Sustainable Water Management in the Circular Economy

A Policy Brief from the Policy Learning Platform on Environment and resource efficiency

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Summary

EU policy on water issues has been particularly fervent in recent times. New EU rules on water reuse and initiatives - kicked-off lately to align urban waste water legislation with the ambition of the European Green Deal - will provide excellent conditions for instilling more sustainability and circularity into the water management sector in the near future. In parallel, EU co-financing made available for the next 7 years under the new Multiannual Financial Framework as well as the resources of the Recovery and Resilience Facility could well be used by regions for stepping up their efforts on sustainable water management through the implementation of targeted projects. Regions can in fact play a decisive role in counteracting most of the worrying trends on water portrayed by the European Environmental Agency. This would encompass taking action on agriculture, which in 2017 was responsible for 59% of total water use in Europe and helping reverse the decrease in the availability of renewable freshwater resources per capita, which has been steadily decreasing since 1990, due to high rates of total water abstraction from rivers (64%) and groundwater (24%) as well as to climate change[1]. To be increasingly sustainable and become a pillar in the shift towards a circular economy, water management needs to improve significantly not only in agriculture but also in all the other sectors. This is crucial for guaranteeing full compliance with relevant EU water legislation and for preserving freshwater resources in the long term. Both nature and the citizens deserve such compliance, for which urgent action is required, in light of the significant transformations envisaged by the European Green Deal and in the context of the recovery from the economic crisis aggravated by the pandemic. The present policy brief aims at offering inspiring solutions to some of the main challenges policymakers and stakeholders are currently facing in the field of water management. It zooms in into innovative solutions for water reuse in agriculture, industry and other processes and explores cost-effective and forward-looking good practices to tackle urban waste water, sewage sludge treatment and groundwater pollution.

Introduction

Challenges for the water sector in Europe

Even at northern latitudes, a growing number of regions in Europe is experiencing water stress because of more frequent droughts exacerbated by the negative effects of climate change on weather events. In July 2018, news about wildfires that ravaged forests in Sweden shocked most observers, normally used to witness fires along the Mediterranean coast during the summer season. Phenomena like this, which are likely to happen with more intensity than in the past, should be addressed by climate adaptation strategies and water reuse measures.

Articles about UK shores and coastal waters being polluted by illicit discharges of untreated urban waste water or headlines on the fines imposed by the European Court of Justice to Spain for failing to adequately serve taxpayers with properly functioning sewage collection networks and treatment plants cause widespread concern, both for their environmental and economic implications.

Source Image: aleksandarlittlewolf from Freepik

Surveys like the one carried out by Eureau in 2016 on the sewage sludge treatment and utilisation point at the existence of a wide gap in the figures reported by water service operators in Europe. On the one hand, respondents in countries like Cyprus and France claimed they deploy from 100% to 75% of their treated sludges in agriculture. On the other hand, respondents from the Belgian Flanders and the Netherlands stated they confer all sludges to incineration (even without energy valorisation). Malta, on its part, disposes off its entire sludge production through landfilling. While such imbalances may be explained by differences in geography, agriculture or technologies employed in waste water treatment facilities,

[1] https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4.

they nevertheless indicate that there is wide margin for improving circularity in the treatment and use of sewage sludges.

European regions are not exempted by serious cases of groundwater contamination either. The best known is probably the one of the Veneto Region (Italy), where over 120,000 people now are living with the long-term health consequences of having unknowingly used the water from an aquifer heavily contaminated with perfluoroalkylated substances (PFAS), persistent compounds illegally discharged by a chemical plant. After the discovery of the contamination in 2013, a series of remedial actions has been undertaken by the competent regional authorities.

The scope of the challenges for the European water sector in the transition to a circular economy is way broader than what could be inferred from the examples outlined above. Marine litter and the release of microplastics, for instance, are other very pressing problems with major implications for the integrity of the aquatic environment. They are becoming extremely evident at planetary level and Interreg Europe projects like CapOnLitter and PLASTECO are well-placed for tackling them at regional and local scale across our continent.

Beside all this, the biggest issue for regions from an EU policy perspective remains the still partial protection of water bodies in their territories. While the implementation of relevant EU environmental law has ensured a higher level of protection for more than 110,000 water bodies across the EU, less than half of them currently enjoys a good status according to the European Commission[2]. The latter target set by the Water Framework Directive (hereinafter WFD) was meant to be originally achieved by end of 2015.

