Rooftop Rainwater Harvesting Potential within the purliue of
Institute of Science for Groundwater Sustenance

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Water Scarcity encompasses water stress, water deficit, water crisis and water shortage. Imbalance between availability and demand, the degradation of groundwater and surface water quality, inter-sectoral competition, interregional and international conflicts, all contributes to water scarcity. The conventional water sources namely well, river and reservoirs, etc are inadequate to fulfil water demand due to unbalanced rainfall. A customary elucidation to dazed water scarcity is Rain Water Harvesting method (RWH). The aim of the present study is to use rainwater and thus taking close concept to the water conservation. In this paper, the Rooftop Rain Water Harvesting (RRWH) technique is analysed as a substitute source of water for flushing and other purpose within the purliue of Institute of Science College, Nagpur.

The objective of the study was to compute the rainwater harvesting potential yearly as well as for five years This helped to further analyze the water deficit between Rooftop Rain Water Harvesting (RRWH) potential and the water required by academic institution for domestic as well as flushing purposes in two categories namely with-boarding and without boarding. Rooftop Rainwater Harvesting Method (RRHM) was selected to quantify the amount of water that could be harvested and utilised after collection, two parameters are used viz. average rainfall intensity and catchment area. The yearly rainwater harvesting potential was found to be 30,67,017.7 litres in year 2013, 17,63,956.4 litres in year 2014, 22,71,925.6 litres in year 2015, 18,63,255.4 litres in 2016, and 20,85,974.8 litres in 2017 with the 9367.8 m² of total roof area. The rainwater harvesting potential for five years was found to be 22,10,238.7 litres. The year wise rainwater harvesting potential revealed that in the year 2013 there was higher rainfall as compared to subsequent years thus had the high rainwater harvesting potential. Result obtained from the present study suggested that, Rooftop rainwater harvesting method in academic institution is a substitute for drinking and domestic water sustainability to the institution especially during dry seasons eventually balancing the ground water table.

Key words: Rooftop Rainwater Harvesting Potential (RRWHP), Catchment area, Average Rainfall Intensity.

1. Introduction

Water is a dynamic entity essential for the survival of life on mother Earth, being a natural resource of principal importance to all the life-forms. About 70% of the earth’s surface is covered by water therefore the earth is known as water planet (https://shodhganga.inflibnet.ac.in/). In arrears to the cumulative industrialization and exploding population, the demands of per capita water supply have increased tremendously thereby creating stress on available ground water resources. Imbalance between availability and demand, the degradation of groundwater and surface water quality, inter sectoral competition, interregional and international conflicts, all contributes to water scarcity (Ringler, C., Biswas, A., and Cline, S., 2010). The thirst of water for India’s rapid development is growing day by day (”Overcoming Water Scarcity”. Vidya Kulkarni UNICEF).

Currently the prime source to all the water supply schemes is “Rainfall” whereas scarcity of water can be jettisoned by harvesting the rainwater sustainably. Rain water harvesting is a process involving collection and storage of rain water with the help of artificial design system. (Centre of Excellence for Integrated Land use Planning and Water Resource Management ILPWRM). Roof top rain water harvesting is the technique through which rain water is captured from roof catchments and stored in tanks or reservoirs. (S. S. Dara). Roof top rain water harvesting is to make water available for future use and recharge the ground water table to maintain the water resource. This technique is particularly important in dryland with low ground-water table, hilly, urban as well as in coastal area.

India receives average annual precipitation of 4000 km³, out of which 700 km³ is immediately lost to the atmosphere,