Ongutoi Health Centre from roof top rainwater collection over the past 10 years and extrapolating the collection potential based upon equivalent surface area. We have also observed in this time of climate change the degree to which rainy seasons are becoming somewhat less predictable in both timing and intensity.

As a result, our plans were based upon addressing the two major challenges;

- 1) We need to ensure we have the maximum available surface area to ensure that in a weak rainy season we can collect as much water as possible to collect and store the minimum water capacity for the trees planted during the mature stage of growth.
- 2) We need to maximize the potential water storage capacity to store the maximum amount of water we can collect accounting for a strong rainy season and creating the necessary water redundancy accounting for a weaker 2nd rainy season or an extended dry season.

What were the plans for Rotary year 2019-2020, please refer to the diagram below;

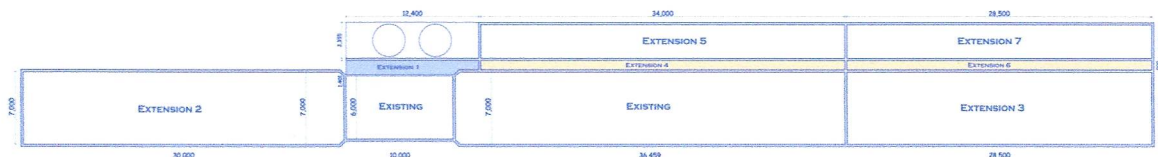


Figure 1

Plans for the period July 1, 2019 through December 31, 2019 was to add extensions 1, 4 and 5 on Figure 1. This was completed and I was fortunate to be present to see the final implementation on my trip in November – December 2019.



Aerial photo of water collection platform with extensions 1, 4 and 5 implemented in addition to the original identified as existing on Figure 1. Phot taken November 2019.

During the November through December 5, 2019 trip, 2 additional 16,000-litre Crestanks were also added increasing the water storage capacity to 196,000 liters of water. Previous storage capacity was 164,000 liters of water.

The second phase of extension for Rotary year 2019 -2020 was to add the platform extension 2 from January 2020 – April 2020 in preparation for what was my anticipated trip from April – May 2020.

Fortunately, all elements were in place and our people on the ground have the training and expertise to implement this extension without our presence. As such, I am pleased to advise, this extension has been completed and implemented.



While it is not possible at this time to provide an aerial photo of this completed phase, this picture illustrates the finished extension connected to the existing platform illustrated by the previous aerial photo.

During this entire process, it is critical to receive reports from the staff who are managing the project and we are receiving regular reports allowing us to continue to capture data on progress.

In early 2019, we installed a rain gage on the site where our supervisor (Okello Abraham) sends a text whenever there is rain and with the recent extensions added we improved the access to the 100,000-litre inground cistern. As a result, we are also having Okello measure the increase in water level after each rain fall. Recent statistics would indicate that a rainfall of .5 inches will collect approximately 6,000 liters while a 1-inch rainfall will collect approximately 13,000 – 14,000 liters. This information will be invaluable as we continue to collect data to project more accurate water collection potential for the longer-term project.

Of course, the objective of the rainwater collection is for drip irrigation for an orange orchard with the ultimate size of 11 – 11.5 acres. The oranges will be sold to the recently opened fruit processing plant just north of Soroti where the net revenue will flow back to the health centre to provide free health care long term. This pilot is the first 3 acres of the ultimate site in order

to evaluate process, outcomes and make any refinements to the platform and distribution system.

If the objective is to grow oranges, does drip irrigation work in this environment and how are the trees doing. We have engaged a local horticulturalist who has his own commercial orange orchard to train our staff along with ourselves on commercial orange production. He has provided extensive training on growth, pruning for a commercial canopy, disease prevention, pesticide and fertilizer use and timing.

The trees recently have benefited by the very good rainy season and have progressed well. Applying the techniques taught to our staff, the canopy is developing well.



This picture shows the trees development and the establishment of the canopy. To put the growth in perspective, these trees planted just over a year ago were approximately .45 meters high at the time they were planted with the growth illustrated in the photo is as a result of a combination of rains and drip irrigation during the dry season.

The trees planted in phase 1, October-November 2018 currently average 2 meters high and the trees planted in Phase 2 currently average 1 meter in height. The trees planted in phase 1 received organic fertilizer in May 2019 that accelerated their growth and the trees in Phase 2 will be fertilized just prior to the next rainy season. Current projections are we will see trees in Phase 1 blossom in May with the potential of the first small salable crop by October – November 2020.

We were fortunate bypassing a setback in period from January – early March when there was a large swarm of desert locusts migrating from the North west through Kenya into Uganda in the north east. The swarm came within a few kilometers of Ongutoi however, when the spring rains returned, the locusts reversed direction returned to where they came. This swarm was the first of its kind in 70 years and while it had the potential of doing great damage, we did avoid that issue. This is not an occurrence that is anticipated to be a regular problem.

As ancillary information to develop the orchard, pollination is required and to that end our partner High Adventure Canada have installed beehives where the bees will pollinate the orange trees and other fruit trees in the compound of the health centre. This will also allow for a secondary crop of honey and time will tell how much revenue this might generate.

