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RAIN WATER HARVESTING SYSTEM AT MHERO PRIMARY SCHOOL PROJECT LUSHOTO TANGA TANZANIA

FINAL REPORT ON THE IMPLEMENTATION OF THE PROJECT

Prepared by
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1.0 Executive summary

The project “**Rainwater Harvesting Project at Mhero Primary school**” has been funded by Arendal Soroptimist Club of Norway .The project is implemented by Nuru Women Group of Lushoto Tanga, Tanzania. The implementation started after Nuru women group signed the contract with Arendal Soroptimist club in February 2011.Initially Nuru women group signed the contract with the beneficiary, Mhelo Primary School. The design and supervision of the construction work was done by Env. Eng. John Nshunju of EECO LTD Lushoto.

The system was designed to cater for 760 students and 15 teachers and dependants. At least each student was estimated to get 3 liters per day during the 3 months dry period. The storage requirement therefore would be 20 m³ if the minimum requirement was to be met. However the infrastructure present for water harvesting gave the maximum of 17.5 m³. Since the available storage tanks are Sim Tanks and the convenient size is 5,000 liters. The provision of 2 tanks by Arendal Soroptimist Club of Norway and one donated by Somaria group Tanzania through Solafrica Company that manufactures and distribute Sim Tanks made possible for system to be able to collect 15,000 liters capacity which is 72% of the intended capacity.

The system gets water from two sources. The leading and dependable source is rainwater harvesting and a supplementary supply comes from the gravity water source owned by the nearby Irente View Hotel. Formal agreement to share water during dry season has been reached between the two parties.

The system has cost 8,169,100.00. Nuru Women Group as project holder was involved in the monitoring and evaluation of the project activities. The government through Lushoto District council gave all the support to make the project a success through the school authority and school managing committee.

2.0 PROJECT OBJECTIVE:

Looking at the size and duration of the project execution, the project purpose was stated as:

775 Students people including 760 students and 15 teachers at Mhero primary school get clean and safe water for basic needs through rainwater harvesting supplemented by gravity water scheme of Irente view Hotel.

2.1 THE PLANNED ACTIVITIES

The planned activities conform to the agreed work plan presented to the Arendal Soroptimist Club that showed that the commencement of the activities would begin the date on which Nuru received the 1st installment of the project cost. According to the bank statement the project commencement date was set at 12th March 2011. Initially the plan was to begin in January 2011. There were some changes in design which led to change of budget after incorporating the additional tank. The project was expected to take 6 weeks thus it would end in April 2011. This has not been possible because of the delay of some building materials especially gutters which according to the supplier, the manufacturer ran out of stock. Two weeks or so were lost in that

way. The heavy rain fall in April also contributed to the further delay. The works therefore were finalized and hand over ceremony done on 30th May 2011.

2.3 OUTPUTS

The System has been successfully installed, water test has been done and handover to the target group has been done (see attached photographs).

3.0 EFFECTS AND LESSONS LEARNT.

The school community has started using the facility. The community around the school has been excited and asking for such service at domestic level.

The storage volume using simtank will be limited in the situation where no piped water is available. The challenge will be that more storage capacity will be needed hence more expenses and construction set up. Eng. Nshunju is working at the Ferro-cement tanks, surface or underground which will suffice the need and apparently reduce the cost.

4.0 FOLLOW UP AND RECOMMENDATIONS

In order to have the system work properly, the engineer has prepared an operation manual which will guide the system attendant to do operation and maintenance of the service. This is with regard to opening and closing of the first flush diversion unit, cleaning the gutters and maintains cleanliness of the system.

5.0 FINANCIAL PART OF THE PROJECT

The finances to execute the project were used as per the allocation with the exception of the following:

There were some overlooked materials like facial board on which gutters are fixed. This cost has been offset by the remaining gutters which were unused because the estimates were based on 2 m gutters but the supplier brought 2.5m gutters. Similarly the gutter suspenders remaining offset some increases of prices of which were underestimated. At the end the given budget accommodated all the discrepancies. Hence the total of 8,134,600.00 was used to give out the above results. (See annexed financial accounts).

6.0 CONCLUSIONS.

The job done is hailed by any person who sees it. The design and the structure itself reflect the value for money and we are certain the structure will live to its expected design period. The Engineer, the School Headmaster and Nuru women Group were co-operating at each step having a back up support from Mr. Kamugisha who tirelessly inspired us to work contract. Nuru women group is again proud of commissioning a second water harvesting system to Mhero Primary School. The experienced gained from the two schools will be used to do a better job in the coming assignments.

