

Roof Top Rain Water Harvesting of SVBIT College Vasan, Gandhinagar

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Abstract

The demand for fresh water is continuously rising with the passing year as a direct effect of population explosion. Rain water harvesting is receiving increased attention worldwide as an alternative source of water. So we are going to design an effective plan by which can collect rain water into a storage tank for a particular building and we are also going to make a design by which we can collect to the ground and use it for an educational purpose.

Keywords: Roof top rain water harvesting, Gandhinagar, SVBIT, Storage tank, Rain water

I. INTRODUCTION

Rain water harvesting is the accumulation/ deposition of rainwater for reuse before it reaches the aquifer.^[1] Around third century BC, the farming communities in Baluchistan and kutch used rainwater harvesting for irrigation.^[2] In Tamil nadu, rainwater harvesting was made compulsory. Rain water harvesting means collecting rain water from the top of roof and store in the water tank. Generally two type of water tanks are utilized- underground water tank and above ground water tank. When the first rainfall of the season occurs, the water accumulated on the roof top is contaminated with various toxic gases as well as the dust on the roof top. Hence this accumulated water is generally flushed off as it is not suitable for drinking purpose. The primary need of such system is that water accumulated on the roof top must flow down under gravity for the use and the storage tank must be well cleaned prior to the use.

“Why we are providing roof top rain water harvesting in college building?” because now a days there are no reliable sources of water in the college. So problem is created for primary use of water. In such circumstances rain water harvesting can prove to be appropriate measure to conserve water. This conserved water can be used for cooking, bathing, washing clothes, toilet flushing and various hygienic purpose and finally if the rainwater is treated well then can be utilized for drinking purpose also. Even after first flushing of accumulated roof top water, the water collected will consist of various impurities and hence will be unsuitable for the usage of the water^[6]. So the accumulated roof top water is allowed to pass through charcoal filter or PVC filter after which water is supplied to the storage tank.

