

An Important Cycle in Hydrological Cycle: Rainwater Harvesting

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Abstract

Water is one of the most important elements for living things. Water, which forms the biological structures of living things, is a vital life support that ensures the growth and development of living things since they came into the world. While most of the world is covered with water, the seas form salty seas. However, only 2.6% of the world's water reserves are composed of fresh water. Drops falling from the clouds in the form of water droplets are called rain. Rain makes the water cycle happen and clears the water on earth. Rain water which raises sea levels is also beneficial for forests, plants and people. Rain water can be stored and used to meet drinking and utility water and agricultural irrigation needs.

Keywords: Hydrological cycle, rainwater harvesting

Review article

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Introduction

As Turkey is not a country rich in water chest. On the contrary, it is a candidate country for water problems in the near future unless the necessary measures are taken. The main reasons for this are the inability to control the resources due to irregularities in the topography and the uneven distribution of precipitation and resources by region (Anonymous, 2001).

Increasing needs on the one hand and increasing standards of living on the other hand make it imperative that all opportunities are made available for the optimal use of water resources. In particular, the social and economic importance of water resources in Turkey are better understood with each passing day (Sağlam and Bellitürk, 2003).

In order to meet the increasing food needs in parallel with the population increase, agricultural production should be increased. The limited use of water and land resources and the increase in competition among sectors necessitate effective use of resources in agriculture. Irrigation takes place on 280 million ha area, which corresponds to 19% of the agricultural land in the world. 35% of the agricultural production in the world is obtained from irrigated areas and 70% of the water used is used for agricultural production (Çakmak, 2001).

Turkey's agriculture, balanced development and economic and demographic structure, especially the great importance of irrigated agriculture. Since the upper limit of agricultural land was reached 20 years ago, the increase in production in the unit area depends on technological development and increase of irrigated areas. Here, not only the increase of production, but also to obtain qualified products according to the demands of the market becomes more important. Therefore Turkey, about 65% of the money allocated for agricultural investment in recent years are spent on irrigated lands. Every year, irrigated areas expand. With irrigation, the product increased 7 times and added value increased 2.6 times. (Kanber, 1997). Some of the water used for irrigation of agricultural areas is provided by rain water. Rain is the precipitation that is formed by the condensation of water vapor in the atmosphere and falls to the earth in the form of drops with a diameter greater than 0.5 mm. The type of precipitation in which the diameter of the drops is smaller is called the drip. When the humidity in the air exceeds 100%, the water vapor condenses to form water particles. These particles come together by drifting with the wind and form clouds. When the cloud encounters a cold layer of air, the water in the cloud condenses into water droplets. Rainfall occurs when these droplets reach a drop size. If the temperature of the atmosphere is at a certain height, precipitation is in the form of rain (Anonymous, 2015).

Conventional rainwater collection systems used to drain rainwater in urban areas quickly remove rainwater from the environment via a separate or combined sewage system. With this situation, as a result of rain water transported to the soil without waiting; inadequate feeding of underground water resources, pollution of foreign bodies transported by rainwater from urban areas and receiving waters where rainwater is discharged and flood, flood and erosion problems are inevitable with traditional rainwater collection systems being insufficient in heavy rainfall. As a result of the excessive increase of impermeable hard surfaces in urban areas and the decrease of light-green areas inversely proportional to this increase, rainfall after rainfall does not penetrate the soil sufficiently (Müftüoğlu and Perçin, 2015). Rain water to be used for irrigating light green areas and agricultural areas are directed directly without any treatment. and shallow pit areas on which natural, foreign dormitory plants can be grown, "rain garden" or "bioretention" (Demir, 2012). The main function of the

rain garden; to improve water quality for the immediate environment by improving the collected surface flow (Jaber et al. 2012).

