

A STUDY OF FACTORS AFFECTING OF RAINWATER HARVESTING TECHNIQUES IN URBAN AND RURAL AREAS

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ABSTRACT: -

In the light of its reflection in our minds as a picture of life water is a combination whose material composition is faculted to its symbolic value. Admission to water is a fundamental common freedom because water is not only a commercial commodity, it is socially and socially important. It is an arrangement for the spread of water for all living things that may refer to the hydrological patterns in the world as water popular administration. The provision of water is important for progress destinations in a country: job creation, food security, GDP growth and social goals. For urban and rural communities worldwide, the absence of rainwater is a significant issue. Old water sources, rivers, reservoirs etc. do not provide the water demand efficiently owing to unstable precipitation. The collecting method Rainwater thus explores as a new supply of water. During the time of shortages, the objective of the Rainwater harvesting system is to meet the demand. An alternate source of water is the rain water collection (RWH) system. The result of the collection system for rainwater, including parking, workshop space, part of the building's terraces. According to a literary study, 53.96,816 litres per year and 5 lakh Rupees are storing the current condition of the RWH system correspondingly. In contrast with traditional water sources, this is also very good. The system created meets societal demands and may be applied by technological techniques in rural as well as urban regions.

KEYWORDS:- Agriculture, Rain Water Harvesting, Reservoir,

INTRODUCTION

The collection of rain water is one of the helpful efficient water management and conservation techniques. It is used for collecting and storing rainwater and also for human, animal and plant requirements. The region's agriculture depends completely on the rain, where the rainfall type and quantity are so high that large-scale erosion may be ensured, if the vegetation is disturbed. The collecting, transmission and storage of rainwater in man-made reservoirs or tanks from the prevailing area in lateral usage is a method called rainwater harvesting. RWH is the method of roof water collection, filtering and storage for further usage. We may either store precipitated water in tanks or utilise it for groundwater replenishment. RWH system offers well-

dependent water sources and other sources. In comparison to other sources, the RWH system is not costly in construction, i.e. channel, dam, diversion etc. The technique of artificial refuelling in ground water increases the groundwater reserve. In a separate pipe distribution[1] the collected water is stored and pumped.

In real fact the worldwide water consumption is more than twice as fast as the increase of human population every twenty years. The whole eco-dispute for India is really caused by mismanagement as well as irresponsible water usage. The bulk of rain that falls outdoors tends to run quickly, making the groundwater scarce. Furthermore, ground water accessibility is very difficult in the Indian subcontinent because of diverse geological formations, complexities in tectonic frameworks, changes in climate and altering hydropower environment. Natural replenishment of ground water resources is in effect sluggish, and the significant ongoing use of groundwater resources in certain parts of the country cannot maintain pace. In large areas of the country, it has led to decreased levels of groundwater and depleted groundwater supplies. Most of the initiatives carried out in India have proven environmentally damaging, socially invasive, extensive and unbearable in virtually all water resource development projects.

The intentional collection and storage of water which is collected on artificial or natural catchment sections is the water harvesting. Catchment comprises of roofs, complexes, rocky outskirts or hill slopes, or even unprecedented and manufactured readiness. The water collected depends on the frequency and the intensity of rainfall, the catchment features, the water need and how fast and even how easily the water infiltrates through the subsurface to percolate into water. It is undoubtedly one of India's oldest and most frequently utilised water management methods. In India you may discover a wide range of techniques from simple to complex production methods to collect rainwater.

Now a day's rain water system consists of the main rain water collection from roofs and other catchment areas, collection of rinses for residential, industrial, farming and environmental purposes from man-made land or natural surface catching places. Systems may be classified as small, medium and large[2]. For man, animals and plants, waters are important. Without water, life on earth wouldn't exist. A sufficient supply of clean water is a requirement for a community's significant socio-economic development. Nonetheless, water scarcity is becoming a worldwide problem[11].

RAINWATER HARVESTING

For downwater harvesting, water management and water preservation is one of our important and fascinating cycles. It is used to show the range and storage of rainfall water and also used for humans, animals and plants. The vegetation of the area is susceptible to rainfall, with the ultimate aim of ensuring large-scale erosion if the vegetation becomes agitated.

The collecting of rainwater is an assortment cycle that transmits and sends downpour water into artificial tanks or supplies to lateral consumption from the precipitation region. RWH is the technique for collecting, purifying and removing water from the roof for further use. We may either store downstream water in tanks for future use or use it to replenish groundwater. The structure of the RWH provides water supplies that are less susceptible to various sources and well. When compared to other sources, for example well, the RWH framework is not expensive in development: channel, dam and redirection, etc., is a cycle by which the ground water repository is extended. In another line distribution the collected water is kept and syphoned.

