

JOSIAH GIRLS SECONDARY SCHOOL
THE JGSS ROTARACT CLUB
ROTARY CLUB BUKOBA



A CONCEPT NOTE
FOR RAIN WATER HARVEST PROJECT
2020/2021

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Proposed by:

Rotary Club Bukoba

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Acronyms

JGSS	Josiah Girls Secondary School
RWHT	Rain Water Harvest Tanks
MEAL	Monitoring, Evaluation, Accountability and Learning
M&E	Monitoring and Evaluation



1.0 Introduction

Josiah Girls High School is a Secondary School in the Kagera, region of Tanzania which is in the North-West corner of the country. Josiah Girls High School is in Bukoba city, about 8 Kilometers away from the city, Bukoba. The school has an estimated population of 600 people although during assessment the total population was estimated more than 500 people. The existing water supply system is from BUWASA, where water pipe is directly connected to a concrete storage tank constructed by BUWASA, the tank is a main storage tank to distribute water in the whole school with a capacity of approximately 20m³. Water from BUWASA is enough to fill the two existing storage tanks which are raised tanks with a capacity of 10m³ each one and a total of 20m³, but the tank storage is insufficient to cover the demand of the population in peak hours (when all students are out washing and cleaning). This results in water shortage in a few hours after usage due to high water demand from the estimated 600 students, therefore most of the times students in the dormitories lack water for their usage.

The school board decides to find another solution which was to drill a borehole with an AC Submersible Pump as a backup for the BUWASA water source and also to increase water supply in the school for the students and staffs. But there is another problem observed during usage of this newly borehole as it dries up faster estimated two hours which is because of an over design of the pump compared to the borehole yield capacity or the pump set was not correct as it was set at the Static Water Level therefore during Draw down water level changes down to the Suction point (inlet of the pump). Because the problem still continues the school board decided to find another permanent solution using a Rain Water Harvest Project 1 system in one of the Cafeteria buildings by constructing a big estimated 100-200m³ underground tank. But after some few years it was suggested the tank is having unseen leakages on its walls, therefore it contributes to water loss and the supply of its water was not sustainable.

Due to the water supply problem at the school, Josiah Girls High School consulted our team for a site visit and to conduct a technical assessment effectively to establish a proper Rain Water Harvest Project 2 system which will include proper water collection from all buildings and construct enough water storage tanks which will be used to harvest and supply enough water to the distribution system facing the community's daily demand and future population to come.



a. General Objective

Promoting friendly learning environment by ensuring proper sanitation and hygiene facilities with adequate water supply by harvesting rain water at Josiah Girls Secondary School by 2021.

b. Specific objectives

c. Project Activities

- i. To conduct community/school water need assessment
 - a. Community/school visit
 - b. Meeting: interview and focused group discussion with students and staff
- ii. Design of the technical solution
- iii. Project Implementation
- iv. Project Commissioning

d. Project activity description

i. Community/school water need assessment

A sample of 10 students was selected representing all classes in school. Interviews and focused group discussion were the methods used for data collection. The community/school water need was assessed and identified with the associated challenges as listed below;

The source:

- Steep slopes, mountainous, long grasses and bushes hence insecurity to students.
- Water is contaminated since it is collected from a shared source being used for washing motorbikes and for cattle drink each afternoon.



School routine:

- Interruption to school timetable for time spent on search for water this far distant source.
- Poor reputation of school on this shortage hence affects performance of students.

Students' wellbeing:

- It is a tiresome routine hence leads to psychological problems to students and with mind upset during classes.
- Poor concentration of students in classes due to water shortages and with the schedules for the walk for water in this distant and unsecured place.

Menstrual Hygiene Management:

- Poor hygiene management during menstrual periods due to shortage of water.
- Psychological torments during menstrual period with inadequate water supply for hygiene management.

ii. Design of the Technical Solution

After a proper observation and technical assessment done by our team we carry our Engineering design corresponding to the requirement and observation. The design will include the following:

- a. Design of the Rain Water Harvest
- b. Design of the Water Storage Tank
- c. Design of the Supply System i.e. AC Water Pump, Piping system, etc.
- d. Design of the Distribution System i.e. Piping system, Gravity flow design, etc.

iii. Project Implementation

After the detailed design of the Rain Water Harvest System in the school compound our team will carry out the project in execution where will includes the followings:



- a. Construction of the Water Storage Tank
- b. Installation of the Rain Water Harvest System
- c. Installation and Repairs of Piping System
- d. Installation of Water Pump
- e. Construction of Borehole Chamber
- f. Operator training

iv. **Project Commissioning**

After the completion of the Rain Water Harvest Project activities, our team will submit the project to the school board and donors/funders. Before commissioning of the project to our client the following activities will be done that include:

- 1) Post installation checklist together with the school administration, the school technical team and the Rotary International.
- 2) Project delivery to the school.
- 3) The signing of the project commissioning agreement between parties.

e. Technical Aspect

Sammy Energy Company Ltd has been in contact with Rotary Club concerning the water problem at Josiah Girls High School in Bukoba. Challenges that the school faces include shortage of water mainly based on unrepaired leaks from existing water storage tank, unreliable water supply from Bukoba Water and Sanitation Authority (BUWASA) and water yield problem from the source yet without distribution infrastructures from the source to the school.