7.0 Annex:

7.1 Financial accounts

Date	Receipt no	Description	Income	Expenditure	Balance	Bank
12.3.2011		1st Installment	7,030,000			
12.3.2011	2327	Cash to supplier		4,470,000.00	2,560,000.00	
12,3.2011	5	EECO LTD advance		600,000.00	1,960,000.00	
		Transport for group members				
10.4.2011	Nil	Trip to Mhero		80,000.00	1,880,000.00	
20.4.2011	Nil	Trip to Mhero		80,000.00	1,800,000.00	
12.3.2011	Pv 001	Building materials & loading and offloading				
		by Mhero community		415,000.00	1,385,000.00	
12.3.2011	Pv 002	Masonry labor		800,000.00	585,000.00	
	Voucher	Communication		50,000.00	535,000.00	
15.5.2011	Pv 003	Allowance for group members to inspect the job		450,000.00	85,000.00	
19.5.2011	1131	photocopy		1,600.00	83,400.00	
20.5.2011	Nil	Transport for group members		25,000.00	58,400.00	
20.5.2011	3953	Internet & printing		3,000.00	55,400.00	
30.5.2011	NIL	Transport for group members		15,000.00	40,400.00	
1.6.2011	Bank statement		1,139,000		1,194,400.00	
2.6.20011	6	Final payment to EECO LTD		450,000.00	744,400.00	
1.6.2011	4	payment to masons		400,000.00	344,400.00	
2.6.2011	5	sign writing on the system		80,000.00	264,400.00	
5.6.2011	Nil	Transport for group members		30,000.00	234,400.00	
13.6.2011		Payment to supplier		197,900.00	36,500.00	
13.6.2011	2511	Photocopy		2,100.00	34,400.00	
		Total /balance	8,169,000.00		4,400.00	30,000.00
Total money spent as per budget items			8,134,600.00			

7.2 Picture of the final touches to the system



Picture 1: women group on the final tour to hand over the project



Picture2: Eng. Nshunju presenting technical issues of the system



Picture 3: Teachers and school management pose in front of the structure



Picture 4: The signboard has been fixed to the first flush diversion unit.



Picture 6: Students showing happiness after school authority receive system



Picture 7: The school authority has initiated tree planting around the system as shown



Picture 8: Teachers and their students at Mhero primary school applause after receiving the system form Nuru women group.

7.3 Operation and maintenance (English)

MHERO PRIMARY SCHOOL RAIN WATER HARVESTING SYSTEM OPERATION AND MAINTENANCE INSTRUCTIONS JUNE 2011 BY EECO LTD.

1.0 USE OF THE FACILITY

1.1 The system serves two purposes

- Pressure piped water
- Rainwater harvesting system

The systems have 65 PTH $\frac{3}{4}$ ' inch pressure pipeline, 64 length of rainwater harvesting gutters, 14 m connection pipes PVC of 4', a foul flush diversion unit, 2 stand pipes with 2 taps at each stand pipe. There are 3 simtank of 5,000 each

2.0 OPERATION AND MAINTENANCE

2.1 The flow of the pressure pipe is controlled by check valves just before GS pipe gets into the tanks. The ball valve has been fixed to each tank and automatically closes the flow when the tanks are full. Any service to be done in the storage tank requires closure of the gate valves and drain of the water through the washout valves.

2.3 The rain collection system requires much attention to avoid contamination of the pressure pipe water supply Irete view hotel water supply source.

- Clean the roof regularly at least once in three months
- At each end flow of the gutter, there is strainer (aluminum coiled wires) put in the gutter reducer funnel to check away grass, leaves and other debris to avoid blockage of the pipes underneath.
- On start of downpour of rain the gate valves of the first flush diversion unit should be open to flush away foul water.
- On ensuring the clear flow, the gate valve on the downward pipe should be closed for clarified water to ascend to the gulley trap before entering into the tank.
- Regular cleaning of the foul flush diversion tank is recommended as well as gulley trap inside this unit.
- The foul flush has been diverted to the nearby bush by 11/2' PVC. The pipe end should be checked regularly to avoid blockage by debris and stones etc.
- Avoid throwing stones, and other solid objects to the roofs used by the system
- Avoid introduction of heavy objects into the wastewater collection system.
- General cleanliness at the stand point (DP) is essential if possible the school should appoint elder student to supervise the daily use.
- The system should be guided by a special team of students to check out naughty students who might want to climb and temper with piping system especially the Gs pipe at the inlet which by their arrangement prompt hanging for pleasure.

Note: .To ensure safe and clean water for the students boil drinking water always.

**EACH DROP COUNTS AND WATER IS A PRECIOUS RESORCE THAT NEEDS
CONSERVATION BY ANY MEANS IN OUR REACH!!**

By John Nshunju – Environmental Engineer: EECO LTD mobile: 0784592242.

