

Lanka Rain Water Harvesting Forum

Uva – Bandarawela

Rain Water Harvesting Tank for Nazareth Convent - Bandarwela

Selected Location : Nazareth Convent

Address : Nazareth Convent Road,
Bandarawela.

Principal's Name : Sis. Therese Marie

Contact No : 0572222369, 0776450851

Number of Children : 30 (Girls)

Number Sisters : 03

Number of Labors : 06

Present water source : Existing an underground well deep of 40 feet – in the dry season water level goes down. There is Tamil Vidyala nearby and the school children also uses the well water for drinking purpose. They pump the water to plastic tanks from the well and use. (There are 4 tanks – 1-10000 Ltrs, 2-1000 ltrs and 1-500 ltrs)

Existing National Water Supply & Drainage Board line is used for drinking only. However supply is not continuous due the hilly location

The main rainy season is September to January and in May also receives some rains

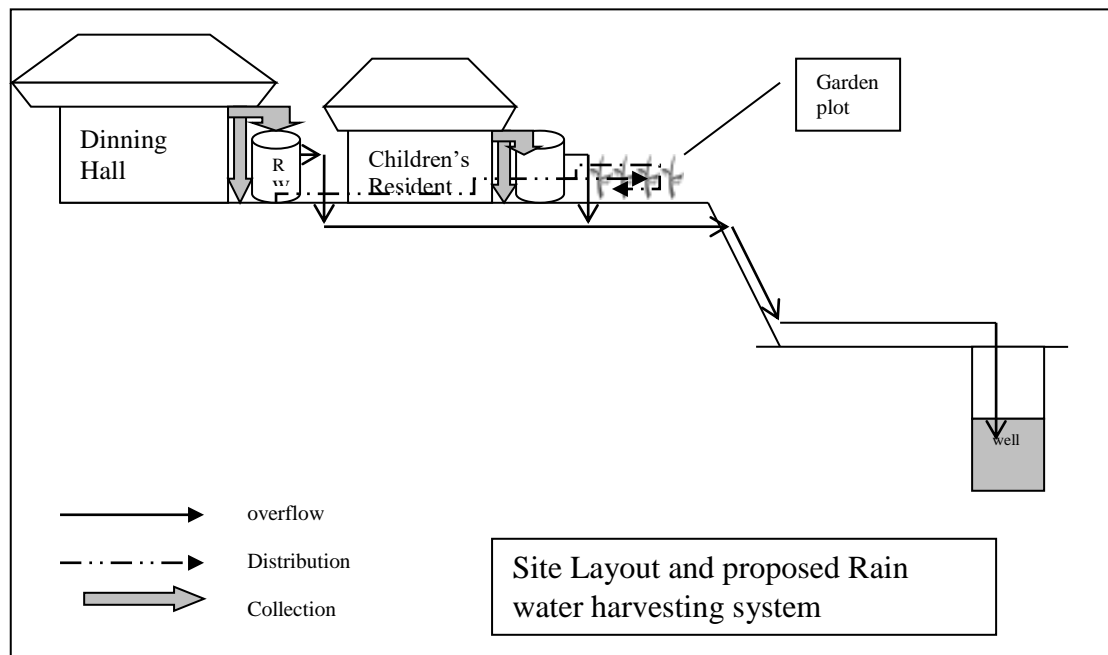
Note : Existing a storage tank by cement but it is cracked, cannot be used.

They are home gardening in 40 perches land (Leeks, Carrot, Cabbage and beet, beans and green leaves) but they are cultivating now only in 20 perches due to water scarcity. The gardening is being done by the children, staff and the labors. Products are mainly used for their own purpose and the excess will be sold. The daily water requirement for the gardening is 2500 liters.

Site Details

Roof sizes: Dinning hall roof area = 390m²
Children's residence roof area = 100 m²

Daily water requirement = 2500 liters



Proposed system

Ideally to meet the demand of 2500 liter per day a large capacity tank such as 100,000 liter is needed (annex 1 for tank performance) . However due to space and budget constraints the following is suggested.

