Q&A with Dursun Yıldız -Director of Hydropolitics Academy-Türkiye

On Water Scarcity and Water Governance in İstanbul

An Interview with HPA's Director Dursun Yıldız


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1. **What is the viability of rainwater harvesting to mitigate the effects of drought and water scarcity in Istanbul?**

With the regulations published by Istanbul Mınicipality Administration in 2018 and 2021, it has become mandatory to collect roof and surface water in an underground tank in constructions built on parcels larger than 1000 m2.

In addition, with a regulation published by İSKİ in 2021, it has been made mandatory to implement a gray water project in constructions to be built on an area larger than 30 000 m2.

Istanbul's 2053 recovery water potential is stated in the Istanbul Drinking Water and Sewage Master Plan 2053. Accordingly, in 2053, gray water recovery potential is: approximately 120 million m3/year, rainwater harvest potential is approximately 80 million m3/year, and purple water recovery potential is: 35 million m3/year. The total recovery potential estimated for 2050 in Istanbul is around 200-250 million m3 / year. This potential corresponds to Istanbul's current water use of approximately 2.5 months.

In order to use this potential, legislative changes, urban transformations, and new infrastructure investments must be completed.

2. I understand that this year's water resources in Istanbul reached a record low, the worst level in nine years. How did this happen? What is being done to prevent a crisis?

Istanbul's water problem occurs mostly on the European side. The reason for this is that 65% of Istanbul's population lives on the European side, but only 35% of the water resources are located on the European side. For this reason, the European side of Istanbul needs water coming from the Great Melen Water Supply System. located on the Anatolian Side.

There are two main reasons for the record low water experienced this year. The first is technical and the second is meteorological. Since the construction of the Melen Dam on the Anatolian side and the capacity increase of the drinking water treatment facility could not be completed technically. Therefore the amount of water supplied from these facilities to the European side was limited.

The second reason is that last year, autumn and winter rainfalls, especially on the European side of Istanbul, were much below long-term normal precipitation. This meteorological drought lasted until mid-January 2023. For this reason, sufficient water could not be stored in the dams, especially on the European side of Istanbul. Istanbul entered the summer season with insufficient water storage in its dams. Extreme heat waves in summer increase both water consumption and evaporation. For this reason, the amount of water stored in the dams, especially on the European side, decreased rapidly.

If it had not rained in the dam basins on the European side by the end of November, water shortage measures would have been implemented by İSKİ on the European side.

To prevent the water crisis, water users were invited to use water more efficiently. Until the rain fell on the European side, water was withdrawn in a controlled manner from the lowest water levels of the dams in this region. I can say that the falling rain prevented the water shortage problem that would occur on the some part of European side.

3. Can you explain the Istanbul-based activities of the Hydropolitics Association and the Hydropolitics Academy Center, and what is your role in fostering the development of this work?

As Hydropolitics Association and Hydropolitics Academy Center, we follow Istanbul's water problems very closely. We publish reports on this subject and present papers at congresses and conferences. We also contributed to Istanbul's Drinking Water and Sewerage Master Plan 2053 by expressing our opinions.

4. What are the specific effects of climate change on Istanbul's drought risk and water scarcity issues and what, in your opinion, is being done in Turkey and throughout the world to address this? Also, what are the greatest challenges that Istanbul may face as its government and people try to adapt to the changing global environment?

Climate change has adverse effects on water resources in many parts of the world and in Istanbul. It is not possible to stop this. Therefore, adaptation to climate change is required. In this context, water management and water users should also change their paradigms.

Because in 2050, 70% of the world's population will live in cities. Especially metropolises,rapidly growing cities, such as Istanbul, will face great difficulties in issues such as water supply and wastewater treatment. As in Istanbul, additional water supply in many major cities of the world is provided by transfers from neighboring river basins. This inter-basin water transfer will lead to increased tensions between provinces or states as the impact of climate change increases. In addition, there will be problems between sectoral water allocations, such as agriculture-industrial water.

Istanbul currently transfers approximately 1 million m3 of water per day to the European side from the Büyük Melen system on the Anatolian side, 160 km away. This distance can be

thought of as transferring water from one country to another considering some neighboring European countries

As the effects of climate change and drought increase, it will become difficult to provide water while achieving social, economic, and ecological balance.

The biggest challenge in adapting to changing global environments is not in finding technical solutions but in changing our water use and water management habits.

Changing this water management and water use paradigm takes a long time due to populist policies.However, sustainable water management requires rational, scientific and applicable social policies, not populist policies.

5. Please share your thoughts on worst-case scenarios. What would it look like, for example, if there is extreme water scarcity in Istanbul, and if the city faces a severe, record drought

In mid-November this year, the worst-case scenario for the European side of Istanbul came very close to happening. If the rains hadn't started. In other words, if the meteorological drought had continued until mid-January as it did last year, water shortages would have started in some regions on the European side.

In Istanbul's worst-case water shortage scenario, periodic water outages may occur on the European side.