Finally, anticipating a potential Global Grant sometime in the near future to extend from the pilot phase of the project, much time was spend continuing to build on existing relationships with a number of Rotary Clubs and District officials in District 9211. All clubs I engaged have



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expressed interest in participating with us on this venture. I was most encouraged when eight members of the Rotary Club of Soroti Central came to visit the site. After the visit, the President expressed much appreciation and excitement and is looking forward to meeting again.

Please refer to the most recent video produced December 2019;

<https://vimeo.com/388364190>

The progress at Ongutoi Health Centre would not be possible without Rotary support and this project along with past stages of development at Ongutoi have been supported by our District 7070 partners with much appreciation;

Rotary 2019 – 2020 Participants

Rotary Club of Newmarket
Rotary Club of Richmond Hill
Rotary Club of Willowdale
Rotary Club of Campbellford
Rotary Club of Leaside
Rotary Club of Scarborough
Rotary Club of Picton
Rotary Club of Toronto West
Rotary Club of Ajax
Rotary Club of Kleinburg, Nobleton and Schomberg
Anonymous Rotarian \$8,000.00 - Matching money
Anonymous Rotarian \$1,000.00 - Matching money

Rotary Previous Year Participants

Rotary Club of Toronto Eglinton
Rotary Club of Toronto
Rotary Club of Markham Sunrise
Rotary Club of Aurora
Rotary Club of Belleville
District 7070 – International District Grant
Rotary Global Grant
RADAR 139
Rotary Toronto AIDS Walk
Rotary Club of Muyenga – District 9211

Recent Developments:

Recently our partner organisation High Adventure Canada received a donation commitment from a donor that will provide 2 additional 16,000-litre Crestanks in addition to the additional tank donated at Christmas that will increase the storage capacity to 244,000 liters of water. This will provide the storage capacity for a 120-day irrigation period for the existing 3 acres of trees at maturity with minimal redundancy. This is indeed great news recognizing we will have the capacity to store slightly in excess of the minimum requirement for the mature stage of growth in advance.



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Moving Forward – Rotary Year 2020-2021:

With the COVID-19 issue, it is uncertain how much of the planned expansion for the Rotary year 2020-2021 will be achievable however, with some residual matching money from the Anonymous donors, we believe at a minimum we will be able to add. Extensions 6 and 7 as illustrated on Figure 1.

The total budget for those extensions is \$9,073.00 where with money currently committed or under consideration and the residual remaining from the private donation, we are projecting a requirement for an addition **\$4,400.00** to be able to proceed with those extensions after July 1, 2020.

In order to complete all the remaining extensions, we would require an additional **\$9,259** over and above the amount referenced above. Please see summary budget below;

Summary Budget

<u>Expansion</u>	<u>UGX</u>	<u>USD</u>	<u>CDN</u>
Extension 7	18,287,500.00	5,225.00	7,315.00
Extension 6	4,394,700.00	1,256.00	1,758.40
Extension 3	23,147,500.00	6,614.00	9,259.60
		<u>\$ 13,095.00</u>	<u>\$ 18,333.00</u>

Detailed budgets can be found in the attached Appendix's.

I will continue to keep all clubs informed of progress and developments on this project.

Should there be any questions, please contact;

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Appendix's

The attached detail budget documents are expressed in Ugandan Shillings and have been prepared by KIMTECH Engineering Services Ltd. that is the engineering and construction firm that has been constructing the platform elements currently in place at Ongutoi Health Centre.

The appendix's are ordered as presented in the Summary Budget recognizing the priority order of completion.

The Summary Budget is copied below as a quick reference.

Summary Budget

<u>Expansion</u>	<u>UGX</u>	<u>USD</u>	<u>CDN</u>
Extension 7	18,287,500.00	5,225.00	7,315.00
Extension 6	4,394,700.00	1,256.00	1,758.40
Extension 3	23,147,500.00	6,614.00	9,259.60
		<u>\$ 13,095.00</u>	<u>\$ 18,333.00</u>

Appendix 1	Extension 7 detailed budget
Appendix 2	Extension 6 detailed budget
Appendix 3	Extension 3 detailed budget

