EVENT REPORT

THE VALUE OF WATER(S)

STRATEGIES TO REDUCE IMPACT ON FRESHWATER RESOURCES

IN PARTNERSHIP WITH

Aqua publica europea
EUROPEAN ASSOCIATION OF PUBLIC WATER OPERATORS

ÁGUAS DE GAIA

EXECUTIVE SUMMARY

Climate change is increasing the frequency and intensity of droughts. Water stress is increasingly common across Europe with a third of the EU now suffering from water scarcity all year round. In 2020, the European Commission proposed a new Regulation on minimum requirements for water reuse for agricultural irrigation (2020/741) to increase efficiency in the use of water resources.

On 30 March 2023, Aqua Publica Europea (APE) organised, in partnership with Águas de Gaia, the public seminar "THE VALUE OF WATER(S): Strategies to reduce impact on freshwater resources" in Vila Nova de Gaia, Portugal, to explore the potential and challenges of implementing the new EU Water Reuse Regulation, as well as the opportunities for alternative water sources in urban contexts.

After a summary overview of the Regulation by a representative of the European Commission, two public water operators shared their experiences with water reuse in Belgium and Portugal. Their presentations were followed by a discussion with a representative from the irrigated agriculture sector who shared their views on barriers to increased use of reused water in agriculture.

These aspects were further fed by experiences from a public water utility operating in an Italian region hit by water scarcity. The Portuguese water regulator, which recently published guidance on water reuse, brought additional perspectives to the discussions before a representative from the Portuguese Water Council outlined best practices from other regions of the world, including California and Israel.

A representative from the Portuguese Environmental Authority closed the public seminar. He stressed the need for a change of mindset to boost water efficiency, increase awareness about water protection, and ensure a high level of investment in infrastructure maintenance and preparedness – not only in view of future droughts but also of heavy rainfall episodes.

BACKGROUND

The frequency and geographical extent of drought events affecting Europe are increasing. As predicted by the latest reports of the Intergovernmental Panel on Climate Change (IPCC), water scarcity is rapidly shifting from a primarily Mediterranean issue to a continental emergency. Addressing this fundamental societal challenge requires an overhaul of water resources management.

The new Regulation on minimum requirements for water reuse for agricultural irrigation (2020/741) should encourage water reuse by the agricultural sector, which is the main 'user' of freshwater resources in Europe. Reclaimed water or alternative water sources also have the potential to meet certain industrial needs or urban uses. In addition to reducing the impact on freshwater resources, these alternative sources can also help save high quality and precious water for drinking purposes.

In this framework, Aqua Publica Europea (APE) organised, in partnership with Águas de Gaia, a public seminar on 30 March 2023 in Vila Nova de Gaia, Portugal, to explore the potential and challenges of implementing the new water reuse regulation in agriculture, as well as the opportunities for alternative water sources in urban contexts.

OPENING

MIGUEL LEMOS RODRIGUES

President of the Management Board of Águas de Gaia

Miguel Lemos Rodrigues, President of the Management Board of Águas de Gaia, welcomed participants online and in Vila Nova de Gaia on behalf of Aqua Publica Europea (APE).

In his opening remarks, he reminded the theme of the 2023 World Water Day: “accelerate change”; this was also the main message that a delegation of APE members conveyed at the UN 2023 Water Conference that took place in New York on 22-24 March.

APE published a declaration in the run-up to the conference outlining the role that public water operators have played in the past, and will continue to play in the future, to ensure access to water services for all while guaranteeing the sustainable use of water resources.

Sustainability is the compass that has been guiding the action of institutions and stakeholders for the last 30 years following the Protocol of Kyoto and the Paris agreement, Lemos said.

In Europe, the objective to achieve a sustainable economic development is the cornerstone of the European Green Deal, which remains the reference policy framework for public water operators despite the numerous crises that have occurred in recent years, from the COVID-19 pandemic to the war in Ukraine.

