

Rain Water Harvesting

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Abstract – Water is important for all life and used in many different ways, It is also a part of the bigger ecosystem in which the reproduction on which bio diversity depends. Fresh water scarcity is not limited to the arid climate regions only, but in areas with good supply the access of safe water is becoming critical Aspect. Lack of water is caused by low water storage capacity, low infiltration, larger inter annual and annual fluctuations of precipitation (due to monsoon rains) and high evaporation demand.

KEYWORDS : life, different ecosystem, reproduction, diversity, regions, critical, capacity, infiltration

1. INTRODUCTION

Water is essential for all life and used in many different ways, It is also a part of the larger ecosystem in which the reproduction of the bio diversity depends. Fresh water scarcity is not limited to the arid climate regions only, but in areas with good supply the access of safe water is becoming critical problem. Lack of water is caused by low water storage capacity, low infiltration, larger inter annual and annual fluctuations of precipitation (due to monsoon rains) and high evaporation demand. The term water harvesting was probably used first by Geddes of the University of Sydney. He defined as the collection and storage of any form of water either runoff or creek flow for irrigation use. Meyer's of USDA, USA has defined it as the practice of collecting water from an area treated to increase runoff from rainfall. Recently Currier, USA has defined it as the process of collecting natural precipitation from prepared watershed for beneficial use. Now a days water harvesting has become a general term for collecting and storing runoff water or creek flow, resulting from rain in soil profile and reservoirs both over surface /under surface. Previously this was used for arid and semi-arid areas, but recently their use has been extended to sub humid and humid regions too. In India water harvesting means utilizing the erratic monsoon rain for raising good crops in dry tracks and conserve the excess runoff water for drinking and for recharging purposes.

1.1 RAINWATER HARVESTING TECHNIQUES

Water is our most precious natural resource and something that most of us take for granted. We are now highly becoming aware of the attention of water to our survival and its limited forward. The human beings require water for various purposes. The most part of the earth

surface i.e. about 71 % is covered by water. Out of total volume of water available on the surface of the earth 97 % is saline water, 2 % water is in the form of ice and glaciers and only 1 % is fresh and potable water. India is well endowed nations in the world in terms of average annual rainfall. It is unbelievable but it is true that Cherapunji which gets 11000 mm annual rainfall still suffers from serious drinking water shortage. Though India's average annual rainfall is 1170 mm; in the deserts of western India it is as low as about 100 mm. Hence, it is necessary to opt for rainwater harvesting measures for completion of water requirement.

Rainwater from the roof surface is drained through gutters into storage tanks. To prevent contamination and dust to flow into the storage tanks there is a provision of a hand movable gutter connection which can be manually moved to divert the water out. The rooftop is used as the collection device. Guttering generally made of PVC is used to transport the rainwater from the roof top to the storage tanks. Storage tanks may be either above or below the ground and should be properly covered. In apartments more than one storage tanks can be used and they can be interconnected through connecting pipes. The storage tanks should have provision of an adequate enclosure to minimize contamination from human, animal or other environmental contaminants. The end of the gutter, which connects the storage tank, should be attached with a filter to prevent any contaminants to get into the storage tank. It is also advisable to drain the first flow to get rid of the dust and contaminants from the roof top.

1.2 RAIN WATER HARVESTING AND RECHARGING GROUND WATER

Water is the most important resource of the entire society as a whole, since no life is possible without water. As water, being a limited resource, its efficient use is basic to the survival of the ever increasing population of the world. In India, the ground water is mainly used for drinking and agricultural purposes. About 85% of drinking water is available through dug well, bore well, filter point and tube well etc. The per-capital availability of water at national level has reduced from about 5,177 m³ in the year 1951 to present level of 1,869 m³. In view of this, water management is very critical for the growth and development. economy, more so in a large country like India which is supplied with many large rivers, lakes and wells that need to be conserved, better managed, recharged and channelized for meeting the ever growing requirement of agriculture, industrial and

urban growth. Moreover bleeding of ground water has been taken up by millions of individual farmers mostly in regions where surface water is either scarce or absent to meet their extreme water needs. Although this has led to local depletion or decline of ground water levels causing serious concern about rainwater harvesting & the need to recharge ground water. The quantum of ground water so far harnessed is one third of the replenish able ground water of 431 km³ a year. In the comprehensive strategy needed for the conservation and development of water resources, several factors are to be kept in view. These include the availability of water, its quality, location, distribution and variation in its occurrence, climatic conditions, nature of the soil, competing demands & Socio-economic conditions. In dealing with each of these, every effort must be made to make the best use of water for the survival of human life, animal and plant life.