ONGUTOI ORANGE ORCHARD SLAB EXTENSIONS 7					
s/n	DESCRIPTION	UNIT	QNTY	RATE	Amount
A	SLAB EXTENTION 7 INCLUDING PLINTH WALL				
	Strip fdn concrete volume Mix 1:3:5	CM	3		
	Foundation Plinth wall Volume Mix 1:4:3	CM	7		
	Slab volume Mix 1:2:4	CM	11		
	Concreting & Finnbuilder Plinth walls				
	Cement	50kg bags	155	30,000	4,650,000
	Sand	tonnes	25	60,000	1,500,000
	18mm Aggregates	tonnes	17	60,000	1,020,000
	7mm aggrts	tonnes	13	60,000	780,000
	Marum soils on delivery at site	tonnes	50	35,000	1,750,000
	water	20ltr jerrican	1,000	500	500,000
	A66 BRC mesh	roll	1	260,000	312,000
	T16 mm bar	12m pc	2	65,000	130,000
	8mm Rebar	12m pc	18	16,000	288,000
					10,930,000
C	Labour and transport				
					-
	3 Masons	days	8	105,000	840,000
	4 Helpers @ 12000	days	10	48,000	480,000
	cook	days	10	7,000	70,000
	Site Supervision	days	8	85,000	680,000
	Sand transportation	trips	5	160,000	800,000
	Stone transportation	trips	6	160,000	960,000
	4 units labour transportation	trips	1	280,000	280,000
	cement transportation	item	6	200,000	1,200,000
	Machinery transportion from and back to kla	trips	1	1,600,000	1,600,000
					6,910,000
	Miscellaneous				
	petrol	ltrs	60	4,250	255,000
	engine oil	ltrs	5	10,500	52,500
D	wheelbarrows	item	-	125,000	-
	spades	item	-	12,000	-
	diggers	item	-	7,000	-
	glooves	pairs	4	10,000	40,000
	Diamand cuting disc	item	1	100,000	100,000
					447,500
	GRAND TOTAL				
					18,287,500

ONGUTOI ORANGE ORCHARD SLAB EXTENSIONS 6					
s/n	DESCRIPTION	UNIT	QNTY	RATE	Amount
A	SLAB EXTENTION 6 INCLUDING PLINTH WALL				
	Strip fdn concrete volume Mix 1:3:5	CM	1		
	Foundation Plinth wall Volume Mix 1:4:3	CM	3		
	Slab volume Mix 1:2:4	CM	3		
	Concreting & Finnbuilder Plinth walls				
	Cement	50kg bags	40	30,000	1,200,000
	Sand	tonnes	5	60,000	300,000
	18mm Agreggates	tonnes	5	60,000	300,000
	7mm aggrts	tonnes	3	60,000	180,000
	Marum soils on delivery at site	tonnes	15	35,000	525,000
	water	20ltr jerrica	500	500	250,000
	A66 BRC mesh	SM	21	4,200	88,200
	8mm Rebar	12m pc	3	16,000	48,000
					2,891,200
C	Labour and transport				-
	3 Masons	days	2	105,000	210,000
	4 Helpers @ 12000	days	4	48,000	192,000
	cook	days	4	7,000	28,000
	Site Supervision	days	2	85,000	170,000
	Sand transportation	trips	1	160,000	160,000
	Stone transportation	trips	1	160,000	160,000
	4 units labour transportation	trips	1	280,000	280,000
	cement transportation	item	1	200,000	200,000
	Machinary transportion from and back to kla	trips	-	1,600,000	-
					1,400,000
D	Miscellaneous				
	petrol	ltrs	10	4,250	42,500
	engine oil	ltrs	2	10,500	21,000
	wheelbarrows	item	-	125,000	-
	spades	item	-	12,000	-
	diggers	item	-	7,000	-
	glooves	pairs	4	10,000	40,000
	Diamand cuting disc	item	-	100,000	-
					103,500
	GRAND TOTAL				4,394,700

ONGUTOI ORANGE ORCHARD SLAB EXTENSIONS 3					
s/n	DESCRIPTION	UNIT	QNTY	RATE	Amount
A	SLAB EXTENTION 3 INCLUDING PLINTH WALL				
	Strip fdn concrete volume Mix 1:3:5	CM	3		
	Foundation Plinth wall Volume Mix 1:4:3	CM	8		
	Slab volume Mix 1:2:4	CM	24		
	Concreting & Finnbuilder Plinth walls				
	Cement	50kg bags	200	30,000	6,000,000
	Sand	tonnes	30	60,000	1,800,000
	18mm Agreggates	tonnes	34	60,000	2,040,000
	7mm aggrts	tonnes	8	60,000	480,000
	Marum soils on delivery at site	tonnes	85	35,000	2,975,000
	water	20ltr jerrica	1,000	500	500,000
	A66 BRC mesh	roll	3	260,000	780,000
	8mm Rebar	12m pc	8	16,000	128,000
					14,703,000
C	Labour and transport				-
	3 Masons	days	10	105,000	1,050,000
	4 Helpers @ 12000	days	12	48,000	576,000
	cook	days	12	7,000	84,000
	Site Supervision	days	8	85,000	680,000
	Sand transportation	trips	6	160,000	960,000
	Stone transportation	trips	9	160,000	1,440,000
	4 units labour transportation	trips	1	280,000	280,000
	cement transportation	item	4	200,000	800,000
	Machinary transportion from and back to kla	trips	1	1,600,000	1,600,000
					7,470,000
	Miscellaneous				
	petrol	ltrs	80	4,250	340,000
	engine oil	ltrs	5	10,500	52,500
D	wheelbarrows	item	2	130,000	260,000
	spades	item	4	12,000	48,000
	diggers	item	-	7,000	-
	Hoes	item	2	12,000	24,000
	Formwork faciaboards	pcs	2	55,000	110,000
	glooves	pairs	4	10,000	40,000
	Diamand cutting disc	item	1	100,000	100,000
					974,500
	GRAND TOTAL				23,147,500