Public water operators have a crucial role to play in the realisation of the European Green Deal and in particular in ensuring a sustainable use of water resources, while at the same time guaranteeing that everyone has a fair access, as set in the UN Sustainable Development Goals, Lemos stressed.

However, this responsibility is getting increasingly complex because of climate change and of the consequent rise of extreme events like floods and droughts. Public water operators are responding to these challenges by applying economic and environmental rationality to the use of the resource, though a greater effort in increasing efficiency and reducing leakages, and working to find alternative sources of water like reclaimed water and desalination.

These priorities are part of the agenda of APE, to which Águas de Gaia actively contributes. It is in this framework that Águas de Gaia proposed to co-organise this seminar dedicated to water reuse, as an opportunity to explore new approaches to reduce the exploitation of freshwater resources and the associated risk of a water scarcity crisis across the world, while continuing to ensure a fair access to the resource for all, Lemos concluded.

SESSION 1

THE NEW EU REGULATION ON WATER REUSE: POTENTIAL AND CHALLENGES

VALENTINA BASTINO

Policy Officer at the European Commission

The first session kicked off with a presentation by **Valentino Bastino**, Policy Officer for EU Water Legislation and Policy at the European Commission's Directorate General for the Environment, who provided a summary overview of the new Water Reuse Regulation.

Water stress is increasingly common across Europe with a third of the EU now suffering from water scarcity all year round, Bastino said. The frequency and intensity of droughts are increasing due to climate change, which causes higher pressures on water resources. In this context, the European Commission proposed a new Regulation in 2020 to address water scarcity and drought, increase efficiency in the use of resources, and to safeguard public health and the environment in line with the EU Green Deal.

Bastino explained that the Water Reuse Regulation focuses on agricultural regulation. It is a fit-for-purpose instrument with different levels of treatment and therefore of quality to be used for different purposes. According to the European Commission, there is a potential of 6-fold increase in water reuse in Europe for 2015-2025 for an estimated investment cost of around €700m and an estimated 5-10% reduction in water scarcity.

The Regulation is in force since June 2020, but the rules will start applying across the EU in June 2023, Bastino clarified. In August 2022, the European Commission published application guidelines to explain the new rules and provide examples. Technical specifications for risk management and data reporting format are being developed.

Bastino outlined the Regulation that sets minimum requirements for water reuse: parametric values for the quality of reclaimed water (*E. coli*, BOD, TSS, turbidity, others) as well as monitoring parameters (established frequency, EN ISO19458 or equivalent). These requirements are designed to address health risks and parameters are set per class of reclaimed water (A, B, C and D) with different quality depending on crops (intended use) and irrigation methods (e.g., drip irrigation, spraying).

The Regulation requires a risk management plan for each water reuse project to ensure safety, including addressing environmental risks and potential additional health risks, Bastino concluded. The projects are subject to permitting requirements and compliance checks as well as to transparency and access to information requirements (as public acceptance can be a hurdle).

HUGO XAMBRE PEREIRA

Executive Vice-President of Águas do Tejo Atlântico

Hugo Xambre Pereira, Executive Vice-President of Águas do Tejo Atlântico, explained that around 244 million m³ of urban wastewater are treated annually across 23 municipalities in the Greater Lisbon and West region leading to environmental benefits such as safeguarding ecosystems, providing excellent conditions for tourism and water sports, and increasing economic activities linked to rivers and sea.

Climate change is causing fewer raining days, but increased precipitation events. There is therefore a need for integrated water management with systems to use rainwater and reuse water, Pereira said while pointing out that water quality could differ depending on its use (e.g., from high quality for drinking water to lower quality for road washing).

For this to happen, wastewater treatments plants should be considered as water factories, i.e., as industrial establishments where raw materials are transformed into products, according to Pereira who then provided a few examples of the Agua+ project such as the use of non-drinking water for cooling and heating by IKEA in Loures and water reuse for watering green spaces in Parque das Naçoes in Lisbon.