EU water policy: an overview

The Fitness Check published in April 2020 by the European Commission concluded that the EU water legislation is broadly fit for purpose. Nonetheless implementation issues do exist and are recognized by the Commission as a major factor hindering the overall performance of such legislation[3]. Through this exercise the EU executive assessed the WFD and its related legislation, namely the Groundwater Directive, the Environmental Quality Standards Directive and the Floods Directive.

The WFD has been the cornerstone of EU water policy for twenty years now. It has established a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater as well as defined environmental objectives for each type of water body. To this end, competent authorities in the Member State must adopt 'river basin management plans' (RBMPs) that should encompass specific 'programmes of measures', aimed at preventing the deterioration of the aquatic environment and ensuring the sustainable management of water resources. Currently, the European Commission is following up on their implementation to ensure that these measures are the most appropriate for pushing all water bodies towards a good status by 2027 at the latest.

In this very delicate conjuncture, regions and municipalities need to engage more in increasing the sustainability and circularity of the water management sector to better protect water as well as citizens' health from the hazards that may be engendered by human activities**.** This will require all players in the water sector to engage in a massive improvement of compliance with the WFD and its related legislation by: 1) practicing water reuse in line with the minimum quality criteria prescribed by the Water Reuse Regulation; 2) guaranteeing that all urban waste waters and the by-products of their treatment are discharged or disposed of in accordance with the Urban Waste Water Treatment Directive and the Sewage Sludge Directive; 3) respecting obligations relevant to water protection laid down in

[2] https://ec.europa.eu/info/news/evaluation-eu-water-legislation-concludes-it-broadly-fit-purpose-implementation-needs-speed-2019-dec-12_en.
[3] Data on enforcement of EU water legislation also demonstrate that Member States have issues with compliance. By the end of 2019, 50 out of 327 active infringement cases on environmental matters concerned shortcomings in the area of water protection and management. See Commission Staff working document (Part II: Policy Areas) accompanying the 2019 Annual Report on monitoring the application of European Union Law.

sectoral EU environmental legislation, such as the Industrial Emissions Directive, the Landfills Directive and the Waste Framework Directive.

The next sections will investigate some very concrete solutions shared by local authorities and regions in the context of European interregional cooperation to make water management more sustainable. As such, they can ease compliance with extant EU obligations in the field of water and environmental protection. Moreover, they can provide valuable insight to public and private stakeholders alike on how to better address the very ambitious policy challenges of European Green Deal, especially concerning the shift to a circular economy. Such challenges will be presented along with a selected number of relevant Interreg Europe good practices.

> *"The new Regulation is an excellent example of how circular economy works in practice and delivers for all. I am confident that it will encourage the take up of practices for more efficient use of water and contribute to a more predictable, safe and secure water supply, while diminishing the pressure on precious water resources and ensuring the safety of our agricultural produce".*
>
> **Virginijus Sinkevičius**, Commissioner for Environment, Oceans and Fisheries

Water Reuse

The new Circular Economy Action Plan published by the European Commission in March 2020 aims at moving away from a predominantly linear system of production and consumption. It pinpoints the recently adopted Water Reuse Regulation (WRR) as a key tool for instilling more circularity in agriculture. The Action Plan also acknowledges the potential of water reuse in other industrial processes to further alleviate the ever-mounting pressures on freshwater resources. In the years to come, the biggest challenge for the Water Reuse Regulation, the rules of which will apply from June 2023, will be to drive the deployment of water reuse in the agricultural sector. The magnitude of the challenge will be greater for water management bodies in regions that started to face droughts and water scarcity more intensely only in recent times, due to the increasingly adverse impacts of climate change.

