Circular Economy Lab & Observatory

2020-1-IT02-KA201-079994

WATER STATUS

Status of waters in Europe

Croatia-2.1

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We are all familiar with water being a crucial element for all living creatures on the planet. In fact, 60% of the human body is made up of water. Most people do not realize just how much water we consume; an average person is recommended to drink about two and half liters of water daily, to put that into perspective, that is equivalent to about a thousand liters of water per person, annually. Everybody knows that water is an essential element of life, but what many people do not know is the status of our freshwater bodies; as a matter of fact, only about 40% of European water bodies are said to have achieved high purity status. As of the last decade, our water reserves have been getting smaller and smaller, while our spending has been getting greater and greater.

Unclean water discharge (photo by Darijan Ozimec)

In addition to that, not only has the quality of water got worse, but rising temperatures have caused many new complications. With temperatures reaching their all-time highest for certain parts of Europe, numerous major rivers of Europe like the Danube, Loire, Rhine, and the Sava in Croatia have been facing severe droughts. In the last couple of years, the Danube River has been flowing at less than half of its usual summer volume.

This creates problems for all of Europe, as they provide natural paths for distribution across Europe. One example are Eastern European countries such as Ukraine, which is relying on the Danube as a way to export food and import other goods during the war. Another instance is Romania, which almost entirely depends on the Danube as a fresh water supply. [1]

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Although the impact of what humanity is doing might be easily visible on the surface, much longer-lasting consequences might happen below the ground. As the groundwater does not move as fast as the surface water, the effect of human activity may not be clear enough just yet. From the experience of remediation attempts during the last 20 years, it is noticeable that the measures taken have yet to be significantly successful. Surface waters might be affected too, as most of them have subsurface streams as their water sources. Additionally, about 60% of drinking water and about 50% of total water used in the EU comes from subterranean sources. That number can grow up to 90% during summer as surface water bodies lose a portion of their volume. Ultimately, groundwater has a much larger potential as our main source of usable water, but the most substantial obstacle is exactly that, it is below the surface, thus much more inaccessible. [2-3]

Most groundwater in Europe has achieved high quality status. However, there are some beliefs that water in the EU might be contaminated with endocrine disrupting chemicals (EDCs), chemicals that interfere with physiological and biochemical processes occurring in the human body. Endocrine disrupting chemicals affect secretion of hormones. They can be found both in soil and water. The main source of EDCs is industry as numerous industrial chemicals contain such waste. Agriculture too, as substances such as pesticides end up in soil and groundwater, and over time they accumulate in the water we drink and the food we eat. EDCs can be found in fish, other animals and even humans.

A duck on the move in an empty river bed (photo by Darijan Ozimec)

The European Parliament hailed the Drinking Water Directive on 12 January 2021. The directive analyses the quality of water intended for human consumption. Its mission is to preserve human health by making sure that the water is safe. This watch list is still ongoing and will last two years from the date it was launched. [4-5]

There are problems to solve, and new problems are still being discovered.

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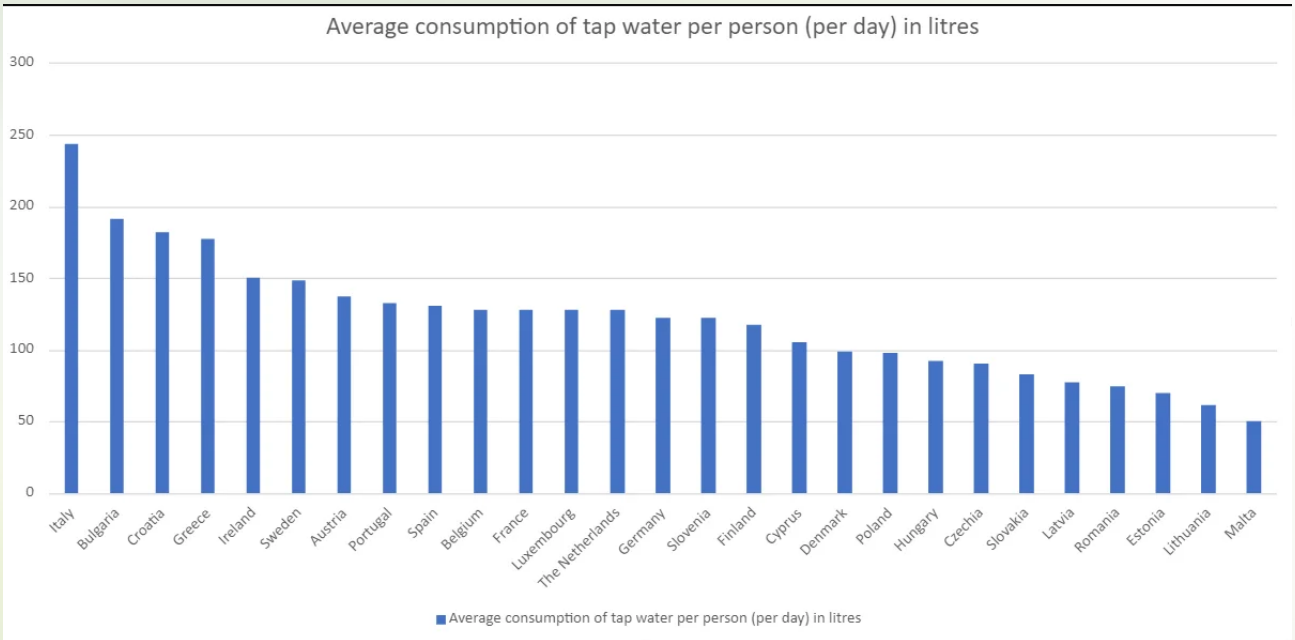

