

Rain Water Harvesting for Recharging Ground Water

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Abstract

Rainwater harvesting {RWH} can be well described a process to use natural water by storing it in water scares. But, due to global issues such as global warming, population growth and disposal of harmful chemical wastes in water bodies the amount of potable water is reducing. With increase in population, the demand for water is also continuously increasing. The end result is that many residential colonies and industries are extracting ground water to fulfill their daily demands. This has led to depletion of ground water which has gone to significant low level in some areas where there is huge water scarcity. Is it not our responsibility to store water for future use? When we have a really easy and a convenient method to save water. But, why don't we implement it? Because of rainwater harvesting there can be a permanent solution to the problem of water crisis in different parts of the world. In addition, it's an ideal solution for farmers who depend on monsoon for consistent water supply. It is also an alternative method to back up the main water supply especially during dry spells. Systematic rainwater harvesting can help in irrigation with minimum use of technology and is therefore cost effective. So what is wrong with us to follow this pocket friendly process? Yes, it's hard to predict rainfall and sometimes little or no rainfall can limit the supply of rainwater. It is not advisable to depend on rainwater alone for all our water needs in areas where there is limited rainfall. Rainwater harvesting is suitable in those areas that receive plenty of rainfall. It also requires regular maintenance as they may get prone to rodents, mosquitoes, algae growth, insects and lizards. They can become as breeding grounds for many animals if they are not properly maintained.

Keywords: *Global warming, population, portable water, water crises, dry spells.*

Introduction

Water is the most precious gift of nature. It has no taste, no smell and no colour. It is found everywhere and the other name of it is life. We find it in tanks, ponds, wells, rivers and springs. Almost three-fourth of the earth is water. We should conserve and save water so as to protect the water environment. Rainwater harvesting refers to the trapping and storing of rainwater so that it can be used at a later time when the need arises. As the rain falls, water is directed to a suitable collection point. It can also mean collecting rainwater before it infiltrates into the ground and becomes underground water. It's a practice that has been around for a long time. Government has been promoting the concept of water harvesting, particularly in urban areas, as a technological solution that can be adopted by all. The only difference is that now better methods have been developed to make the process a great success. New technologies have come into play and are now making the process easier and more efficient.

Major Sources of Water

There are various different sources of water out there in the world, and below you will find in depth information on our main water sources.

1. Rivers and Streams

Rivers and streams are a source of fresh (i.e. not salty) water. Collecting water from rivers is still a widespread practice. Often it will need to be treated to be safe for drinking. The rivers that we see above ground originate underground, and burst through to the surface of the earth as springs. River water is generally safest to drink close to the source – the spring. However, it is also true that river water can absorb minerals if it flows a certain way through mineral rich rock (for example volcanic rock) and so to get the benefit of these minerals it can be a good idea to let your river water flow awhile through mineral deposits to get the full benefit of it. The source of the river is called the head, and the end of the river – the point at which it flows into the sea – is known as the mouth. It may be surprising, but many of the

world's great rivers, such as the Thames in London, UK, start off their lives as small trickles of water emerging from an underground spring. As well as providing us with water for drinking and washing, rivers have also historically provided us with a means of transport – taking a boat along a river remains a useful way to get people and goods from A to B.

2. Lakes.

Lakes are still bodies of (usually fresh) water. They are replenished by the rain and often by rivers and streams, too. Some lakes are natural lakes, forming in valleys in hilly or mountainous regions. Others are man-made. A good example of a man-made lake is a quarry lake. When land is quarried, a large basin remains cut away from the earth. Once it fills with water, this can form a lake. Again, lakes have long provided humans with a source of drinking and washing water.

3. Rainwater.

Rainwater falls naturally over our entire planet, except in the very harshest and driest deserts. Rainwater in rural areas is usually safe to drink, though in the cities rainwater can be contaminated by the pollutants found in vehicle and factory fumes rendering it highly acidic. Nevertheless, rainwater is an abundant source of water for watering plants and crops. Many people use rainwater as a free source of water for washing their cars, too. Rainwater can be collected in water butts or simply in tubs left on the roof or outside the window. Rainwater is sometimes referred to as 'gray water'. People who go traveling in camper vans or who stay in tents often collect rainwater and sterilize it either by boiling it or by mixing it with sterilizing tablets so that they can use it for drinking and brushing their teeth with.