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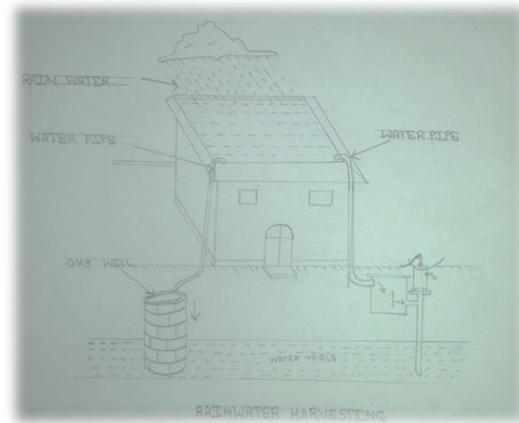


fig Roof top rainwater harvesting

2 ROOF TOP RAINWATER HARVESTING FOR ARTIFICIAL RECHARGE TO GROUND WATER

The water has been harvested in India since antiquity. Evidence of this tradition can be found in ancient texts, inscriptions, local traditions and archaeological remains. The Purina's, Mahabharata, Ramayana and various Vedic. Buddhist and Jain texts contain several references to canals. Tanks, embankments and wells. Overexploitation of groundwater resources is increasingly being recognized as a major problem. Despite being one of the wettest countries of the world, India's growing water shortage has reached alarming proportions.

Over the last few centuries, a range of techniques to harvest every possible form of water has been developed. Technically speaking, water harvesting means capturing the rain where it falls, or capturing the run-off in one's own village or town. So, the need of roof top rain water harvesting has become an urgent demand of the present century.

The amount of water harvested depends on the frequency and intensity of rainfall, catchments characteristics, water demands and how much runoff occurs & how quickly or how easy it is for the water to infiltrate through the subsoil and percolate down to recharge the aquifers. Moreover, in urban areas, adequate space for surface storage is not available and water levels are deep enough to accommodate additional rain water to recharge the aquifers, so the roof top rain water harvesting is ideal solution to solve the water supply problems. The present paper focuses in brief about the components of the roof top rain water harvesting structure, types of recharge structures and the benefits of the system.

Thus, the knowledge on the several traditional water harvesting processes, storage facilities, practices and their significance to the present day situations has become necessary in the present century. It is estimated that 8 billion people (globally) are to be fed by the end of the first quarter of the 21st century. This effort requires utilization of all water resources intelligently. For this, there is a need to collect, conserve and use critical water resources judiciously. In this context, roof top rainwater harvesting can become popular technique to improve the recharge regionally and globally. Moreover, in Urban

3. CONCLUSIONS

Considerable amounts of rainfall in semi-arid areas are lost (e.g. by evaporation from soil surfaces), which could be utilized for agricultural production. This could be achieved through water 127 harvesting. Rainwater Harvesting have the potential to increase the productivity of arable and cropping land by increasing the yields and by reducing the risk of crop failure. They also facilitate re- or afforestation, fruit tree planting or agroforestry. With regard to tree establishment, rainwater and floodwater harvesting can contribute to the fight against erosion. Most of these techniques are relatively cheap and can therefore be a viable alternative where irrigation water from other sources is not readily available or too costly. Unlike pumping water, water harvesting saves energy and maintenance costs. Using harvested rainwater helps in decreasing the use of other valuable water sources like groundwater. Remote sensing and Geographical Information Systems can help in the determination of areas suitable for water harvesting. The decision making process concerning the best method applicable in particular environmental and geophysical conditions depends on kind of crop to be grown and common socio-economic and cultural factors.

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