6. Are certain dams in Istanbul especially vulnerable to drought? Please explain the dam infrastructure in general, and how it might further develop in response to the changing environment.

The main point that prevents Istanbul from experiencing a water crisis during dry periods is that the dams that provide water in Istanbul are connected to each other for integrated operation. This provides the advantage of water transfer between dams. Thus, water can be supplied to regions experiencing regional water scarcity. The dams on the Anatolian side have the infrastructure to transfer water both among themselves and to the dams on the European side. This situation also exists among drinking water dams on the European side. This infrastructure network facilitates risk management during very dry periods.

In order to manage the risk of water scarcity that may occur due to the impact of climate change, it is necessary to manage water demand, especially on the European side of Istanbul. In Istanbul, first of all, the water management approach should be reviewed in order to use the current available water in the most efficient way.

7. How important is public consumer behavior in mitigating the effects of drought and water scarcity in Istanbul? What have been some effective measures, and where can progress be made?

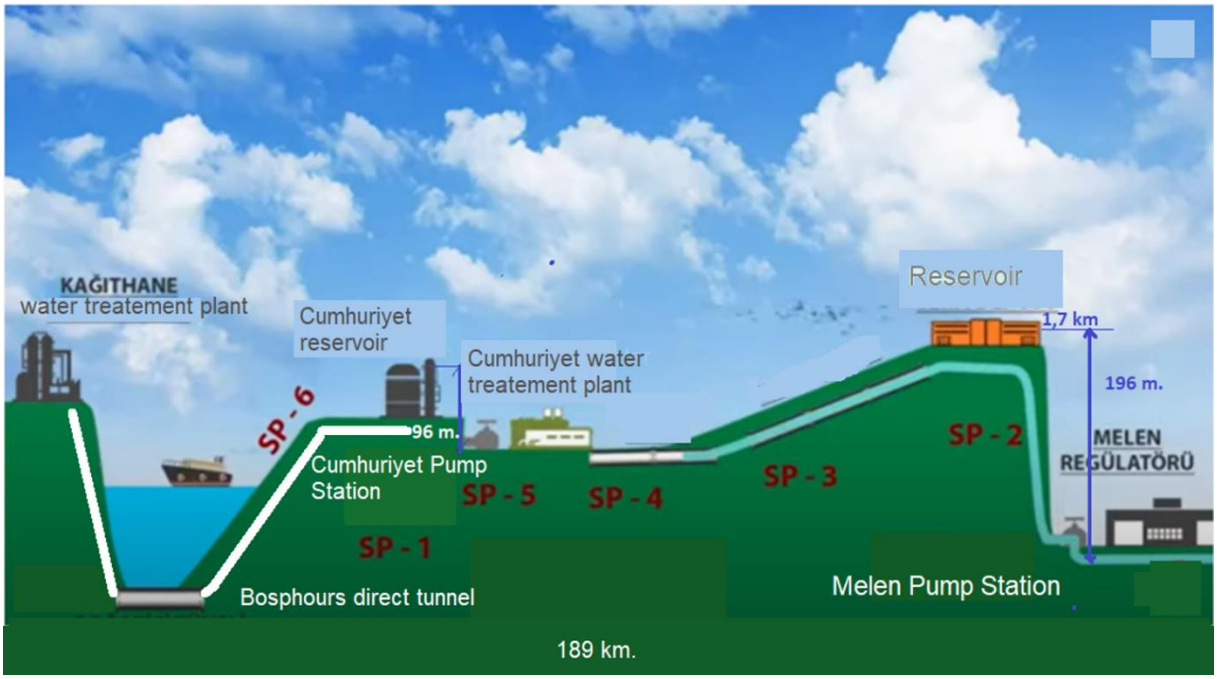
Public consumer behavior in mitigating the effects of drought and water scarcity in Istanbul is very important. This is one part of the sustainable water demand management approach. Another part of this management policy is that to reduce losses and leaks in city water networks. In Istanbul, this rate was successfully reduced to below 20%,

Subscribers who use excessive water should be taken under control and their water consumption should be reduced.

Emphasis should be placed on water use awareness-raising efforts for the efficient use of water in Istanbul. These studies can be carried out together with civil society and universities. In addition, there are 57 universities in Istanbul. Among these, those studying on campus should be encouraged to implement an innovative water management program. Special projects should be developed on these campuses for rainwater harvesting, treated wastewater use, and efficient use of water. This will also be very useful for increasing water use awareness.

In addition, more efficient use of water can be encouraged by controlling water use in medium and small-scale industries. In Istanbul, the use of gray water should be mandatory in buildings that will be demolished and rebuilt to make them earthquake-resistant, by making two different water lines.

In summary, there is a need for two-pronged water management in Istanbul. The first leg of this includes the necessary measures to reduce water demand (training, efficient water installation, control), and the other leg includes making water supply more efficient (reducing network losses, measurement systems, use of gray water and treated wastewater, etc.).