4. Wells

Water from wells tends to be very fresh and clean, and they have been a source of water for many centuries. Usually man made, wells are deep shafts dug into the earth until water is found. Well water is generally thought to be clear and uncontaminated – as long as the well is dug down very deep. It is accessed by lowering a bucket on a rope down to the bottom of the well, letting the bucket fill with water and then hauling it back up again. However, adequate precautions need to be taken to protect the well water from contamination.

5. Reservoirs

Reservoirs are like artificial lakes created by humans to collect either rainwater or river water. The water in a reservoir is typically treated in a water treatment plant until it is safe to drink and then piped off to people's homes for them to use in the form of tap water. Reservoirs may look like natural bodies of water – they may be cut in to a hillside, for example and reinforced with concrete or stone. Otherwise, they may simply be large metal structures that are able to hold huge amounts of water – ready to be piped over to your bathroom or kitchen whenever you feel that you need a glass of water to drink.

6. Recycling water

Did you know that much of the water than you drink has been recycled, whether it comes in bottled form or out of the tap? Sewage and tap water than runs down the sink (for instance when you brush your teeth) can be cleaned, sterilized and made ready for people to drink it once more. There is nothing dangerous about this – in fact, you may well have been drinking recycled water all of your life without realizing it.

Methods of Rainwater Harvesting

There are many ways in which rainwater can be harvested. Some of these methods are very effective and can aid in the collection of a lot of water even for commercial activities while others are only suitable for harvesting water meant for domestic use. Every system has its merits and demerits. These are the common methods of rainwater harvesting:

1. Surface Water Collection Systems: Surface water is simply water that accumulates on the ground's surface. When rainwater falls on the surface of the earth, it usually flows down slopes as it moves towards a point of depression where the moving water can collect. Surface water collection systems enable the collection of ground surface rainwater before it flows to other locations. Examples of such systems include rivers, ponds, and wells. Drainage pipes can be used to direct water into these systems. Water can then be fetched from these sources and then used for other purposes.

2. Rooftop system: These can also be used to harvest rainwater. They can be used to direct rainwater that falls on the roof of a building into containers or tanks. These tanks are usually elevated so that when the tap is opened, water flows at a high pressure. This method of rainwater harvesting is good because the accumulated water is mostly clean and usually requires no further treatment to make it fit for human use.

3. Dams: These are barriers that are designed to trap water. Rainwater can accumulate directly in them or drainage systems can be created to direct water into them. Water collected in dams is mostly used for irrigation purposes or treated and then distributed for domestic use. They can also be used to harvest a lot of water because of the way in which they are modeled. Unlike ponds, measures are put in place to reduce the amount of water draining into the ground.

4. Underground Tanks: These are also ideal for collecting rainwater. They are constructed by digging into the ground and creating a space which is then cemented to reduce water infiltration. The top is also sealed and water is obtained through pipes directed into the tank. To get water out, pumps are used. Underground tanks are wonderful for harvesting rainwater because the rate of evaporation is reduced since they are located underground where sunlight does not really penetrate.

5. Rain saucer: Sometimes one can decide to collect rainwater directly as it falls from the sky by using a rain-saucer. These look like upside down umbrellas or big funnels. Some are usually attached to a pipe so that the collected water is directed elsewhere. Some people also do a little improvisation by placing the collecting container underground with only the rain-saucer above the ground. It is a simple method yet effective.

6. Water Collection Reservoirs: Water collected through this method is not really clean and may be contaminated. However, it can still be used for crop irrigation. Such rainwater is harvested from roads and pavements.

7. Barrage: A barrage is a dam that has several openings which can be closed or opened to control the quantity of water that passes through it. It is usually large and can be used to collect a lot of water.

8. Slopes: Rainwater tends to collect at the bottom of slopes when it flows on the ground. When it rains heavily, water levels can rise to the hill top. This is a simple and natural way to harvest rainwater.