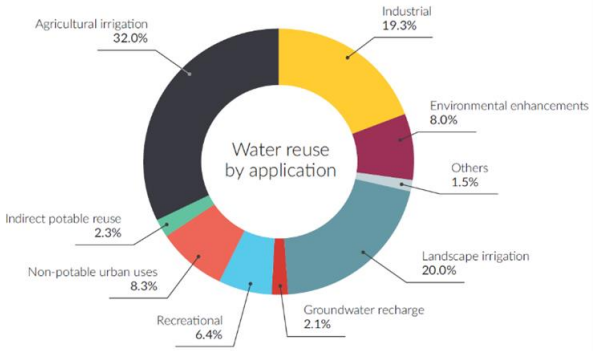


Figure 1 - Global water reuse after advanced (tertiary) treatment: Market share by application (European Commission, 2018)

According to the European Commission about 1 billion m^3 of treated urban wastewater is reused annually, which corresponds to 2.4% of the treated urban wastewaters and less than 0.5% of annual freshwater withdrawals in the Union. The EU executive estimates that this figure could grow to 6 billion m^3, boosted by the new rules on water reuse agreed upon by the European Parliament and the Member States in May 2020. Aqua Publica Europea, the European association of public water operators, welcomed the adoption of such rules, which protect human health 'by ensuring safety of reused water and agricultural produce irrigated with it' and provide a 'circular economy response to intensifying drought periods affecting the entire EU'. Eureau, a prominent EU-wide network of water services suppliers, described it as a 'significant step towards transitioning to the circular economy and to the EU's green future'.

Water reuse for agricultural irrigation

A wide application of EU-harmonized minimum quality requirements for water reuse in agriculture could have positive effects on the environmental performance of the sector, regulated and funded by the Common Agricultural Policy (CAP). A recently closed public consultation on the evaluation of the CAP impact on biodiversity, soil and water showed rather mixed results. The share of respondents affirming that CAP instruments are effective in contributing to the sustainable management of water both in terms of quantity and quality is indeed limited. Discussions on the future of the CAP are currently ongoing.

Inventory of water treated for reuse in a River Basin District (Spain)

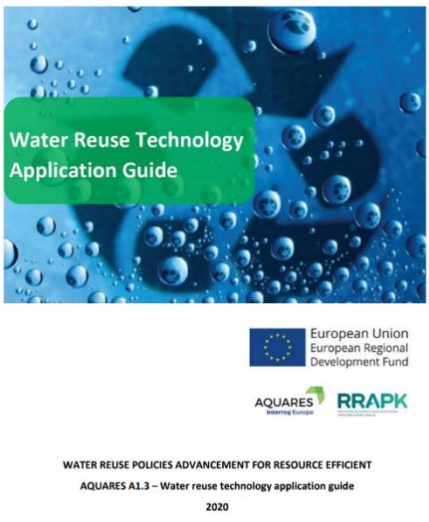
The River Basin Authority of the *Segura* River developed an inventory of reclaimed water available at the level of the River Basin District. Based on such inventory, the Authority allocated to farmers and other final users rights to use reclaimed water. Cataloguing water resources available for reuse in agriculture is of critical importance for ensuring their optimal distribution and effective use, thereby pursuing the goal of alleviating water scarcity and addressing over-abstraction in drought-prone regions. This good practice proved successful in increasing the awareness on water reuse for irrigation amongst farmers who, in turn, pushed for enhancing the quality of water treated for reuse, thereby triggering a virtuous spiral.

Further information about the practice is available here.
Image Source: Photo by Karolina Grabowska from **Pexels.**

Mapping reclaimed water that can be safely reused for agricultural irrigation allows water reuse to play a bigger role in reducing water stress. It also helps information and awareness raising on water reuse and enables the optimal use of reclaimed water. For this reason, it could be further taken up by European regions that experience severe water deficits. It could in fact help them to reverse one of the main trends outlined in the impact assessment of the Water Reuse Regulation, according to which water reuse options tend to be rather 'excluded or forgotten' in the context of river basin planning[4]. Improving information on water reuse *vis-à-vis* interested stakeholders (i.e. farmers, policymakers) and the general public seems to be increasingly recognized as a fundamental issue by the AQUARES project partners, as demonstrated by targeted communication campaigns such like the ones carried out successfully in Lower Saxony (Germany), where "learning expeditions", "touch tables", "dialogue events" and other initiatives where carried out to reach out to the largest possible public.

