



## THE NEED FOR EFFECTIVE USE OF RAINWATER: WATER SHORTAGE AND PROBLEMS

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### Annotation

This article delves into the critical need for effective rainwater harvesting, highlighting the growing problem of water scarcity and the multifaceted challenges associated with it. It examines the causes of water scarcity, explores the impacts on various sectors, and emphasizes the potential of rainwater harvesting to mitigate these challenges and promote sustainable water management.

### Keywords

Rainwater harvesting, water scarcity, drought, water stress, climate change, water management, sustainable development, agriculture, urban water supply, environmental degradation, water.

### Introduction

Water scarcity, a pressing global issue, is intensifying due to a confluence of factors including population growth, urbanization, climate change, and unsustainable water management practices. The consequences of water scarcity are far-reaching, impacting agriculture, industry, human health, and environmental sustainability. Rainwater harvesting, a proven strategy for capturing and storing rainwater for various uses, emerges as a critical solution for mitigating water stress and promoting sustainable water management. This article explores the need for effective rainwater harvesting, examining the root causes of water scarcity, its consequences, and the benefits of this crucial water management practice.

### Main part

Several crises are looming due to water scarcity.

- a) Population growth and urbanization. Population growth and urban centers place great demands on freshwater resources, which often exceed the availability of reliable sources.
- b) Climate change. Changes in precipitation patterns, increased frequency and severity of droughts, and accelerated evaporation due to rising temperatures will exacerbate water scarcity.
- c) Unsustainable water management. Inefficient irrigation practices, leaks in water infrastructure, and overuse of groundwater resources contribute significantly to water stress.

In recent years, consistent reforms have been implemented in our republic on effective use of land and water resources, improvement of the water resources management system, modernization and development of water management facilities. At the same time, due to global climate change, the growth of the population and economic sectors, their demand for water is increasing year by year, the shortage of water resources is increasing year by year. The average annual water used in 1098 is 51-53 billion cubic meters, including 97.2 percent from rivers and streams, 1.9 percent from collector networks, and 0.9 percent from underground, which is reduced by 20 percent compared to the allocated water intake limit.

Water shortage will become one of the most urgent problems in Central Asia in the next 10 years. In Uzbekistan, not only irrigation, but also the shortage of drinking water is increasing. The melting of glaciers is accelerating in the region, and the mechanism of economical use of water in agriculture has not been formed. New energy-saving technologies require significant investment and government attention.

One of the farmers notes that this year's drought has been very difficult for farmers: Special investigations have shown that the ever-growing population of the planet (if its number was 0.9 billion in 1800, 1.8 billion in 1920, 4.0 billion in 1970, 5.2 billion in 1990, 6.3 billion in 2000, 11 billion in 2050) to provide food by 500 million by 2050. hectare of irrigated land will need to be cultivated to achieve high productivity (currently this area is about 285 min.). According to the data, the level of water supply in the Amudarya river basin in 2018 is expected to be lower than last year.

The Ministry of Water Management informed Kun.uz that in the 80s of the last century, the annual water consumption of Uzbekistan was estimated at 64 billion cubic meters. Of this, 20 percent corresponds to rivers and streams within the republic, underground water reserves, and 80 percent to the amount of water taken from transboundary rivers formed in the territory of neighboring republics. The average annual amount of water used in the republic was 53.9 billion cubic meters in 2019, -51.2 billion cubic meters in 2020, and -43.2 billion cubic meters in 2021. Out of 8 billion people, 1.5 billion people need clean drinking water, and 2.4 billion people are forced to consume water that does not meet sanitary standards. In the countries of the Middle East, North Africa and South Asia, water shortage has become a permanent process. In addition, currently 4 out of 10 of the world's population is forced to live in areas where drinking water is scarce, and in 2025, 6 out of 10 people, or 5.5 billion people, are likely to face a shortage of clean drinking water.

Let's look at what the effects of water scarcity are:

- The impact on agriculture is high. Scarcity of water for irrigation affects crop yields, food security, and farmers' livelihoods, leading to economic instability and potential social unrest.
- Industry. Water scarcity can affect economic growth and job creation in industrial production, particularly in sectors such as manufacturing, energy and tourism.
- Human health. Water scarcity leads to poor sanitation, limited access to safe drinking water, and increased disease, especially in vulnerable communities.
- Environmental degradation. Ecosystem degradation due to over-extraction of groundwater, reduced river flows and water stress affects biodiversity and overall environmental health.

It should be noted that the demand and need for water is increasing more than ever. As a result, there is a water shortage all over the world. This urgent issue has not bypassed the Central Asian region. According to experts' calculations, water resources are expected to decrease by 5% in the Syrdarya basin and 15% in the Amudarya basin by 2050. On the other hand, due to population growth, the demand for water in Uzbekistan by 2030 will increase to 7 billion. cubic meter, and by 2050, this figure may double.

Taking this into account, the use of water resources in our country has been fundamentally reformed in recent years. The main issue is the rational and efficient use of water, aimed at improving the amelioration of irrigated lands. Therefore, in the pre-election program of the President, special attention was paid to saving water resources, and by 2030, all cultivated areas under irrigation in our republic should be transferred to water-saving technologies. and it was determined that measures will be taken to further increase incentive mechanisms for farmers.

There are two different views among experts about the causes of the drought that has been observed since recent years. At first glance, the region is under the influence of global climate change. This will cause not only severe drought in the region, but also severe environmental crises. It should be noted that various international reports have warned that lack of water and drought will cause various conflict situations in the region. According to estimates, ecological crises will become more evident from the 2020s.

According to the data, by 2040, Uzbekistan is expected to face a water shortage of more than 80%. That's why we started this work. 250-360 mm of rain falls every year, which causes floods and floods in some places.

Residents and communities are also affected by these floods. We know that 99% of the population does not use water in every household. According to hydrometeorology, there is information on the average annual precipitation of 250-360 mm. It can be seen from this that 250-360 liters of rain fall per 1 m<sup>2</sup> every year. On average, if the surface of the roof of one house is 14x18=252 m<sup>2</sup>, this means 252 m<sup>2</sup>x300 liters=75600 liters per year, which means 75.6 tons of water per year. If there will be 2 thousand 681 thousand 088 households on average in our republic, this means that if we multiply 75.6 tons x 2681088 households, 202.7 million tons of water can be used every year. These are only residential houses, besides there are

several livestock farms, factories, state organizations and other buildings.

### **Conclusion**

To sum up, if we use the rainwater that we offer effectively, this water can be used by the population, and as a result of the processing of the used water, it can be used effectively in agriculture.

Rainwater harvesting is one of the sustainable solutions. Let's look at the reasons for this.

1. It increases water availability. Rainwater harvesting provides an additional source of water, reduces reliance on limited groundwater and mitigates the effects of drought.

2. It improves water quality. Rainwater is generally cleaner than treated municipal water, making it suitable for a variety of uses, including irrigation, non-potable applications, and even drinking after proper treatment.

3. Replenishment of underground water. Rainwater infiltration replenishes aquifers, increasing their storage capacity and ensuring a sustainable water supply for the future.

4. Stream and flood reduction. Rainwater capture reduces the volume of water flowing into storm drains and sewers, mitigating urban flooding and erosion.

Water scarcity is a complex and multifaceted problem requiring a comprehensive approach. Rainwater harvesting, coupled with other sustainable water management practices, offers a promising solution for mitigating water stress and promoting a more resilient and sustainable future. By embracing rainwater harvesting, we can enhance water security, protect our environment, and create a more sustainable and equitable future for all.

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