9. Trenches: This is another great way to harvest rainwater for irrigation. When it rains, the water is directed to the farm using trenches. It is one of the traditional methods of rainwater harvesting that is still very much in use today.

10. Rain Barrels: These are also used for rainwater harvesting. They are specifically designed for this purpose and can be purchased from retail stores. Rain barrels are used for harvesting rainwater that falls on rooftops.

Advantages of Rainwater Harvesting

1. Water for Domestic Use: Rainwater harvesting is beneficial because it provides a source of water for domestic use. The collected water can be used for house cleaning purposes, washing

laundry and for cooking. When treated, rainwater is good for drinking. It is an easy way of obtaining water for use in the home.

2. Water for Industrial Use: Industries can also harvest rainwater for use in some of their processes. Rainwater meant for industrial use is normally harvested in large scale. Such companies can construct their own dams or have underground tanks to store rainwater.

3. Supplementary Water Source: Many areas experience water shortages during summer due to lack of rain and as a result of the high rate of evaporation. It can be difficult to get a reliable source of water during these periods. Those who sell water may also increase their prices because of the high demand and short supply. Harvesting rainwater is therefore seen as a way of preparing for the sunny days when water is scarce.

4. Cost Effective: We basically harvest rainwater for free because it is naturally occurring. If you store enough water during the rainy season, you may never have to pay for water services again because you'll have enough supply to last you through the summer. This saves you money by cutting down your monthly expenditure on water bills.

5. Reliable Flow of Harvested Water: Even though harvesting of rainwater depends on rainfall, once stored, the supply of the available quantity is guaranteed. You can have an uninterrupted flow of water from the place of storage as long as the amount harvested has not been exhausted. The same cannot be said when you depend on an outside source to supply your water. There is also the benefit of locational-suitability because the source of water is in your place of stay.

6. Mitigates/Reduces the Impacts of Floods: Harvesting rainwater plays a key role in mitigating or reducing the impacts of floods. When rainwater is directed to farms through trenches or collected in dams, its movement is controlled. This prevents the accumulation of water in one area, something that often causes flooding. Rivers can also overflow and cause flooding in the adjacent areas. The negative impacts of floods are too many and costly. Harvesting rainwater is, therefore, an effective way of reducing the impacts of this natural disaster.

7. Building and Construction: Collected rainwater can be used for building and construction. The process of building a house requires a lot of water. Harvesting rainwater would thus avail water for this activity.

8. Helps in Preventing Water Pollution: Rainwater flowing on the ground surface can carry with it a lot of impurities and toxic substances. When it drains into water bodies, it pollutes them because of these impurities. Harvesting rainwater, therefore, prevents pollution of water bodies.

9. Irrigation: Rainwater is good for farming because once harvested, it can be used for irrigation especially during the summer. One can, therefore, have a thriving farm and realize a bumper harvest.

10. Saves Potable Water: Instead of using clean and treated water for other purposes such as washing and in the toilet, rainwater can be used. This saves potable water which would then be used for drinking and cooking only.

Precautions

1. Pre-filtration to remove impurities would make the harvested water safer.
2. The hKlaus Koenig harvested rainwater can also be boiled to kill any germs before drinking it.
3. Rainwater should be collected in containers that do not give out toxins when exposed to sunlight.
4. Set up the collection points before it starts raining because you can fall ill when you run around in the rain.

Conclusion

Rainfall is a very important weather phenomenon. It is a source of water and is very critical for the growth of crops and farming. Harvesting rainwater is a practice that has been

going on for a while. Many people actually engage in it without even realizing that they are doing so. Because of weather changes, water sources can dry up and in the process impact animal, human, and plant life negatively. Rainwater harvesting is a smart way of preparing for such times because even when the conventional water sources dry up, we can still use the stored water for many purposes. The best part is that this type of water is naturally occurring. Some of the setbacks can be avoided by taking precautionary measures. When we employ innovation and technology, we can come up with better ways of rainwater harvesting and increase the storage capacity.

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