Water reuse in industrial processes

According to Eurostat available data, the total water use by the manufacturing industry in the European Union varies greatly from one country to another. It ranges from 193 m³ per inhabitant in the Netherlands (2018 data) to the 4 m³ per inhabitant recorded in Cyprus (2017 data)[5]. This picture of course varies even more if one takes a closer look at the situation within the regions and if one considers the actual rate of water reuse in industrial processes. This latter aspect is very much influenced by the type, the degree of presence and development of the industrial fabric in a given region. The Water Reuse Technology Application Guide published in the Interreg Europe Library by the AQUARES project offers, among others, a clear overview on the extent to which reclaimed water is reused by the industrial sector in partner regions. The guide also specifies which technologies are the most suitable for application in industrial processes such as food processing and energy production. For this reason, in the absence of harmonised EU rules on water reuse in the industry and considering nonetheless the industry need of improving its water



[4] Preliminary analysis carried out by the European Commission prior to the impact assessment showed that almost 50% of River basin management plans (2nd cycle) did not encompass any measures on waste water reuse (and rain water harvesting).

[5] https://ec.europa.eu/eurostat/statistics-explained/index.php/Water_statistics.

management performance, this guide's findings deserve to be underlined. They can inspire policymakers and industrial stakeholders in the regions to take action on water reuse.

The case of the Biliński Textile Factory (Poland)

Specialized in printing, dyeing and manufacturing various kinds of fabrics, this industrial installation in Łódź treats its own waste water in a closed cycle in compliance with the 'best available techniques' (BAT) issued for the textile sector in accordance with the Industrial Emission Directive.

Thanks to a chemical-biological wastewater treatment plant that is now operational, the factory is managing to reuse 50% of the total water used in its production processes and to significantly reduce the water actually consumed for the production of textiles, which has been brought down from 50 litres to 3 litres per kilo.

Further information about the practice is available here.
Image Source: Photo by Mario Luengo from **Freepix**

Technological options in the area of waste water management and water reuse will need to be taken up more broadly in the future by the European textile sector to pave the way to a more sustainable industry. The upcoming EU Strategy for Textiles, announced by the Commission in March 2020, is expected to orient precise actions to curb all pressures exerted by the sector, including those on water[6].

The case of the Granarolo dairy production plant (Italy)

Granarolo is one of the leading companies in the Italian milk and dairy sector. In 2012-2013 its average water consumption was about 1 million m^3 per year. Said figure progressively decreased over time and reached 600,000 m^3, also thanks to a more stringent regulatory framework. Today, a wastewater treatment plant equipped with technologies for water reuse allows the company to have a water saving rate of 12% and to reuse 60,000 m^3 of water on yearly basis, with an economic benefit of 120,000 € in terms of avoided costs of drinking water consumption.

This good practice contributed to inspiring the environmental criteria that from 2018 onwards are being included in the calls under operational programme of the Emilia-Romagna Region to support productive investments, with the view to reward greener projects and induce more sustainability and circularity among enterprises. Reduction of water consumption is now one of the environmental criteria for the assessment of submitted projects.

Further information about the practice is available here.
Image Source: www.dairyfoods.com

[6] Several EU-based civil society organizations are already proposing a 'European Strategy for Sustainable Textile, Garments, Leather and Footwear' to inspire EU policymakers on the work towards the EU strategies for textiles.

The CESME Interreg Europe project proves that water reuse can have a place even in highly regulated sectors such as the agri-food business, where the safe use of reclaimed water can find application to non-food related processes, thereby coexisting with production methods that are required to meet extremely high EU hygiene and food safety standards.

Water reuse: beyond agriculture and industry

Legislative action on water reuse for agricultural purposes sparked the ongoing policy debate on how to incentivise water reuse also in the industrial sector. Evidence gathered in the context of interregional cooperation tells us that other forms of water reuse equally exist and are already gaining ground across Europe. They could easily be included as measures in any local and regional strategy for achieving both circular economy and climate adaptation goals. The AQUARES Interreg Europe project is certainly a very rich source of inspiring good practices in this respect.

Source: photo by Apfeltalk from Pixabay

Rain harvesting can serve various purposes in different contexts. Public buildings may reuse rainwater by means of collection and treatment systems to irrigate the green areas surrounding their premises. Such a good practice is being implemented in the Headquarters of the Regional Fund for Environmental Protection and Water Management in Łódź (Poland), where water savings and reduced costs for water consumption are being reported. Harvested rainwater can also be treated and subsequently used for washing maintenance machinery, following the example of the publicly-owned road maintenance company Latvijas Autocelu Uzturetajs (Latvia). At present, this company is also able to reuse the by-product of the rainwater treatment process (i.e. sand) which helps in keeping the skid resistance of road surfaces during winter season, in full compliance with the circular economy principles.