Rainwater Collection

In the old times, rain water was collected and used with cistern systems, which are common in the regions where water shortage was felt. Today, rain water usage decreases water consumption to a great extent in garden irrigation, which has a large proportion of total water consumption in arid regions where water problems are experienced. Cistern application is a very effective method for such uses. Cistern applications are offered as an ideal solution especially for places where there is limited ground and surface water resources, but there is sufficient rainfall and settlements without central water supply infrastructure (Alparslan, 1992).

Cisterns can be used in rural areas, coastal areas, arid, semi-arid areas, islands and scattered settlements are located. A typical cistern system consists of four components. These;

- Collecting rainwater from roofs or floors of buildings
- Ensuring the transmission through the gutter system,
- Accumulation in rain water tank,
- Purification is transmitted to the building (Alpaslan et al. 2008).

According to the rain water collection method, the water flowing along the slope is collected. Rainwater from roofs or stony, rocky areas can be stored and used as domestic needs. This system is of little importance for food safety, but it can improve the quality of life to some extent. The water collection technique is advantageous because it is easy and inexpensive. It can be applied on almost any slope. Compared to large irrigation systems, water transmission losses are very low. Approximately 50% of the water required for domestic use can be provided by this method (Ferguson, 1998).

Advanced Rain Water Collection Systems

- Another possibility to increase the leakage rate is the use of some special stones in parking areas or public spaces.
- These stones are highly permeable and provide a suitable environment for rainwater to drain and mix into groundwater, even in torrential rains.
- An important prerequisite for the permeability of stones is the use of “clean” production techniques.
- Never cover the floor with concrete.
- Rain water permeability must be ensured.
- As the advantages of leakage, it reduces the load that the sewage system will carry. Therefore, the costs of the network and sewage system are reduced.
- There is no need to take any more safety measures against water that randomly seeps into the sewerage network.

- The advantages of rainwater and leakage systems are; reduction of wastewater treatment costs, easy way of building rainwater tanks, reducing the damage caused by floods and floods (Tanik, 2017).

Benefits of Rain Water

Rain makes the water cycle happen. The waters of the earth are cleaned by rain. Rain water is useful for field crops. Plant can be grown by irrigation. However, the fact that rain water is rich in minerals and that it affects all parts of the plant instead of a certain point increases the yield. Rain water is drinkable. It is useful in terms of minerals it contains. It can be applied to hair, hands and body. Leaves skin soft Rain meets the water needs of the trees in the forest. Thanks to the forests, oxygen is obtained for the survival of the vitality. Thanks to the rains in the spring, flower dust and pollen circulate through the atmosphere and positively affect inter-plant diversity and fertilization. Rain whips your nose, cheeks, your whole face and acts like a good sprayer for free. They can occur in many different forms, which are baked in moist air with dust from the air and in the sunlight. The clouds are officially reviving, because they contain reduced iron, zinc, manganese, and so on. with trace elements such as arginine, alanine, proline, valine, isine, histidine, aspartic acid, glutamic acid serine and so on. as the cornerstones of life are enriched with amino acids (Anonymous, 2015).

Damages of Rain Water

The biggest damage of rain is that it causes flood formation. Floods cause people to lose their lives and suffer financial damage. Sometimes it is seen that it interferes with transportation. Rainy weather can cause accidents due to tire slippage. In case of heavy rain, it prevents the development of some field plants and may even lead to decay. Fig rain can prevent the harvest of the plant. The icing of the water accumulated as a result of rainfall in winter also affects human life negatively. Avalanches, lightning strikes, hurricanes, storms and tornadoes are other damages of rain (Anonymous, 2015).

RESULTS

Water is an important source of life for human life as well as light green areas and agricultural areas, but is also important for the whole world. Agriculture should also be improved with increasing population. Product efficiency should be ensured. To achieve this, water is needed. Since rainwater collection is economically feasible, it is one of the preferred methods. It is recommended to use rainwater for irrigation of agricultural areas. With the collected rain water, productivity will be increased.

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