Pereira outlined the conclusions of a research project, which showed that wastewater reuse is increasingly economically competitive in comparison to seawater desalination and stormwater capture due to scarce water resources. He then explained that Lisbon has developed a strategic plan for water reuse under which it is assessed whether treated water can be used for non-drinking water purposes in spaces located close to wastewater treatment plants.

The Water Reuse Regulation together with a new law in Portugal, which provides for a simplification of administrative procedures (SIMPLEW), will encourage and facilitate water reuse in the EU, Pereira concluded. He cautioned, however, that regulation needs to be coupled with innovation (e.g., to increase efficiency in agricultural irrigation) and improved communication around water reuse to address barriers. In this respect, a beer made of recycled water was launched a few years ago to change mindset about water reuse among the public.

EDDY TROOSTERS

Chief Executive Officer of PIDPA

Despite a rainy weather and a rather low daily average use of tap water (around 80-90 litres per person), Flanders, Belgium, is in a high water stress situation, said **Eddy Troosters**, Chief Executive Officer of PIDPA. The causes for water scarcity are historical (land reclaimed from water), geographical (low infiltration), demographic (high population density) and industrial (strong industrial presence) – all of them strengthened by climate change.

From a socio-economic perspective, water is very important to Flanders. One in four people work in water-intensive sectors (e.g., chemicals, logistics, agriculture, food, metallurgy) and these sectors contribute 34% of gross value added to the region.

In agriculture, nearly 70% of the water used comes from groundwater. Groundwater is the exclusive source of water production for PIDPA, which works with the agricultural sector to preserve this resource. Troosters outlined three ongoing projects: irrigation modelling in Mechelen to identify best times to irrigate, surface water capture engineering for a tomato company to replace freshwater use, and waste treatment for agricultural processing.

ADRIANO BATTILANI

Secretary General of Irrigants d'Europe

The agricultural sector is at the front line of climate change and is much aware of the water crisis, said **Adriano Battilani**, Secretary General of Irrigants d'Europe, who concluded the first session. Most crops common in Europe can no longer be grown with rain-fed agriculture. Irrigation is now vital to guarantee basic productivity for agricultural production.

All viable water resources are welcomed but the Water Reuse Regulation is presenting several limitations, Battilani said: implementation is scattered across Member States, reporting rules are still in discussion with the European Environmental Agency (EEA), and there is still uncertainty about who should be in charge and who should pay for monitoring the agro-ecosystem target matrix.

In many countries, water is only treated at secondary level, especially in small wastewater treatment plants. As direct uses do not benefit from dilution factors, this might have a detrimental effect on risk assessments. Upgrading wastewater treatment plants will take decades and require significant investments. In addition, the cost of the treatment needed to achieve fit-for-purpose criteria might be high, Battilani said.

The Regulation originally aimed at safeguarding producers from the impact of a distorted communication to consumers, but this aspect seems to be gradually relegated to the background, he cautioned. Effective education, information and capacity building campaigns for all actors directly or indirectly involved in the supply chain, including consumers and agri-food producers, are therefore essential.

There are also financial aspects to be considered, he concluded. The agricultural sector will have to deal with water pricing issues and a potentially insufficient offer of reused water in comparison with other sources. Water reuse is expected to generate direct and indirect resource cost increases for the irrigation sector, whilst incentives for infrastructure modernisation are largely insufficient.

SESSION 2

THE POTENTIAL OF WATER REUSE IN AGRICULTURE AND BEYOND: PERSPECTIVES

DOMENICO LAFORGIA

President of Acquedotto Pugliese

The Puglia region, Italy, is historically a very dry territory, said **Domenico Laforgia**, President of Acquedotto Pugliese, the water operator of Puglia. For this reason, Acquedotto Pugliese catches water resources from neighbourhing regions, through a 5000 kilometre-long aqueduct – the oldest in Italy. Climate change, and in particular rising temperatures, increases average air humidity and modifies rain patterns, which are exacerbating water scarcity challenges in the region.

