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Rooftop Rainwater Harvesting System for Residential Building

Rajwardhan Kutwal¹, Mayur Pande¹, Shubham Suryawanshi¹, Rohit Shinde¹,
Prof. Milind M. Darade²

UG Student, Department of Civil Engineering, Dr. D. Y. Patil School of Engineering & Technology, Lohegaon,
Charholi(Bk), Pune, India ¹

Assistant Professor, Department of Civil Engineering, Dr. D. Y. Patil School of Engineering & Technology, Lohegaon,
Charholi(Bk), Pune, India ²

ABSTRACT: Water is one of the most important elements for all forms of life to survive. Based on hydrological research, the ideal tank area. The inns' and worker flats' water gathering potential has been determined, and the tank limit with an acceptable strategy is being evaluated. In order to preserve and meet our day-to-day water requirements, we must consider discretionary and generally less demanding mechanical ways for water monitoring. Despite the huge amount of water found on the earth's surface, just 3% of the total water available is fresh water. Water gathering from housetops, which is regarded to be catchment regions from a residential building in Sonori village near Saswad, Purandhar Taluka - Pune are the specialised portions of this research. Rainwater harvesting is one of the most effective methods for meeting such needs. The volume of the tank has been determined using the most appropriate estimating approach. The needed information, such as catchment zones and hydrological precipitation statistics, is obtained first and foremost. Only 0.4 percent of this 3% is useable and drinkable water, which must be shared by 7.7 billion people.

KEYWORDS: Rainwater harvesting , Precipitation, Catchment, Water.

I. INTRODUCTION

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off, convey and store rain for later use from relatively clean surfaces such as a roof, land surface or rock catchment. It is defined by Meyer's of USDA, USA, as the practise of collecting water from an area that has been treated to maximise rainfall runoff. In India, water harvesting is using the irregular monsoon rain to grow good crops in dry areas while preserving the excess runoff water for drinking and recharging. The water is generally stored in a rainwater tank or directed to recharge groundwater. He described irrigation as the gathering and storage of any type of water, whether runoff or creek flow. Rainwater infiltration is another aspect of rainwater harvesting playing an important role in storm water management and in the replenishment of the groundwater levels. Land-based rainwater harvesting occurs when runoff from land surfaces is collected in furrow dikes, ponds, tanks and reservoirs. The practice of collecting rainwater from rainfall events can be classified into two broad categories: land-based and roof-based. Roof-based rainwater harvesting refers to collecting rainwater runoff from roof surfaces which usually provides a much cleaner source of water that can be also used for drinking. Today, rainwater harvesting has gained much on significance as a modern, water-saving and simple technology.

II. PROBLEM STATEMENT

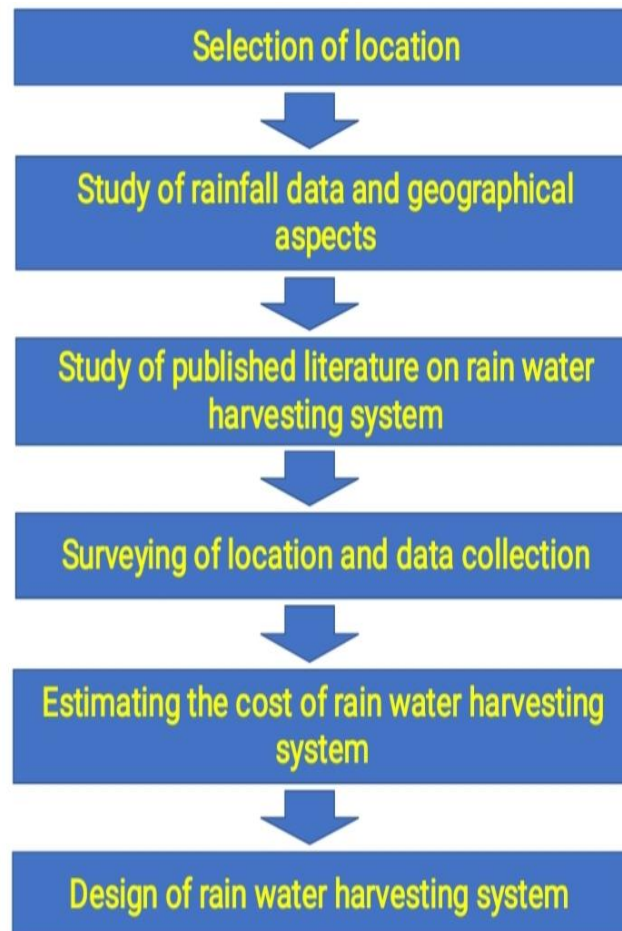
To identify and design the most economical and suitable rainwater harvesting system to tackle the water scarcity problem during summer season in Saswad, Purandhar Taluka, Pune – Maharashtra.

