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ISSUES OF COLLECTING WATER FROM FUTURE AND USING IT FOR IRRIGATION OF GREEN AREAS

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Abstract: At the moment, water shortages are increasing every year in the countries of Central Asia, as well as in our republic, and by 2030 water shortages may reach 15%. One of the most important issues is to prevent water shortages and provide water to green areas by collecting snow and rainwater and using it to irrigate green spaces and trees.

Keywords: Atmosphere, wastewater, water treatment, green spaces, irrigation, reservoir, apartment buildings, water collection.

Introduction

Our country is consistently working to protect the environment, rationally use natural resources, and improve sanitation and the ecological situation.

At the same time, the results of the analysis conducted in this regard indicate the lack of a comprehensive approach and strategic planning in the implementation of state functions in the field of environmental protection, as well as the insufficient powers of the nature protection body to effectively fulfill the assigned tasks [1].

The growth of the population and the number of industrial enterprises in our republic does not fail to show its negative impact on nature, as a clear evidence of this can be seen in the decrease of natural resources. For example, the increasing scarcity of water, the accelerating melting of ice reserves, the decrease in the level of river, stream, lake and underground water reserves and the reduction of green areas are the reasons. These emerging problems arise from the irregular and purposeless use of natural resources, as well as the fact that the targeted management system of these resources has not been fully implemented [2]. Today, the use of energy and resource efficient devices is of great importance.

Current analyses show that by 2030, water reserves in our republic could decrease by up to 15% [3]. To prevent this, we can reduce the negative consequences of water scarcity by harvesting rainwater and using it to irrigate green spaces and trees.

Solution method (or methods). Based on the content of the research work, a number of methods were used, such as systematic analysis, comparison, mathematical, statistical, extrapolation, reference experimental research, comparison, systematization of the obtained data in graphs and tables, as well as Decrees and resolutions of the President of the Republic of Uzbekistan, resolutions of the Cabinet of Ministers, the Ministry of Water Resources, the Ministry of Construction and Housing and Communal Services, and ministerial reports on Ecology and Environmental Protection and Climate Change.

Analysis and results. Today, due to increasing water scarcity and insufficient protection of forests in the Republic of Uzbekistan, forestry is decreasing and amounts to 7.7% of the territory of the

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republic. In order to protect the environment, prevent water shortages, and reduce green spaces in our republic, our government has adopted a nationwide state program for green spaces, and practical work is being carried out to create green spaces and plant trees [4,5,6].

Planting a tree alone will not solve this problem; these seedlings require constant care to grow and develop. Water is essential for the proper growth of any plant. The amount of water used for irrigation varies depending on the type of plant, as can be seen in the table below.

Table 1

Indicators on water consumption [7]

/p	Water consumers	ater consumption l/m ^{2}	Watering season	The amount of water required for 1 m ^{2} of land in the irrigation season is m ^{3}	
				2 times a day	1 time per day
	Sprinkle water on the sidewalk	.4	2 times a day	0.144	0.072
	Spraying water on the green area	.4	2 times a day	0.252	0.126
	Garden irrigation	5	1 time in 7 days	0.385	

It can be seen from the above table that each plant's irrigation period and water demand are different, so it is necessary to reduce water consumption and use alternative water sources.

Irrigation of green areas requires an average of 126 liters of water per m2 ^{of} area during the irrigation season. At first glance, this may not seem like a large amount, but it certainly creates some difficulties when irrigating green areas in areas where surface water, i.e., irrigation canals, is not available. Since the only source of irrigation here is drinking water, drinking water is also used to irrigate trees [8].

Using drinking water for irrigation is nothing more than doubling the problem. For example, using drinking water for irrigation leads to a decrease in drinking water reserves, increased water losses, and a decrease in pressure in the network, which leads to a lack of drinking water reaching the upper floors of multi-storey buildings and end users.

Clause 96 of the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 194 “On Approval of the Rules for the Provision of Communal Services” dated July 15, 2014 states that the use of drinking water for irrigation of trees is allowed in the following exceptional cases: in the absence of irrigation water, when there is capacity of the ISKH organization and according to the schedule approved by local government bodies, only at night (from 00:00 to 05:00) [9].