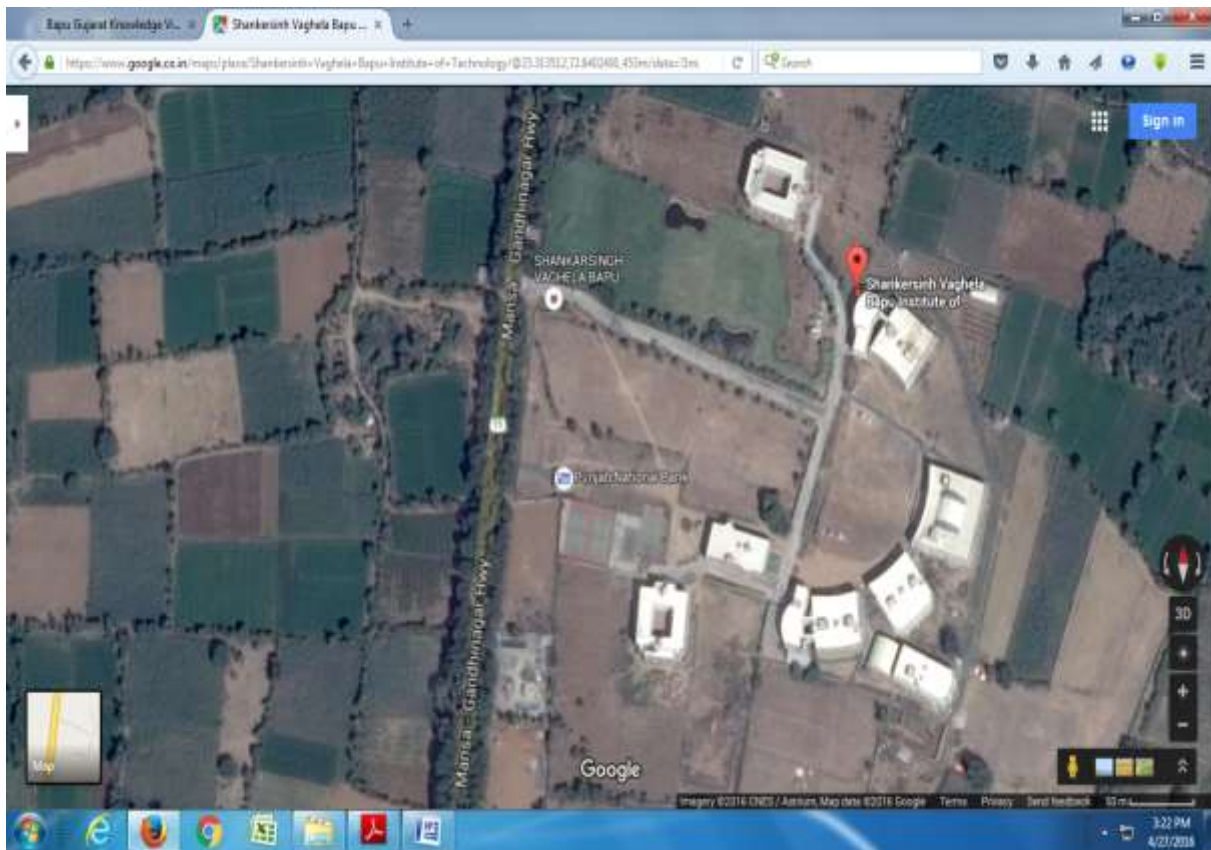


Fig. 1: Google image of Study area SVBIT (source. www.google/map.com)

II. STUDY AREA OF SVBIT

The SVBIT located at Gandhinagar-Mansa Road, While SVBIT is on 12 acres. The campus holds separate hostels for male and female students and offers dining and shopping facilities. The area of roof top of SVBIT building is 9415 M².