Rainwater harvests are more reasonable in cases of low groundwater, sullied groundwater, rough or hilly terrain, normal earthquake and flood occurrences. The aquifer is under risk of intrusion of saltwater, population size is limited, energy and water prices increase, water is very hard or mineral laden, buyers should restrict admittance to salt and chlorine, where aid is temperamental and protection purposefully sought. In India and other parts of the globe, water conservation and harvesting were refined. In the area of Kunds, Pokhar, Talab, Johad, Khet Talab, Nadi, Khadins, Anicuts and Bavadi, Rajasthan is known for its traditional water preservation and harvesting practises. Pat Bandhna Madhya Pradesh is an ancient tradition of elderly families. The Chandela tanks, constructed by the Chandelas leaders, are an authentic example of the preservation and collection of water. The main design was the johad, a sickle, moulded earth and shocks dam, which was responsible for catching the rainwater. Two abilities were serviced by a johad. It had water for animals on the surface. In any event, its most important portions were below the surface comparable to an ice shelf. It allowed the fluid to penetrate the soil by keeping water in place. It loaded the aquifer down to a distance of one kilometre. Water could not be lost through dissipation while stored underground.

A rainwater collecting framework for a day is an important range of rainwater from rooftops and other catchments, as well as a range of human-made overflow and regular surface catchment areas for domestic, industrial, agricultural and climatic applications. Smile, medium and huge scope of the frameworks] may be purchased. For human beings, animals and plants, water is essential. Without water, life on earth wouldn't exist. A large financial development in a local region depends on an adequate supply of clean water.

Rainwater quality harvested

The surface on which rain water falls, is combined with both soluble and insoluble materials. Organic (plants, fungus, insects) or inorganic contaminants such as minerals, metals, and chemicals additionally collected by surface rinse may be contaminated. Although collected rainwater does not need a high degree of garden cleanliness and agriculture. For the drinking and culinary purpose, rainwater collected from dirty surfaces is noteworthy.

Components of Rainwater Harvesting System

A Rainwater harvesting system includes the following components such as pipes or drains, filtration, and tanks for storage of harvested water.

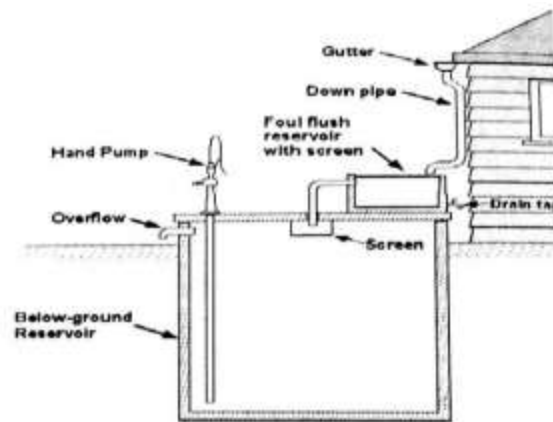


Figure-1: Components of Rainwater Harvesting System

The design and installation of RWH system comprises following:

1. Rainwater Catchment basin and Carriage
2. Rainwater Handling and Reservoir Sizing and
3. Rainwater Purity and Filtration

With this research it has been discovered that an effective quality strategy may build the rainwater collecting system. The purpose of this article is to highlight the economic advantages of rainwater collection.

WATER RESOURCES

The main business of the inhabitants of almost all India's states is agriculture. The rain water for crops and other agricultural goods is thus important. The main issue of agriculture in the Himalayan and plains of the countries is water scarcity for irrigation reasons. There is limited and extremely fluctuating water supplies. It is important that these resources be used judiciously[3].

1 Techniques

1. Ground water recharge in rural area

- [a] Gully plug
- [b] Contour bund
- [c] Gabion structure

[d] Percolation tank

[e] Recharge shaft

[f] Nalla Bunds

[g] Ground water dams

[h] Dugwell recharge

[a] Gully plug:- Gully plugs are built using local stone, clay and bushes across small gully and stream. Gully plug helps in conservation of soil and moisture.

[b] Contour bund:- Contour bunds are effective methods to conserve soil and moisture in watershed for long duration. These are suitable in low rainfall area where monsoon runoff can be impounded by constructing bunds on sloping grounds.

[c] Gabion structure:- The height such structure is around 0.5meter and is normal used in the stream with width less 10meters.

2. Ground water recharge in Urban area.

[a] Recharge pit

[b] Tube wells

[c] Recharge trench

[d] Trench with recharge well

[a] Recharge Pit:- this technique is suitable for building having a roof area of 100 square meter. They are may be of any size are generally constructed 1 to 2 meter wide and 2 to 3 meter deep.

[b] Recharge Trench:- Recharge trench are suitable are suitable for building having a roof area of 200-300 square meter and where permeable strata is available at shallow depth.

[c] Trench may be 0.5 to 1 meter wide and 1 to 1.5 meter deep and 10 to 20 long.