8. How do droughts and water scarcity issues negatively affect other aspects of the environment, such as the increase of wildfires or the intensity of heat waves?

The relationship between water, energy, food and ecology has increased in the last 30 years. For this reason, drought and water scarcity not only result in a decrease in drinking water. They also create risks for food security and energy security. In addition, the most basic element of ecological balance is water. Water scarcity also causes the ecological balance to deteriorate, creating an environmental safety risk.

Climate change increases wildfires and destroys the forest ecosystem, which is an important element of the hydrologic water cycle. Heatwaves both increase water consumption and reduce the amount of stored water by increasing evaporation.

In addition, increases in sea water levels caused by climate change affect coastal aquifers and deteriorate water quality. The rise in sea water level is also a significant threat to water resources. Approximately 10% of the world's population lives between sea level and 10 m elevation. A very large population will be affected by this increase. This rise will also cause the quality of water resources, especially on the islands, to deteriorate.

9. To what extent is the increasing industrialization of fossil fuel extraction across Turkey part of the problem in terms of addressing water scarcity issues in Istanbul? Do Turkey's coal mines and/or thermal power plants have a direct and adverse effect on Istanbul's water resources?

Turkey's coal mines and/or thermal power plants don't have a direct and adverse effect on Istanbul's water resources..All these industrial activities and fossil fuel use contribute to the global warming effect by increasing greenhouse gas emissions. This indirectly has negative effects on water resources

10. What are your thoughts on Turkey's engagement with COP28, and how might Turkey have a greater role in the upcoming edition in Baku next year?

Turkey participated in the United Nations (UN) Climate Change Conference (COP 28) in Dubai this year with a record number of representatives of over a thousand. Turkey, which demands to be evaluated in the status of fragile countries, argues that it is one of the most exposed countries to the destructive effects of climate change.

Turkey stated that he wants to benefit from the lost and damage Fund for disasters caused by climate change. On the other hand, Turkey, which is located between the 20 most developed countries in the world (G20), has not yet updated its climate target, which envisages more than 30 percent of the 15th country and national greenhouse gas emissions in the world, which provides the most greenhouse gas in the world. According to the summit decision, the parties must update the 2030 national climatic targets in accordance with the Paris Agreement until the end of 2024. Turkey, which has a vision of being a net zero emission country in 2053, should start to reduce greenhouse gas emissions as soon as possible and target at least 35 percent absolute emission reduction compared to 2020 until 2030.

Türkiye is not a fossil fuel producer contry , due to fossil fuel imports we face serious current account deficit, and economic loss, We are rich on renewable energy sources.

Therefore, the gradual exit decision from fossil fuels should be supported more by Türkiye

In line with these objectives, Turkey in COP 29 will be held in Bakü next year will sign much more declarations than this year.

11. I read your 2021 report, "Why does İstanbul need a paradigm shift in water and sanitation management", and I'm wondering what has changed in the last two years in terms of water management projects? Your report noted; "Even though Istanbul has had water supply problems periodically, sustainable water governance to Istanbul has not been the subject of scientific and innovative management concepts." Is this still true?

Istanbul's population is increasing rapidly and water resources are limited. The European side of Istanbul is more fragile in terms of sustainable water supply. Most of the water of this region is brought from Asia side by inter-basin and even inter-continental water transfer. For this reason, water management in Istanbul should undergo a paradigm shift, taking into account the impact of climate change as well as the increasing cost of unit water.

Therefore besides the water supply management approach, water demand management policy should also be implemented in Istanbul.

Climate change and the incomplete construction of the Melen Dam increase the unit water cost of Istanbul. Under these conditions, the economic sustainability of the water supply to Istanbul is at risk. Water Management covers not only water supply but also sanitation and wastewater management. In this case, Istanbul's need for a more scientific and innovative management concept is increasing.

12. **Which other overpopulated cities could we compare Istanbul to in terms of water resources and risk of drought? Why is Istanbul in the situation it is in, comparatively speaking, when thinking of water resource management globally?**

Istanbul is a very different city among other big cities in Turkey, both geographically, demographically and in terms of water supply systems. Therefore, it is not easy to make comparisons.

Water supply to Istanbul has always been a very important issue throughout history. The main reason for this is that the watershed basins of Istanbul's drinking water dams are inadequate against the rapidly increasing population.

The second reason is the unplanned urbanization of Istanbul and the spread of the city over a very large area. For this reason, the water basins of the dams that supply water to Istanbul are surrounded by rapid and uncontrolled urban development.

Meteorological conditions and rainfall regimes are also different on the European and Anatolian sides of Istanbul.

The population of Istanbul has increased very rapidly due to excessive internal and external migration. For this reason, the implementation of the desired innovative water supply policies was insufficient and additional water supply began to be achieved through inter-basin water transfer.

In addition, Istanbul is a very unique city both in terms of geography and historical and cultural heritage. These features also restrict water and wastewater management in many respects. Due to these constraints, it is not easy to implement innovative approaches in water and wastewater management in Istanbul.