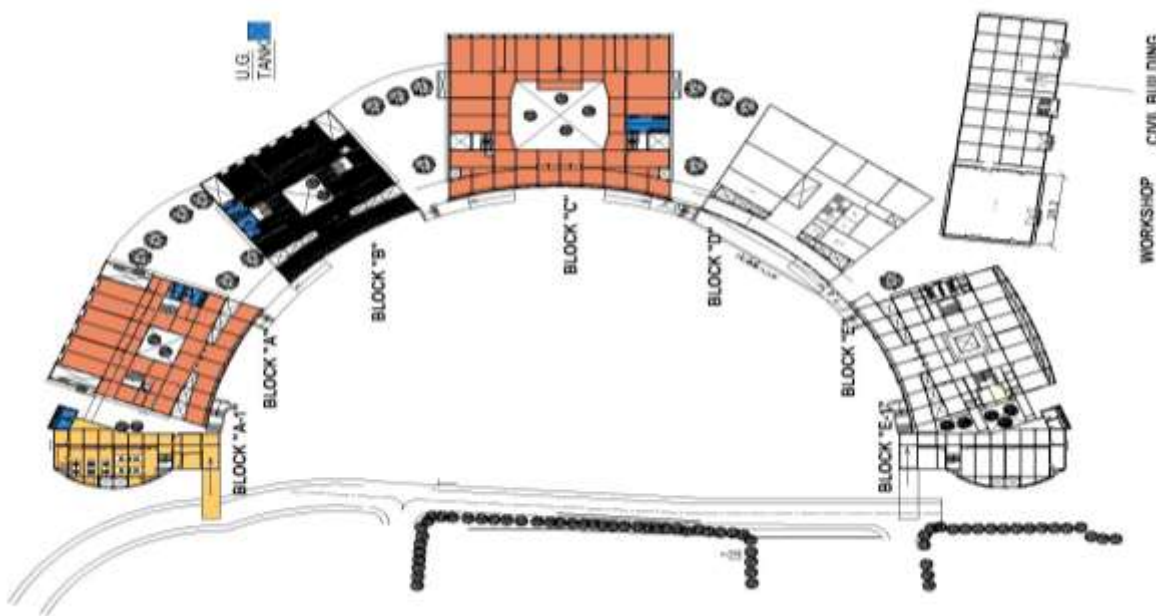
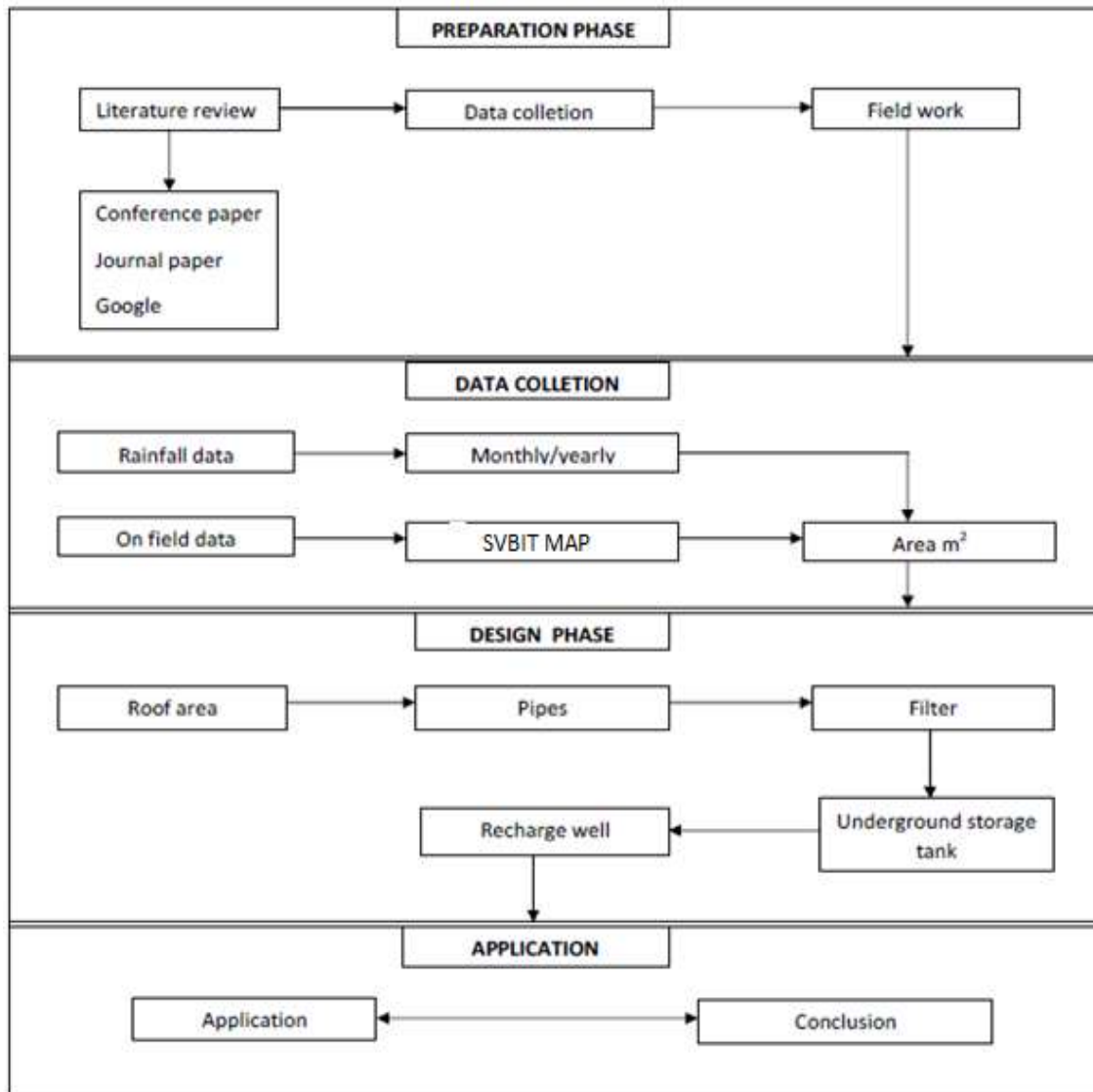


Fig. 2: Area Map Cad image for Study Area of SVBIT

III. METHODOLOGY



IV. TECHNICAL DATA

A. Rain fall Data:

No.	Taluka Name	year-rainfall data (in mm)										
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	Gandhinagar	806	1254	1133	1294	802	611	913	819	690	1266	559
2	Dehgam	914	1473	977	968	845	424	897	550	784	1216	661
3	Mansa	589	1751	1110	1094	492	526	971	823	528	934	803
4	Kalol	915	1299	1040	1050	767	670	890	594	450	977	823