Aim of the assessment

The aim was to assess and design the construction of the rain water harvest system for the school which will solve the water shortage in the school buildings for student, teachers and other staffs usage daily through our the year. Other objectives will be repairs of the leakages on the underground water storage tank and piping system for sustainability water storage and supply for the school usage.



Data Collection

- Our survey was done by using Simple hand held GPS to obtain coordinates and ground elevations of different points and buildings at compound.
- Documents from the office (number of the buildings, dimensions of the buildings, type of the roofing's and materials)
- Expected output
- This coordinates and elevations will help us in choosing important points with good gradient to construct gravity rain water harvest storage tanks.
- Helps to propose the pipeline routes that receive water from the Gutters.
- Gives clear satellite pictures, distances apart and ground dimensions between the buildings that acts as our catchments areas of rain water.
- Documents help to calculate the catchment area.
- Rain water potential.
- And rain water endowments.
- Develop detailed design and project plan for the water project
- Implement solar powered pumping system

Data Calculation and Analysis

- Population= 450
- Catchment area
- *Admin block=379 sqm*
- *Class block 1=344 sqm*
- *Class block 2=344 sqm*
- *Comp block=342 sqm*
- *Dormitory=420 sqm*

Total area =1829sqm

Total amount of water can be harvested:

Rain harvesting potential=Rainfall (mm)*collection efficiency

Annual rain fall=1023(minimum taken as an average while recent shown it is 2047mm)

(Attachments for the Rainfall data attached)

Area of of catchment=1829sqm

Height of rainfall 0.3m

Volume of rainfall on an area=Area x height of rainfall

=1829x 0.3

=548.7 Cm

=548700 Liters



The 548.7m³estimated to 550m³volume size for the Tank is the estimated volume amount of Rainfall which can be collected per annual.

Observation

Water Source information's

- i. Drilled borehole
- ii. SWL: ; DWL: ; Pump Depth:
- iii. Safety yield:
- iv. Demand: Above 20,000Ltrs per Day
- v. Storage tank capacity: 20,000Ltrs

Water Quality

No existing water treatment system

Pump and Power

Pump: Submersible water pumps in both underground tank and borehole.



Power source: Electricity

Supply and Distribution Line

Water piping systems are of different sizes and design; there are HDPE pipes, IPS pipes, steel, etc. designed for the system. Some of them need improvement in future for clean water and sustainable supply without loss.

Water Storage

- a. BUWASA water storage tank with a capacity estimated of 20m³ which store water supplied directly from BUWASA water sources and supply water to the dormitories, laboratories, public toilet, head mistress house, teachers' house, etc.
- b. Elevated PE water storage tanks there are two each with a capacity of 10m³ raised which gives a total of 20m³ water storage which is supplied from Borehole and Underground tank from rain water harvest system but they supply water to the cafeteria building, dormitories, laboratory, public toilets, head mistress house, etc.
- c. Underground water storage tank with a capacity of estimated 100-200m³ concrete design which supplied with water from the borehole and supply water to the elevated tanks.

Distribution Points

There are several building in the school which are the end point or the distribution points for the water

7. Project Budget Estimates



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SAMMY ENERGY COMPANY LIMITED

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Proforma Invoice

Customer **Josiah Girls High School** TIN **126-397-178**
P.O.Box 1605
Bukoba, Kagera DATE **28th Aug 2017**
Tanzania
 Contact (s) **(+255) 754 553 322** PFI No. **SECL/TZ/17-00012**

Summary for Cost Estimates					
Items	Description (s)	Qty	Units	Unit Price	Cost
1	Construction of Concrete tank 550m3	1	pc	92,744,000.00	92,744,000.00
2	Rain Water Harvest Installation	1	pc	24,530,000.00	24,530,000.00
3	Water Pump Installation	1	pc	7,590,000.00	7,590,000.00
4	Construction of Pump House	1	pc	2,075,000.00	2,075,000.00
5	Construction of Borehole Chamber	1	pc	485,000.00	485,000.00
Sub Total					127,424,000.00
6	Project Contingency	10%	perc	127,424,000.00	12,742,400.00
Total					140,166,400.00

Price All prices are stated in Tshs.
 Exchange rate of 1Usd to 2200Tshs at the time of budget finalization

Mode of Payment: 70% with order, 30% balance on delivery

Terms of delivery: 4 - 6 weeks

Warranty: 2 years

For Sammy Energy Company Limited

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THE STORY OF JOSIAH GIRLS SECONDARY SCHOOL
Photos: Josiah Girls Secondary School Water Situation



Caption 1&2: Girl students in the cue waiting for one another to start the journey to the source for the search of water to at least 1km away from school.



Caption 3&4: *It is a shared source between the school and animals with high degree of contamination.*



Caption 5 (right): *It is a tiresome distant source and located in mountainous place at least 1Km walk from school to collect water.*

Caption 6 (left): *It is shared source where surrounding communities wash their motorbike and other farm equipment after shamba work.*



Caption 7&8: A walk with 10 and 20 litter buckets on head from the source back to school.



Caption 9&10: *Poor sanitation and hygienic practices is due to water shortages in school. Flush toilets need pouring water by using water stored in buckets in wash rooms.*