TREATMENT FOR RWH

1. Chlorine Treatment: This method is widely use when treated water to be stored for later use and in general industrial use.

2. Ultraviolet Light Treatment: This is another method for treatment of water. It reduces risk to industrial applications to reduce the corrosion.

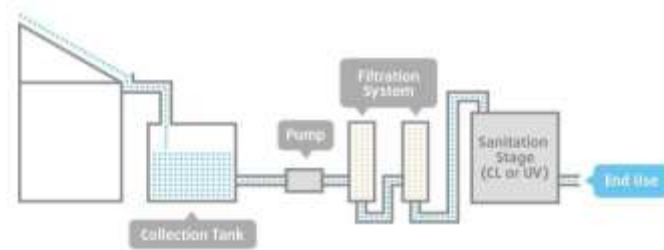


Figure-2 : Filtration of Harvested Water

3. Filtration: In the first step removal of particle and sediments is done.

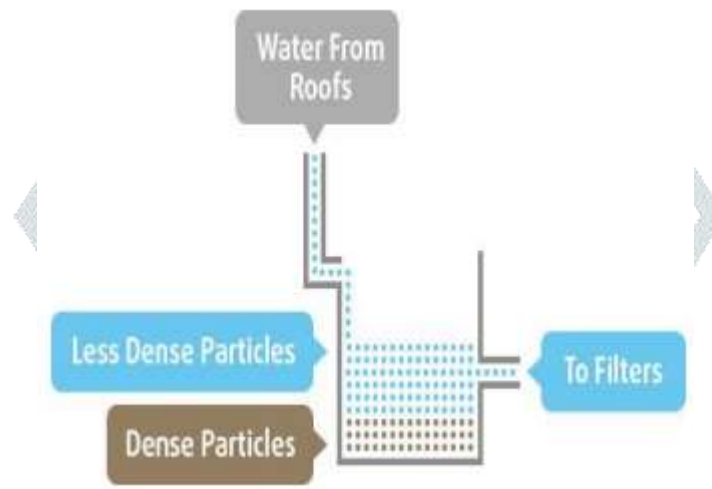


Figure-3: Filtration

Water from the roof is collected and stored in a pit or tank. At the bottom of the tank, dense sediments will settle under gravity. A float switch initiates the system functioning at the beginning of the pumping or an inline drop shows the immediate treatment and transfer of water. The filtering is intended for the removal of 1-5 micron materials, screens and sand filters. The possibility of self-cleaning filters is also available [10].

ADVANTAGES OF RWH

- Provides independence to water supply.
- Reduce the expense for siphoning of groundwater.
- Provides high quality water.
- Improves the quality of ground water.
- Reduces soil erosion from rainfall area.
- Rooftop rainwater harvesting is economical.

- Structure for downpour water harvesting frameworks is not difficult to develop, work and keep up.
- Rainwater harvesting framework controls the flood at same time.
- Reduces the few impacts of dry season.
- Reduction of water wastage because of surface spillover and tempest water overflow.
- Reduction in metropolitan floods and soil erosion.
- Reduction in water bills.
- Reduction (saving) of energy consumption used in water extraction/supply.
- Reduced load on ground water sources.
- Availability of water for broadened timeframe.
- Used to artificially recharge groundwater table.
- Environmentally attractive solution particularly in water scant regions.

DISADVANTAGES OF RAIN WATER HARVESTING

- Rain water harvesting in regions with no or extremely less rainfall may not appear as a most plausible or choice as only water alternate.
- Rain water harvesting during construction stage can be more affordable, yet downpour water harvesting for previously existing designs has a high establishment cost.
- Regular upkeep is required with the goal that the framework doesn't get stopped up.
- Storage cutoff points can be caused because of area, sort of equipment, rainfall and deficient storage spaces.

NEED FOR RAIN WATER HARVESTING

- I. As the water sources are exhausting at a quicker speed, it is expected to satisfy the water requests just as to renew the groundwater table and consequently downpour water can be utilized for groundwater recharge

- II. Soil erosion from spillover should be controlled and downpour water harvesting can help in this perspective.
- III. Rain water helps in diminishing burden on water sources and water supply frameworks.
- IV. To decrease water bills by utilizing collected downpour water for different purposes as opposed to utilizing metered water supply.
- V. Rain water harvesting can help extraordinarily in diminishing urban floods.

CONCLUSION

Basic water recharge is a time-consuming procedure, which takes time to recharge a table of soil water. After building any kind of recharge infrastructure, we cannot abruptly raise the groundwater table. In rural and urban regions the RWH is extremely helpful, therefore the RWH system is preferable. This will contribute to the recreation of the source of groundwater supplies. Help also preserve the little rain water that had drained from many years. For people and animals as well as for the depletion of groundwater, the collection of rain water is important.

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