Visual representation of daily water usage in the EU, per country, per capita (created by Leon Marković, information used:https://www.statista.com/chart/amp/19591/average-consumption-of-tap-water-per-person-in-the-eu/)

There have been numerous EU meetings based on water status and tackling the water crisis. On one such occasion in 1988 the Frankfurt ministerial seminar on water defined problems with European waters and suggested solutions.

This was to define and tighten the laws on pollution.[6] One of the big issues with Europe's waters is ecological in nature. Chemical and biological waste is often released into the water, either directly, after treatment, or indirectly, such as the result of seeping through the soil, dispersing from surfaces or depositing from the atmosphere. Some of these pollutants have harmful effects on the environment and can be especially difficult to remove. [7]

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A major contributor to this is nitrate and phosphorus pollution from agriculture. They are essential organic compounds and can easily be broken down into nutrients by algae and microorganisms. Naturally, the algae and microorganism count rise along with nitrogen and phosphorus concentration, making the water murky. This is not good since it reduces sunlight, thus reducing oxygen levels in the water, which causes mass dying. This process is named eutrophication, and it is one of the leading causes of water degradation since it has a rippling effect on the food chain.

It is why the Water Framework Directive set a goal in 1955 to achieve good status for all water bodies by their set deadline of 2015. And as far as humans are concerned, although nitrates are not toxic to the human body, they can (in higher doses) be lethal to infants, which is why the WHO has set a maximum concentration of nitrates in drinking water. [7-8]

Good ecological status is defined as the state of a water body whose conditions are only slightly different than if they were undisturbed. Today the percentage of European bodies that have not achieved the good status is 60%, which is far from desirable.

A 2018 assessment evaluated the northern, Scandinavian countries as well as Romania, Slovakia, and certain river basins in the Mediterranean as having a particularly high percentage of water bodies that have achieved the good status, while Hungary as well as specific central European river basins were evaluated as having a particularly low percentage. The reason for this variation in reported water quality might not be due to the water quality itself, but the approach of gathering and analyzing the data of the country. The assessment mentions how the major variability in the percentages might be, for instance, due to some countries using the Environmental Quality Standard set in 2013, while others use the outdated, generally less strict EQS set in 2008. [6-9-10]

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Another major issue with Europe's waters are the droughts caused by increasing temperatures.

The cost of droughts in the European Union in the past 30 years is estimated at 100 billion euros, and both the intensity and number of droughts have increased.

The amount of surface area and people affected by droughts has gone up by 20% in the 30 years between 1976 and 2006. These numbers are expected to rise even higher due to the ongoing climate crisis. [11-12]

Swans on a lake far in the eutrophication process (photo by Alexandros Michailidis, standard license, downloaded from https://www.istockphoto.com/photo/a-family-of-swans-swim-gm1369543000-439282076)

Although this spells a bleak future for the waters of Europe, there is a lot of potential in reducing these problems and having a sustained, diverse environment in the time ahead. Solutions are repeatedly being suggested, and although they can take a lot of time and resources to implement, they offer to reduce the biggest issues at hand.