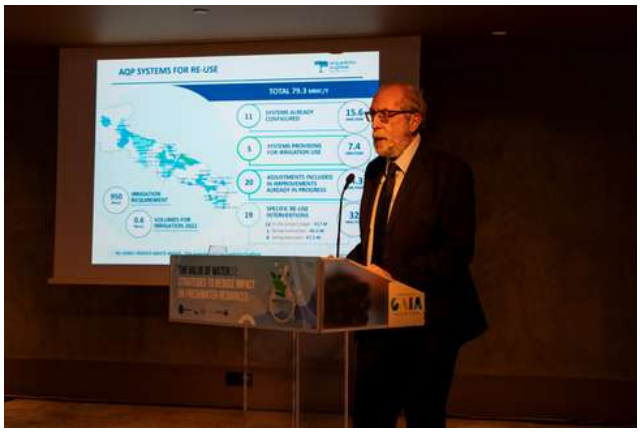
To preserve the little water resources available, Acquedotto Pugliese already produces almost 50 million m^3 of reclaimed water through 36 plants and plans to increase reclaimed water production to 79.3 million m^3 in the coming years. In 2022, however, only 0.6 million m^3 of reclaimed water were reused for irrigation while agriculture would require 950 million m^3 of water annually. This means that more efforts are needed to establish a framework whereby agriculture makes a greater use of reused water.

The agricultural sector has specific responsibilities for this, considering that reclaimed water is currently provided for free to farmers (the cost of additional treatment needed to make water quality compliant with national and European regulations are borne by domestic users). What is missing then is an action by farmers' organisations to support at least the cost of bringing the water from the treatment plant to the irrigation areas (as this cost cannot be added to domestic bills).

While Acequedotto Pugliese waits for greater use of reclaimed water by farmers, the operator will continue to pursue its water reuse strategy, in particular for environmental, civil and industrial uses, as part of its broader strategy to reduce the consumption of freshwater resources, Laforgia said.

The operator is able to purse this strategy also thanks to a regional regulation – the regional *Water Protection Plan* – that already complies with the European one, and goes even beyond it in some aspects (in particular for other non-agricultural uses and for establishing minimum ecological flows to be respected). The economic resources needed for the investments in the treatment plants to produce water for reuse quality are coming partially from the EU, and partially from the own resources of the operators (from domestic bills).

In a context of climate change, it is necessary to treat and purify as much water as possible, especially water coming from wastewater treatment plants, Laforgia said. Water reused in irrigation reduces pressures on reservoirs, leaving precious freshwater for drinking purposes, but also the need for farmers to extract groundwater, hereby reducing the risk of salinisation of aquifers, an acute problem in the Puglia region, and of using fertilisers as reused water contains phosphorus and nitrogen.



The problem does not concern just the Puglia region. In Italy, water reuse represents just 4% of water consumption by agriculture. Laforgia called for a shared strategy, particularly in the agricultural sector, to ensure the presence of irrigation water distribution systems downstream of treated wastewater refining systems while pointing out the need for a cost regulation policy of water resources used by the agricultural sector, with higher amounts for extraction from the aquifer when refined wastewater is available.

With regard to regulation, Laforgia noted that new Italian standards are not particularly inducive, as they impose stricter thresholds than European ones for phosphorus and nitrates, when they are actually needed by farmers. He finally expressed hopes that regulation could in the future promote reclaimed water to recharge aquifers.

MARGARIDA MONTE

Senior Engineer at the Portuguese Water Regulator (ERSAR)

Water shortages and droughts have increased significantly in the last decades and are likely to be more frequent and sever in the future in Mediterranean countries. There is a need to adapt and be more efficient and resilient, said **Margarida Monte**, Senior Engineer at the Portuguese Water Regulator (ERSAR), the independent body, which regulates the quality of water and waste services in Portugal.