Water reuse options go well beyond rain harvesting for non-agricultural and non-industrial activities. The current state of technology allows regional policymakers to embrace a more sustainable approach towards water management in the areas of sport and recreation, amongst others. The case of the Sport Bay at the Technical University of Łódź (Poland) exemplifies how European sport facilities could do their part in facilitating the shift to a circular economy. Swimming pools of this campus operate in a close cycle and thanks to water reuse techniques they generate measurable water saving while ensuring the maintenance of enhanced hygiene standards.

Urban Waste Water & Sewage Sludge

Urban waste water treatment

The Urban Waste Water Treatment Directive (UWWTD) laid down specific obligations for the collection and treatment of urban waste water. The directive foresees that collected urban waste water undergo secondary (biological) treatment and mandates a more stringent treatment if water is discharged into sensitive areas and their catchments, in order to remove excess nitrogen and phosphorous which are responsible for the eutrophication of the aquatic environment. The European Commission is currently in the early stages of the impact assessment that could lead to the revision of the UWWTD envisaged by the new Circular Economy Action Plan[7]. In the meantime, the 10th report on the implementation of the Directive (issued in September 2020) confirmed that while collection and treatment of urban waste water have steadily improved throughout the territory of the EU, full compliance with the Union's rules on waste water management is yet to be achieved.

[7] According to the roadmap laid down by the Commission, a public consultation for the revision of the Directive is scheduled in 2021 (first quarter) and the possible adoption of a legislative proposal to amend the UWWTD could see the light in 2022.

Urban waste water treatment plant designed with the Circular Economy principles (Greece)

The University of Western Macedonia teamed up with a technical construction company in the field of waste water treatment and a slaughterhouse to form a small industrial pool. Their goal was to test a waste water treatment plant prototype designed for keeping sludge to a minimum at the slaughterhouse, given the major difficulties experienced in the region with regard to treating this by-product of waste water treatment. The prototype led to up to 95% sludge minimization. Available data showed that, if applied together with overall efficiency improvements at plant level, it could halve construction and running costs for waste water treatment normally incurred by slaughterhouses. The model created in Western Macedonia has been already transferred to the neighbouring regions of Eastern and Central Macedonia. The waste water treatment and sludge minimisation technologies employed by the prototype are being adapted to industrial plants other than slaughterhouses.

Further information about the practice is available here.
Image Source: www.yaleclimateconnection.org

The release of pharmaceutical products in the environment is central to the current policy debate on the nexus between health and environmental protection. On 17 September 2020, the European Parliament adopted a resolution outlining its own position on how a strategic approach to this matter should look like[8]. MEPs called for increasing the support for technology improvements on waste water management. At present most conventional treatment plants are not indeed capable of ensuring the effective removal of all pharmaceutical residues. In addition, along with invoking the adoption of a holistic approach on the entire life cycle of drugs to make them 'greener' from design stage to disposal, EU lawmakers suggested to give special attention to discharge hotspots such as hospitals.

Pharmaceuticals degradation in waste waters from nursing homes and hospitals (Slovenia)

The goal of the LIFE 'PharmDegrade' project is to demonstrate the feasibility and financial viability of a technology that could be deployed at a larger scale for removing pharmaceuticals from the effluents of waste water treatment plants. Originally implemented at the scale of a pilot plant, this technology (based on advanced oxidation processes associated with electrochemical degradation of pharmaceuticals) could be applied to all wastewaters, including those from nursing homes and hospitals. At trial stage, the pilot plant showed that up to 90% of all monitored pharmaceutical residuals could be removed in a cost-effective manner. The transferability of this solution is mainly due to the fact that the pilot plant can be easily transported to any suitable location for further testing and evaluation by interested stakeholders like public authorities and private investors. The successful performance of the pilot plant contributed to raising awareness on the presence of pharmaceutical residues in waste water and is set to improve the performance standards of waste water treatment plants in Slovenia.

Further information about the practice is available here.
Image Source: Photo by freestocks.org from **Pexels**

[8] In response to COM(2019) 128 final of 11 March 2019 on the 'European Union Strategic Approach to Pharmaceuticals in the Environment' available here.