Fitting examples of this are the Nitrates Directive and the Urban Waste Treatment Directive, which deal with the eutrophication issue mentioned above. After the analysis of a given water body, member states are given a time limit to achieve certain objectives, and if these objectives are not met, the member state is required to report exactly why not, as well as design additional measures. This means that, even if a certain goal is not met, the member state will be pressured further to fix the problem. [13]

As we know, water, or the lack thereof, is a severe problem for us at the moment. There is not enough water for everyone, and we are aware that we will soon be out of it. In the past, the amount of water was never a problem, especially not in Europe, but, in the past few years the circumstances in Europe have changed.

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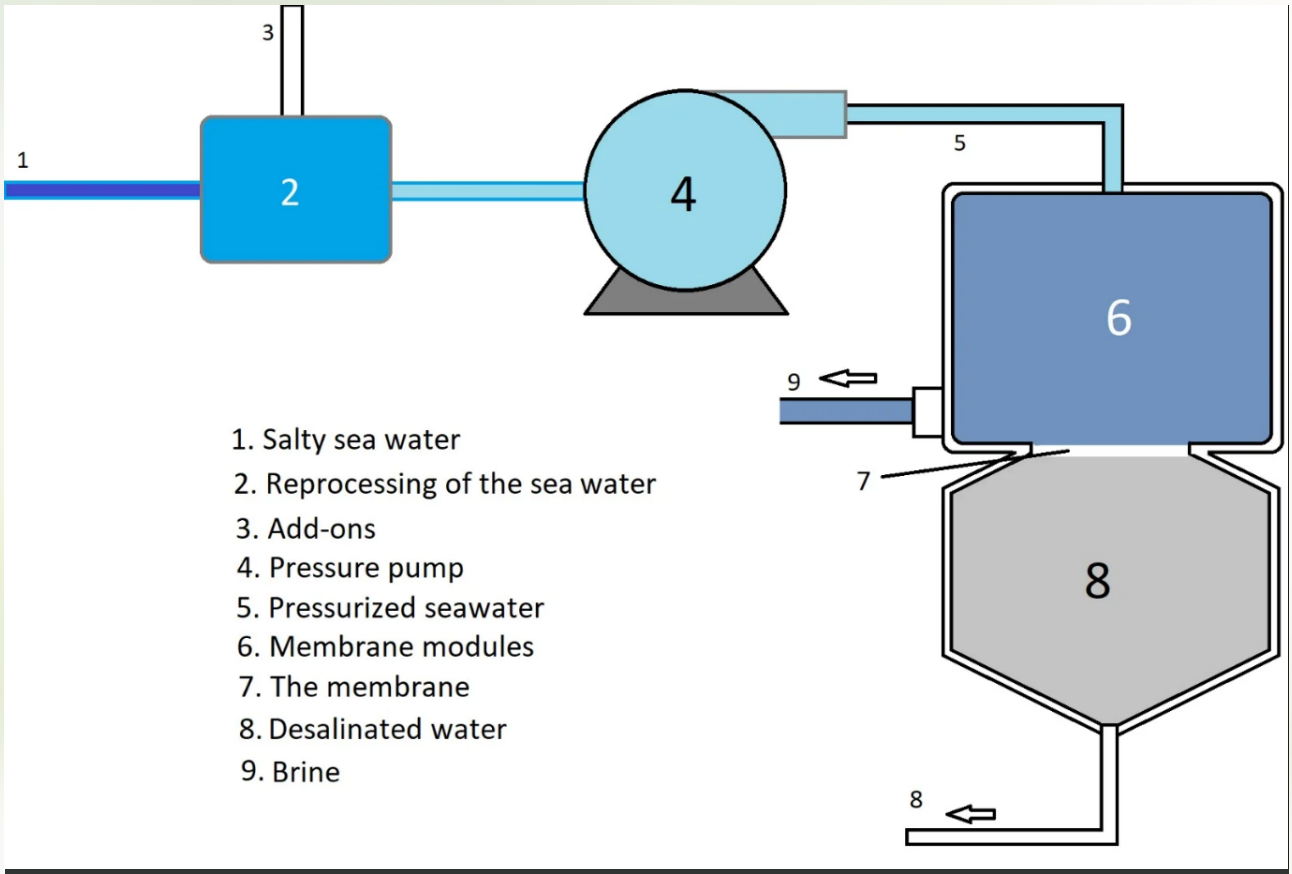

Simplified visual representation of desalination process (created by Ivan Nevečerel)

As we mentioned earlier, even the rivers flow with smaller volume than before. People are worried about the lack of water and their worries are justified by scientists who believe there will not be enough drinkable water by the end of the year 2040 and that is only eighteen years from now.