In Portugal, only 1.2% of wastewater was reused in 2021 – 87% of which by wastewater operators themselves, continued Monte who outlined the four main challenges for water reuse:

- Pricing: Water for irrigation is often free of charge. The price of reclaimed water depends on the quality, the volume and if it includes or not distribution costs. The willingness to pay for this resource depends on the availability of cheaper sources.
- Distance: Distance between plants and users can be a barrier as it may significantly increase distribution costs.
- Safety: The quality and the practices adopted must minimise potential risks to public health and the environment.
- Public acceptance: The public needs to trust the product. Policymakers must therefore improve their communication and provide clear and accurate information to the population.

In March 2023, ERSAR published a new recommendation to assess the technical, economic and financial viability of water reuse projects based on three principles:

- The water utility must ensure that there is sufficient demand to justify the investments to be made in the reclaimed water production activity;
- It is recommended that protocols be concluded in advance with potential users to better understand their expectations;
- An economic and financial feasibility study must be submitted to the regulator to demonstrate the feasibility and sustainability of the activity.

In terms of tariff structure, ERSAR recommends that each utility applies a single variable tariff depending on the volume delivered. Water utilities must maintain independent accounting of the expenses occurred, there should be no cross-subsidisation between activities, and the financial self-sustainability of the activity must be demonstrated annually to ERSAR.

The tariff applied must ensure the recovery of all expenses incurred in a scenario of productive efficiency. The subsidisation of investment and/or operation may be justified in water scarcity regions so that the tariff is competitive, Monte concluded.

JOAQUIM POÇAS MARTINS

Secretary General of the Portuguese Water Council

In Gaia, wastewater of 300 000 people is discharged after treatment into the sea annually at a cost of around 30€ per inhabitant. This volume of water is sufficient to irrigate 5000 football pitches, said **Joaquim Poças Martins**, Secretary General of the Portuguese Water Council – yet it is being wasted. In Portugal, less than 2% of wastewater is being reused.

Poças Martins provided best practice examples of water reuse from California where there is a water entitlement system in place as well as from Israel, a country with an excellent water supply infrastructure where reclaimed water is less expensive than water from wells.

The technology for water reuse already exists – it is notably used in space stations, he said. There is now a need to walk the sustainability and circular economy talk. Water has a price, which should be paid, otherwise it will exacerbate already existing water scarcity, he concluded.

During the Q&A session, **Margarida Monte** stressed that water reuse should be promoted, but only in scarcity environments because of its costs and energy insensitivity. The scope of the Water Reuse Regulation could be broadened to landscape irrigation and industrial use, she said giving the example of Portugal where water is already being reused for urban use.

According to **Domenico Laforgia**, EU regulations should push regulators to support water producers and distributors in ensuring that water reuse costs and connection costs are integrated into water bills, increase awareness among citizens of the importance to safeguard water, and promote the shift from well water to reused water to make it more competitive.

Joaquim Poças Martins called for a balance between what citizens and what farmers are paying, a better application of the user-pays principle to make it attractive to reuse water, and for a shift from food subsidies to subsidies to help poor populations who face difficulties in paying for their food.

CONCLUSIVE REMARKS

THE WAY FORWARD

JOSÉ PIMENTA MACHADO

Vice President of the Portuguese Environmental Authority

José Pimenta Machado, Vice President of the Portuguese Environmental Authority, wrapped up the public seminar highlighting the conclusions from the recent UN 2023 Water Conference and reminding participants that across the world 1 in every 5 persons don't have safe access to quality water.

In Portugal, water is of excellent quality and the country has been very successful in providing safe supply and quality water. However, new solutions are required as climate change is increasing drought events across Europe. This notably means reducing water losses and increasing water reuse for non-drinking purposes, Pimenta Machado said.

Portugal is investing in desalinisation plants in the Algarve and in Alentejo, two regions that are severely affected by droughts. Portugal also imposes a tax on water resources, which generates an income that is used to fund water resources protection and enhancement projects all over the country.

Mindsets have to change, Pimenta Machado concluded. There is a need to increase water efficiency, raise awareness about water protection, and invest in infrastructure maintenance and preparedness for future droughts and heavy rainfall episodes.

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