By supporting projects like the one described above, the LIFE Programme shows its readiness to boost innovative solutions to tackle the negative impacts stemming from the release of pharmaceuticals in the environment. The programme (as other EU financing tools) will grant support to similar projects also in the future, taking into account the wider set of objectives that established under the Zero pollution action plan for air, water and soil, which is expected by June 2021[9]. This will have a clear focus on measures to prevent environmental pollution and on remedial actions aimed at pursuing a 'toxic-free' environment, which is one of the overarching goals of the European Green Deal.

Sewage Sludge

With over 30 years of implementation, the Sewage Sludge Directive (SDD) has managed to promote and regulate the safe use of sewage sludge in agriculture by prescribing specific rules to prevent harmful effects on the soil, the crops, animals and our health. However, time is ripe for its reassessment, considering technological and scientific developments as well as the changing policy priorities outlined in the European Green Deal. Both the Farm to Fork Strategy and the 2030 EU Biodiversity Strategy have indeed pointed to the need of tackling excess nutrients from farming and of reducing the overall use of fertilizers. In line with the announcement made in this respect by the Commission in March 2020 via the new Circular Economy Action Plan, policy work that could lead to the possible revision of the SSD has now started. On 20 November 2020 an open public consultation on its evaluation has been launched. Stakeholders – including local and regional authorities – will have time until 5 March 2021 to have their say on how the directive should be amended to better address the environmental challenges deriving from the use of treated sewage sludge. The future SSD will need to be aligned with the 'zero-pollution' ambition of the European Green Deal and foresee measures to tackle contaminants of emerging concern, including microplastics, pharmaceuticals and potentially other hazardous chemicals.

BIOREGIO
Interreg Europe

Composting municipal wastewater sludge in Mioveni's pilot plant (Romania)

A pilot composting plant was built in the Municipality of Mioveni in 2016 as a solution to recover nutrients from the sewage sludge and avoid landfilling costs for both sludge and garden waste. The goal of the pilot was to contribute to a bio-based circular economy where nutrients are recycled back to the soil.

The technique used in the pilot (based on mixing garden waste and sewage sludge in 3 to 1 ratio) resulted in a compost that was initially tested on green areas and then on different crop varieties, pending the adoption of a specific regulatory framework allowing the marketing of products from biowaste in Romania.

In 2017 the Mioveni public service company inaugurated a training centre for its staff involved in composting. The centre expanded in partnership with the Romanian Compost Association and started offering knowledge sharing opportunities to external stakeholders, in spite of the limited possibilities for composting.

This situation is expected to change radically thanks to Law n. 181/2020 adopted on 20 August 2020 for the purpose of establishing a framework for the transformation of non-hazardous waste into compost. The measure transposes the amended Waste Framework Directive, which now requires Member States to ensure the separate collection and recycling of biowaste by the end of 2023 and to promote the use of materials produced from bio-waste. This is one of the first positive results of the Circular Economy Package agreed upon in 2018.

Further information about the practice is available here.
Image Source: www.rivistadiagraria.org

[9] An open public consultation on the plan was launched on 11 November 2020. It will close on 11 February 2021. Local and regional authorities in the Member States are invited to have their say.

Groundwater pollution

Combating water pollution in all its forms can be certainly considered as a cross-sectoral issue in the European Green Deal. This emerges, for instance, in the new 2030 EU Biodiversity Strategy and in the Farm to Fork Strategy, which call for halving the risk and use of chemical pesticides as well as the use of the most hazardous pesticides by 2030, also with the view to ensure a better protection for water bodies.

The Chemicals Strategy for Sustainability of October 2020 completes the picture of the water-related policy initiatives already adopted under the European Green Deal. Its objective is to fight the long-term and large-scale consequences for nature of hazardous chemicals contamination and support R&D for developing decontamination solutions, including for aquatic environments. The Strategy has a special focus on PFAS, which have caused serious cases of groundwater contamination, and proposes a ban on their unnecessary use[10].

The good practices from the COCOON and TANIA Interreg Europe projects illustrated below offer valuable insight on how interregional cooperation can inspire solutions to tackle ground water contamination caused by human-activities at close landfills and former industrial sites.