Stage 1

Construct an 8 m³ above ground Ferrocement tank collecting roof water from Dinning Hall building.

8000 liter tank will give a daily supply of water during the driest period = 400 liters
Water to the garden plot can be supplied by pipe connected to a garden hose or drip irrigation system (which uses small quantity of water at the plant root).

Stage 2

Construct an 8 m³ above ground Ferrocement tank collecting roof water from Children's residence.

8000 liter tank will give a daily supply of water during the driest period = 200 liters
Water to the garden plot can be supplied by pipe connected to a garden hose or drip irrigation system.

Stage 3

Connect the over flow of both tank to the well near by, this will increase the yield of the well.

Budget

Description	Cost
1. Stage 1	
1.1. 8 m3 ferrocement tank, including unskilled labor	50,000
1.2. Distribution pipes	5,000
Sub total	55,000
2. Stage 2	
2.1. 8 m3 ferrocement tank, including unskilled labour	50,000
2.2. Gutters and valence board	10,000
2.3. Distribution pipes	2,000
Sub total	62,000
3. Stage 3	
3.1. Pipe laying to the well 200 m labour	2,000
3.2. Pipes, connections	15,000
Sub total	17,000
Transport and technical support	12,000
Grand total	146,000



Annex 1

Rainwater tank performance calculator: Results

YOUR DATA

Location	Bandrawella
Roof area	390 m ²
Nominal demand	1200 litres
Mean daily runoff	1233 litres
Water management strategy	Constant Demand

RESULTS

USING THE NOMINAL DEMAND AND TANK SIZE THAT YOU SPECIFIED OF 1200 LITRES PER DAY:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	6200⁴	24700⁴	98600⁴
Reliability ¹	42%	35%	62%	76%
Satisfaction ²	49%	44%	66%	79%
Efficiency ³	48%	42%	65%	76%

USING A CALCULATED⁵ NOMINAL DAILY DEMAND OF 1233 LITRES PER DAY:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	6200	24700	98600
Reliability	42%	34%	61%	74%
Satisfaction	48%	43%	65%	77%
Efficiency	48%	43%	65%	77%

RELATIVE COSTS:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	6200	24700	98600
Relative cost ⁶	1.0 X	0.9 X	1.9 X	4.0 X

Rainwater tank performance calculator: Results

YOUR DATA

Location	Bandrawella
Roof area	100 m ²
Nominal demand	500 litres
Mean daily runoff	316 litres
Water management strategy	Constant Demand

RESULTS

USING THE NOMINAL DEMAND AND TANK SIZE THAT YOU SPECIFIED OF 500 LITRES PER DAY:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	1600⁴	6300⁴	25300⁴
Reliability ¹	45%	18%	43%	52%
Satisfaction ²	51%	29%	49%	57%
Efficiency ³	81%	47%	78%	91%

USING A CALCULATED⁵ NOMINAL DAILY DEMAND OF 316 LITRES PER DAY:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	1600	6300	25300
Reliability	65%	34%	62%	75%
Satisfaction	69%	43%	66%	78%
Efficiency	69%	43%	66%	78%

RELATIVE COSTS:

	Your Tank	Comparisons		
Tank Volume (litres)	8000	1600	6300	25300
Relative cost ⁶	1.0 X	0.4 X	0.9 X	1.9 X

Notes

1. Reliability is the fraction of days the total demand will be met by the system
2. Satisfaction is the fraction of the total water demand that can be met by the system
3. Efficiency is the fraction of the runoff from the roof captured by the system
4. The comparison tank volumes are based on the average daily roof runoff multiplied by 5 days, 20 days and 80 days respectively
5. The calculated nominal demand is set at the mean daily runoff
6. Compares the typical cost of each comparison tank with that of your tank size