

The Journey of a Raindrop: From Being Useless to Useful

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Abstract: History stands witness that ancient India used the technique of rainwater harvesting. But present scenario clearly indicates that we are left merely with the name of rainwater harvesting, which is one of the significant cause of wastage of rainwater. This paper deals with the solution to the problem of wastage of rainwater, due to lack of proper rainwater harvesting system in our localities, towns and cities. Based on our survey in our locality we have tried to develop rainwater harvesting system in a simpler and collective manner. Rooftop rainwater harvesting is the technique through which rain water is captured from the roof catchments and stored in reservoirs. Harvested rainwater can be stored in sub-surface ground water reservoir to meet the household needs. Capturing and storing rain water for use is particularly important in dry land and urban areas. This rainwater harvesting technique can also be used to increase ground water level. "The Main Objective of rooftop rain water harvesting is to make water available for future use".

Keywords: Rainwater harvesting, ground water, drainpipe, storage tank

1. Introduction

This paper deals with a method of rooftop rainwater and surface runoff harvesting that is applicable for all the houses having rooftop rainwater drainage system in which the rainwater is directly drained onto the streets or roads. Based on our survey we have developed a simple rainwater harvesting system by which rainwater can be stored and used as per the requirements.

This system can be implemented in cities as well as in villages with minor modifications. This paper is divided into data collection and survey, analysis of data, plan for rainwater harvesting system including various components of the system, future scope and conclusion.

2. Data Collection and Survey

We did a survey of my locality to search how many houses had such system for the drainage of rooftop rainwater which drains the rainwater directly onto the roads or streets. For the survey we have divided our locality into five smaller units and the collected data that is shown in the table 1.

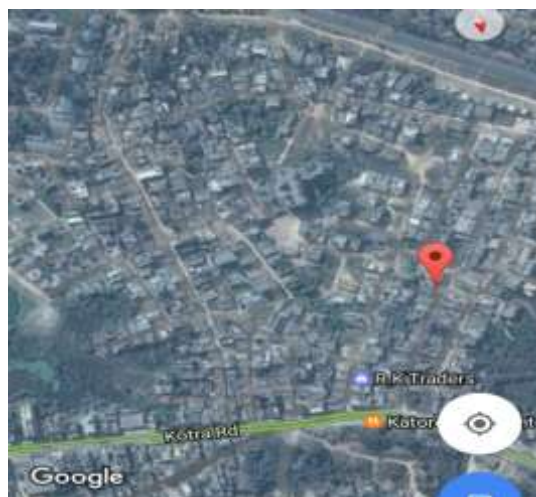


Figure 1: Map of the area of our survey

Table 1: Data collected in survey

Unit of my locality	No. of houses draining water directly onto streets	Total No. of houses surveyed
1	7 houses	10 houses
2	9 houses	10 houses
3	5 houses	10 houses
4	8 houses	10 houses
5	7 houses	10 houses

3. Qualitative and Quantitative Analysis of Data

It's obvious from the collected data that most of the houses in our locality have a drainage system with direct draining of rainwater onto the streets. By observing the data collected in the survey it is evident that number of the houses having a system with drainage of rooftop rainwater in garden or yard is very less. Therefore, we can say that a large amount of rainwater is being wasted after each downpour in the rainy season due to this unsystematic drainage of rainwater

treatment system adopted in the houses present in our locality.

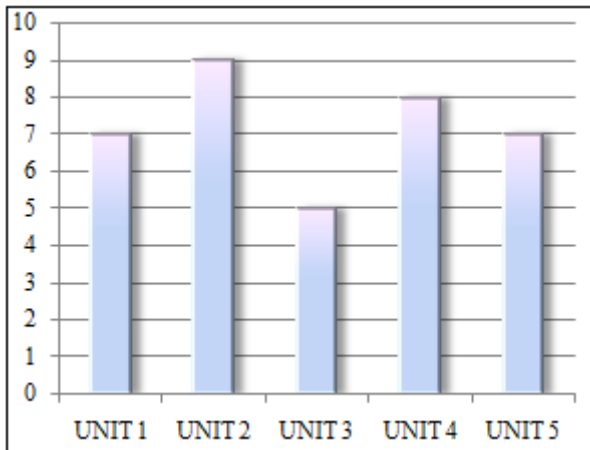


Figure 2: Number of houses draining water directly onto streets

4. Plan for Rooftop Rainwater Harvesting for a Town/City

In the survey of our locality it was found that 72% of all the houses have a system in which drainpipe (pipe from roof to drain rain water) directly drains the water from roof onto the road or street. On the other hand the data shows that only 28% of all the houses under survey have a drainage system which drains the water into garden or courtyard for use.

This system of drainage results in wastage of rainwater. To solve this problem we have rainwater harvesting plan for each locality in a city which can be taken care by Municipal Corporation or residents of that locality. In this system the rainwater is not collected in each and every house separately but the water from rooftop drainpipe is collected in the underground tank which consists of two filters having one at the one end of drainpipe and another on the other end. The water is then passed in the underground channel and then can be sent to the common tank for entire locality (area) from where it is sent back to all the houses for household uses.

4.1 Components of the rainwater harvesting system

4.1.1 Collection unit

It consist of two filters fitted in it at both the ends .The topmost filter have larger gaps and is used to filter the larger impurities like leaves flowing along with rainwater.



Figure 3: Drainpipe (without filters)

The top end filter is exposed on the surface of rooftop and acts as the entrance for rain water. The next filter at the other end with smaller gaps is made to filter very small impurities like pebbles.

4.1.2 Storage and sedimentation unit

This unit consist of a large tank where the water collected from all the streets has to be sent from the collection unit. It is a large tank with human entrance hole for cleaning and maintenance purposes. Water collected in the storage tank will be kept for long standing for sedimentation. Further some other water purification techniques can be adopted to get pure water (like filtration by passing water through different sized gravel and stone, chemical methods, etc).



Figure 4: Storage tank



Figure 5: Water entering collection unit

4.1.3 Supply and filtration unit

Thus rainwater after all the treatments will be supplied to all the houses in the locality for the required purposes and during this supply the water can be further purified in each of the houses by using filters like "POP-UP" filter or any other water filtration devices.



Figure 6: A Pop up filter

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5. Future Scope of this System

The rainwater harvesting plan discussed here is applicable for a city or town. The harvested water can be collected by water supply department. The water harvested here can be sent to some of the industries (after chemical tests if required) as water is used in many industries for various purposes.

The same system can be installed in a village with minor modifications like instead of supplying water back to the houses the harvested water can be supplied to cropland for irrigation purposes. This harvested water can also be used for ground water recharging.

6. Conclusion

What comes out loud and clear by all this matter is that the plan proposed in this paper is very effective for the harvesting of rain water. The system projected is not ideal but can be made perfect by further modifications and addition of other required qualities. This system of rainwater harvesting can be used not only for the upcoming house construction projects but it can be also easily employed for existing houses in our country.

References

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Author Profile



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