[14] Because of that we need to be quick and start making progress, but first we need to find solutions. We also must understand that there is not just one solution that will solve this big issue as it requires more than just one, and not every single one of the solutions will be effective immediately but will need time to show results. That is because we cannot just magically create more water for the world, so we will need to be patient.

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As we said earlier, farm workers have a substantial impact on the lack of water we have in Europe as they utilize 40% of the total amount of drinkable water for growing crops and stock. Thus, one of our solutions for that specific issue is a process called desalination.

Desalination is the process of removing salts from saltwater using a machine which then turns it into drinkable water. [15] It works like a big filter; ocean water goes into the machine and with the help of a special filter the machine produces drinkable water and brine.

There is a lot of water in oceans that we do not use but with desalination that water can be crucial in our fight against water shortages.

The product of desalination is made up of drinkable water (40%) and brine (60%). Brine is a water solution which has more salt than ocean water, and although it sounds useless it can actually be very helpful if used properly. A number of vegetables can grow on seawater, such as potatoes, carrots, red onions, white cabbage, and broccoli.

If the agriculturists were properly educated, some of them would most definitely start using salty water for their plants and the percentage of the drinkable water that they are using would be lower.

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But agriculturists are not the only ones that use vast amounts of water, we all are. On average, 152 liters of water per person is supplied to households every day, [16] that is over 1000 liters of water that is spent weekly, and we only need to drink 2.5 to 3.5 liters per day. [17] These are the shocking numbers that people aren't even aware of and that is the biggest problem. We often hear about extreme situations on the news, but many have become immune to them as we hear it so often and that leads to people brushing the problems off to the side.

That is why we need to organize some big events around the world where celebrities speak on this problem. People love listening to familiar voices and this will help in educating the masses.
Some of the solutions to the problem which the celebrities should bring attention to are closing the faucet while brushing our teeth, taking showers rather than baths, etc. They can also suggest numerous products which help reduce water usage in households.


Wastewater treatment plant in Zagreb (photo by Ivan Nevečerel)

Some of those products are toilets with dual flush which use less water than the regular ones [18] and underground reservoirs that are used to collect rainwater which has benefits for growing plants which the regular water does not have. [19]


A photo of Zagreb's Jarun lake at the ideal quality level (photo by Leon Marković)

The status of waters in Europe is definitely alarming and some actions people perform are shocking, to say the least. It is all connected to other problems and concerns that we hear about on a daily basis, such as global warming, the rise in population and others. While some are constantly worrying about the future of humanity, others choose to simply shun everything away and stick to the status quo. So, unless we change something in our habits, the already great problem is just going to get greater.

We have seen how severe some consequences might be, endocrine chemicals accumulating in our bodies and the food that we eat, fish dying from the lack of oxygen caused by eutrophication. People who have high or at least satisfying living standards tend to get drawn away from the fact that not everyone has access to safe drinking water.

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Even developed countries such as France had suffered such droughts that more than a hundred towns did not have access to drinking water. On the contrary, Germany is starting to implement systems such as rainwater collection.

The problem is we are not aware of just how much water we use. As stated previously, we need to drink only about 2.5 liters of water daily, however our daily consumption is not nearly as low. On average, we use one hundred and fifty-two liters per capita. These facts are really shocking and thought-provoking. However, the solutions presented should pass the test.
Since the changes made will not improve the status immediately, temporary use of other sources might be a viable option. Groundwater has proven to be a usable one, world oceans have potential too.

Desalination has shown significantly good results in the Middle East as countries such as the UAE are almost entirely reliant on desalinated water. Not only them, numerous other Middle Eastern countries like Saudi Arabia and Bahrain, but distant places like Australia too. In Europe, Germany has taken the lead. Desalination is present all around the world. [20-21]
Despite the results not being visible immediately, progress will be seen, and we will see results eventually. People are usually pessimistic about such problems, many do not understand that we are making progress, slowly but surely, we just must continue doing so and we must not stop at the point where things seem somewhat fine.

Let's help the ducks continue swimming in clean waters! (Ducks in a Maksimir lake, Zagreb; photo by Gabrijel Berčuk)

Celebrities and major organisations are starting campaigns such as Team Seas, which many people have heard of. [22] Its goal was to improve the status of seas, but such movements are needed for surface waters too. If nothing, even the pandemic contributed to surface waters' quality in a way that the traffic has been reduced. Finally, it is crucial to remember that if we do not act, we will not lose the Earth, but the Earth will lose us.

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