B. Temperature Data:

No.	Taluka Name	Maximum Temperature	Minimum Temperature	Average Temperature	Average Rainfall
1	Gandhinagar	35 °C	12.3 °C	38 °C	855mm
2	Dehgam	42 °C	20 °C	37 °C	841 mm
3	Mansa	32 °C	20 °C	32 °C	806 mm
4	Kalol	42 °C	20 °C	40 °C	846 mm

V. DESIGN STEPS

The methodology for the planning and designing of RRWH system is explained in following steps;

- 1) Select the appropriate path of pvc pipe connecting the storage tank.
- 2) The area of S.V.B.I.T. building is calculated and the planning for horizontal drain pipe on wall or gutter at the edge of sloping roof and vertical drain pipe on wall is done.
- 3) Area of roof top increased 19% for pitch more than 28°
- 4) The pvc pipes below ground are designed for the corresponding discharge and location of the water tank.
- 5) Design calculation of water tank;

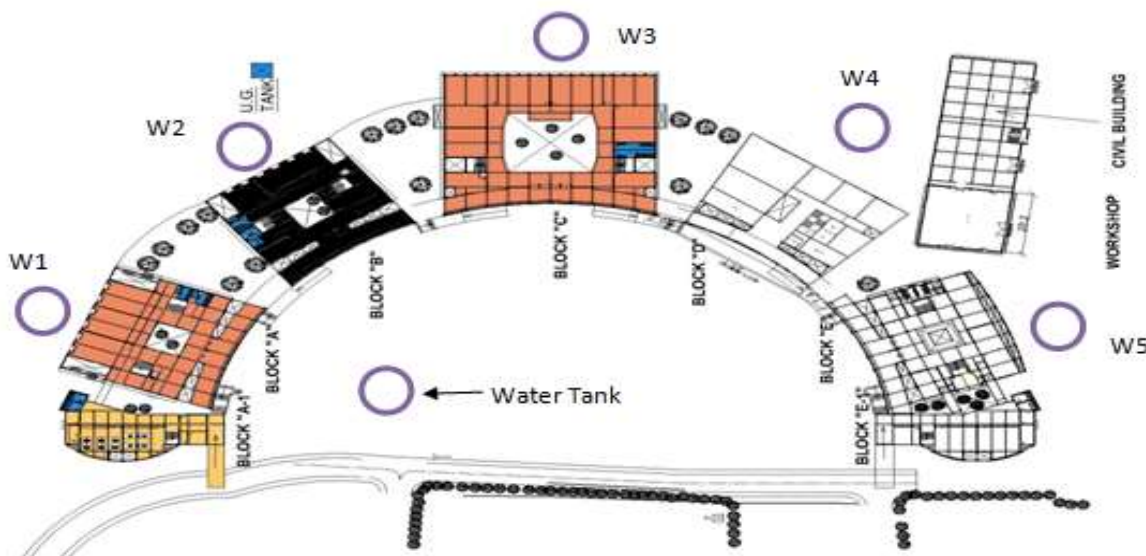
Water available from roof = Annual rainfall (in mm) X Area of roof (in sq m) X Efficiency of the collecting system. The average annual rainfall of the region is 854 mm. The roof area is 9415 m². The efficiency of the system is considered as 85%.

Water available from roof = .855 X 9415 X .85 = 6843 m³

So, the desired capacity of the storage tank is 6843 m³.

Also it is suggested to collect the rainwater during magha nakshatra separately for the drinking purpose, as the rain in magha nakshatra (end of August) is considered beneficial and pure as per Hindu culture.

VI. PROVISION OF WATER TANKS



VII. CONCLUSION

With help of data collection and analysis of SVBIT building, the roof top water harvesting is perfectly suitable for 9415 m² area. So we will collect 7500 litre water in 5 tanks (p.v.c circular) during rainy season which can be useful for gardening purpose as well as drinking purpose in worst condition.

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