7.4 Operation and maintenance (Swahili version)

MAELEKEZO JINSI YA MATUNZO YA MRADI WA KUVUNA MAJI SHULE YA MSINGI MHERO JUNI 2011 TOKA EECO LTD

1.0 MFUMO WA MAJI

Mfumo una aina mbili vyanzo za maji.

- Maji ya mvua
- Maji ya mtiririko

2.0 MFUMO UNA MIUNDO MBINU IFUATAYO

- Bomba 65m la maji ya mtiririko toka mfumo wa maji wa Hoteli ya Irente View .
- Mfumo wa uvunaji maji kwa (gutters) mita 68 jumla unaounganishwa na bomba la plastiki PVC 4” kuelekea chemba ya kusafisha maji
- Chemba ya kusafisha maji (first flush diversion unit)
- Matenki 3 ya simtank yenye ujazo wa lita 5,000
- Mfumo wa kuingiza na kusambaza maji kwa kutumia bomba la chuma 18m (GS3/4’) kwenye vituo viwili vya maji
- Vituo viwili vya kuchotea maji vyenye jumla ya koki 4

3.0 MFUMO UNAVYO FANYA KAZI

Maji ya mtiririko kuingiia ndani ya matenki yanaruhusiwa na viungio vifuatavyo

- Gate valvu 3 zilizo kabla ya maji kuingia kwenye tenki.

Ukitaka kukarabati ndani ya matenki zifungwe.

Kwa kawaida zinatakiwa kuwa wazi muda wote.

- Ballvalve ziko mwisho wa bomba la kuingilia ndani ya tenki hufunga maji endapo matenki yatajaa.Viungo hivi hujiendesha kufuatana na maji yanayoingia.
- Chemba ya kuchuja maji ya mvua ya kwanza (first flush diversion unit)

Wakati mvua haijaanza mabati hokusanya takataka ikiwa ni pamoja na mavi ya ndege vumbi nk. Vitu hivi husombwa na maji hadi kwenye tenki na kusababisha maji yaanze kuoza. Hivyo ni muhimu maji ya mvua ya kwanza yasiruhusiwe kuingia kwenye tenki. Gate valvu iliyofungwa kwenye bomba linaloshuka toka chemba hufunguliwa kiasi cha nusu saa baada ya mvua kuanza na kufungwa ambapo maji hurudi kinyumenyume na kuingia kwenye mitego (water gulley traps 2 za 4” ambazo zimeungwa na mabomba 2 ya 4”.chemba hii ni ya muhimu sana kuangaliwa kwani ndo inayohakiki usafi wa maji.

- Gate valve ya kuruhusu maji kwenda kwenye vituo vya kuchotea maji.

Iwapo ukarabati wa koki unataka kufanyika , gate valvu hii hufungwa ili maji yasiweze kutoka.

4.0 USAFI WA MFUMO WA MAJI.

Mfumo wa maji ya mvua unatakiwa kufanyiwa usafi wa mara kwa mara ili maji yake yasiwe chanzo cha uchafuzi wa maji mtirikoko.

Unatakiwa kufanya yafuatayo:

- Safisha paa walau mara moja kila baada ya miezi mitatu
- Katika upande wa mtiririko wa maji kupitia gata unapofikia bomba la PVC linaloshuka imewekwa chujio la waya ya aluminium ili taka kama majani yasipate upenyo wa kuingia kwenye mfumo hadi matenkini.
- Uasafishaji wa chemba ya kuchuja maji ni muhimu kwani dio muhimili wa usafi wa maji.
- Maji taka na yale yanayovunwa kwanza kwenye chemba ya kuchujia, yameelekezwa kwenye vichaka vya karibu kwa bomba la inchi 3.5.
- Hakiksha watoto hawtupi vitu vigumu kwenye mfumo wa maji
- Hakiksha kuna timu ya wanafunzi wazima ambao watakuwa viranja wa kudhibiti watoto wakorofi wanaoweza kuchezea miundombinu yetu.

- Mabomba ya chuma yanayoingiza maji matenkini yanashawishi watoto kubemba hivyo kuwe na uangalizi wa kutosha,
- Kituo kinapaswa mara zote kiwe kisafi. Hakua sababu ya kituo kuwa na uchafu wakati maji yatoka kibao.

ANGALIZO: KUHAKIISHA USALAMA WA MAJI YA KUNYWA CHEMSHA MAJI UKIPATA MUDA

KILA TONE LINAHESABIWA THAMANI YAKE HIVYO TUMIA MAJI KWA MAKINI ILI RASILIMALI HII IWEZE KUDUMU,

John Nshunju

Environmental Engineer

EECO LTD Managing Director