There are specific requirements for using drinking water for irrigation in exceptional cases, such as during the day when the demand for drinking water is low. However, consumers do not fully understand this, which is why we often see drinking water being used for irrigation during the day.

Areas by collecting and cleaning rainwater and using it to irrigate technical crops, green areas, and ornamental trees [10, 11, 12, 13, 14].

In our country, up to 50 kg of snow falls per m2 ^{and} 150-300 ml/s of rain falls, the duration of the rain is on average 4-6 hours, in some cases it can reach up to 12 hours [15]. In large urban centers

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where there are no irrigation canals, we can see partial flooding during the rainy season, which, of course, leads to water accumulation in the subway, in apartments, in the basements of multi-storey buildings, and on highways due to the lack of irrigation canals that would drain rainwater outside the city.

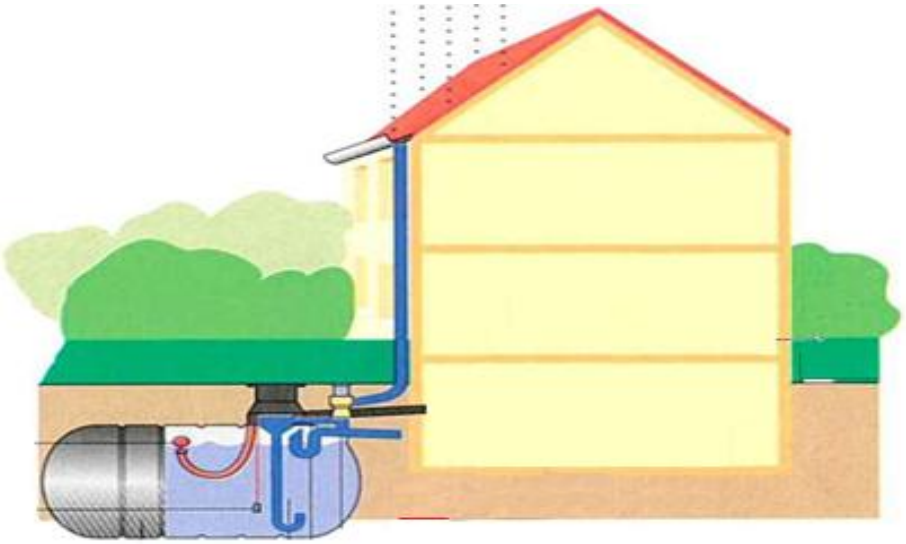

Figure 1. Rainwater collection tank.

Assuming that a single rainfall lasts an average of 4 hours, 36 to 72 liters of rain and snow fall per square meter of land ·

To collect rainwater from the roofs of residential houses and multi-apartment buildings, the use of water for beautification by collecting them in special reservoirs is effective for the increase and preservation of green spaces [16, 17].

If we take the example of Tashkent city alone, as of January 1, 2023, there were 41 thousand apartment buildings [18], each of which has a roof area of from 200 m ^{2} to 1400 m ^{2} (average 800 m ^{2}). During a single rainfall, from 28.8 m ^{3} to 57.6 m $^{3\ of}$ rain and snow water is produced, which is enough to irrigate 41142 m ^{2} of green space at once.

Studies show that each apartment building has up to 600 m2 of green space around it, which means that a single rainfall ^{can} irrigate the green spaces around the house for 34 days.

Today, in order to prevent the depletion of water resources, another solution to the problem is the widespread use of water-saving technologies and the introduction of irrigation of industrial crops and green areas using local wastewater treatment technologies [19, 20].

Conclusions and recommendations. In order to prevent water shortages and the reduction of green areas worldwide, and at a time when surface and underground drinking water reserves are decreasing, we can see the construction of water collection tanks and the establishment of irrigation using rainwater to irrigate trees and green areas as one of the most important solutions to prevent water shortages.

Rainwater and snowmelt from the roofs of apartment buildings and their targeted use for watering trees and shrubs by relevant government, scientific and public organizations, apartment building management service companies, private homeowners, and social sector facilities will yield good results in areas with a shortage of surface and groundwater, and increase the possibility of preventing water shortages in other areas.

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