III. OBJECTIVES

1. To study the published literature on Rainwater harvesting system.
2. To analysis the Runoff.
3. To calculate amount of Rainwater collected.

4. To design the Rain Water Harvesting System.
5. To estimate the cost of Rain Water Harvesting System.

IV. METHODOLOGY



1. The site considered in this case is Rahul kale's residence. The existing plan of location were studied and the dead boundaries for the area in which work is to be executed were fixed. Total area is 2501.25 sq.ft. The visual study of total area was done.
2. Collection of rainfall data from metrological department
3. Also studied the geology of the area.
4. Surveying of location , their population and requirement of water per year. Collected all those data.
5. Estimating the cost of rainwater harvesting system
6. Design of rain water harvesting system

V. EXPERIMENTAL RESULTS

From the experimental work carried out following result are listed below

1. The total area under Project is calculated as 204 m².
2. The total cost of the rain water harvesting system is Rs. 1,80,334/- calculated and suggested.
3. The water which will be collected by the rain water harvesting system is of Drinking Quality.
4. So we are successfully achieving the Goal of the Project.

SR.NO	Description	value
1	Total area under Project	634.9 m ²
2	Total discharge collected from roof	101.7 m ³ /sec
	One time cost of installation of rainwater harvesting system	Rs. 1,80,334/-

VI. CONCLUSION

We have implemented an rooftop rain water harvesting which deal with water scarcity can be mitigated. The total discharge calculated from roof is 101.7 m³/sec. This system can benefit the owner of the property to save water in summer season . This system has a cost 1,80,334/- this is one time investment can benefit greatly in long term.

REFERENCES

- 1) Case study: rainwater utilization and water saving design of village - Junling Wang, Wan Sun et.al(2016)
- 2) Design of Rooftop Rainwater Harvesting in Nimgaon village - Mr. Chetan Bangale, Mr. Chandradeep Patil (2018)
- 3) Design of rooftop rainwater harvesting system for the administrative block of V.V.C.E. Mysore-Ramya R and Rudraappa shetahalli(2015)
- 4) Development of rainwater harvesting technology for securing domestic water supply in Ibadan, Nigeria - Shittu O.I, Okareh O. T et.al (2015)
- 5) Effective utilization, storage and treatment of rain water for drinking purpose at ADYPU Campus-Shridhar renuse, sahil shekh , Vishswajeet kadlag(2020)
- 6) Feasibility of Rainwater Harvesting and Consumption in a Middle Eastern Semiarid Urban Area - Ali Abbasi , Ehsan Rane (2021)
- 7) Optimal sizing of rainwater harvesting systems for domestic water usages: A Systematic literature review - Mary Semaan , Susan D (2020)
- 8) Optimal sizing of storage tanks in domestic rainwater harvesting systems: A linear programming approach – Chiemeka OnyekaOkoye , OguzSolyalet. a (2015)
- 9) Rain water harvesting – a review on conservation, creation and cost effectiveness -Pala Girish Kumar ,Abhirami Priyanka Pathivada, shalini veeranki (2021)
- 10) Rain water harvesting an emerging technology in changing condition a case study of graphic era university - Nitin Mishra, Amit Kumar (2019)
- 11) Rain water harvesting potential for different locations in Maharashtra - P. Guhathakurta , K.J. Ramesh, S.D. Sangale(2016)
- 12) Rain water harvesting, conservation and management strategies for drought –prone tahsils of Jalgon district Maharashtra state, India: urban and rural sectors-Dr. Pallavi Namdev Arjun(2019)
- 13) Rainwater Harvesting for Agricultural Irrigation: An Analysis of Global Research - Juan F. Velasco- Munoz (2019)
- 14) Roof - Top rainwater harvesting system for official / multistoried building with reference to malda districts, WB - Dr. Suman Panigrahi(2017)
- 15) Water scarcity : A major concern for citizens - Dr Bidyut jyoti gogoi (2019)



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