Remediation of a closed landfill: the Hennickendorf case (Germany)

The Hennickendorf landfill (Brandenburg) was operational from 1976 to 2001 on an area of 13,8 hectares. In 15 years the site was used for the disposal of 2 million m^3 of construction and demolition waste. Located in a former clay quarry, the landfill lacked any technical solution to prevent leachate from penetrating the soil and reaching groundwater. The severity of the problem was exacerbated by the fact that on-site groundwater levels tended to raise, coming into direct contact with landfilled waste.

After closure, remedial action was made possible thanks to ERFD co-financing (15,6 million €) and was carried out in three stages to seal the landfill with a proper waterproof layer and to put in place a drainage system to keep low the groundwater level around the site.

The technical solutions implemented to remedy the Hennickendorf site could inspire remediation of other closed landfills predating Directive 1991/31/CEE, which made mandatory the installation of proper ecological barriers for any new authorised landfill. Their transferability has already been proven in the Municipality of Baena (Andalusia, Spain), where a closed landfill for construction and demolition waste was sealed following the Hennickendorf example. A study visit to Brandenburg was crucial for triggering the decision of the Andalusian Regional Government, which authorised the remediation in March 2018. The risk analysis conducted on the Baena landfill revealed that the cost of implementing such a solution would have been significantly lower than those resulting from sealing procedures foreseen by the Spanish legislation (Real Decreto 1481/2001).

Further information about the practice is available here
Image Source: Photo by Tom Fisk from **Pexels**

[10] PFAS are being increasingly regulated at EU level. It is worth recalling in the context of this policy brief the 2018 Commission proposal to recast the Drinking Water Directive, which introduced limit values for these substances for the first time ever. On 23 October 2020 the EU Council endorsed the compromise reached with the European Parliament on the revised Directive, which got final approval by MEPs on 15 December 2020.

Nano-remediation technique to address groundwater pollution (Hungary)

At a former solvent regeneration site, the drycleaner in the City of Békéscsaba, groundwater was contaminated by chlorinated volatile organic compounds (CVOCs). The concentration levels of these substances was extremely high (in the order of 10,000-50,000 micrograms per litre) and could not be addressed through any common remediation approach. Therefore, the Körös Valley Directorate for Water decided to opt for a nano-remediation pilot technique (based on the use of sodium lactate, a permeable reactive barrier and a special additive to stimulate biogeochemical processes to reduce pollution).

During a 5-month long trial, the pilot technique managed to cut the total CVOCs concentration by 80% in spite of the continuous flow of untreated contaminated groundwater. At the end of the remediation, more than 16.000 m^3 of groundwater underwent cleaning treatment over an area of around ca. 5 000 m^2.

Such an innovative nano-remediation technique applied to a large-scale site provided a useful technical input for NANORAUTA, a Finnish project to increase remediation knowhow and to support SMEs in the remediation sector which was admitted to ERDF co-financing in mid-2019. Not previously used in Finland, the experience at the Hungarian drycleaner will guide the testing of new remediation techniques under this project.

Further information about the practice is available here.
Image Source: Photo by Emiliano Arano from **Pexels**

European support for sustainable water management

According to the ex-post evaluation of Cohesion Policy in 2007-2013, water projects co-financed by the EU improved drinking water supply for at least 4 million citizens and contributed to better wastewater treatment for over 7 million EU citizens. In the last programming period (2014 and 2020) EU Structural and Investment Funds (ESIF) have kept providing resources to support local and regional authorities in their efforts to protect and preserve water. About 15 billion € were allocated to water management, mostly to help cities and regions build the necessary infrastructure for adequate collection and treatment of wastewater.

The new Multiannual Financial Framework (2021-2027) is now adopted. Both the European Parliament and the Council have considered regional policy pivotal to mitigate the effects of the COVID-19 pandemic, pursue European Green Deal policy goals and trigger economic recovery. Sustainable water management projects designed to make Europe greener and smarter will be certainly well-placed to attract EU investments. Among the manyfold EU financial instruments supporting the water sector, it is worth mentioning a novelty of the Horizon Europe programme. In the next 7 years the new programme will in fact encompass a specific mission to guide research and innovation on healthy oceans, seas, coastal and inland waters ('Mission Startfish 2030').

Public investments on sustainable water management projects at local and regional level could also be implemented thanks to the grants and loans that will be allocated to the Member States through the newly established Recovery and Resilience Facility, which is the financial instrument of the so-called 'NextGenerationEU'. Considering the evident contribution of sustainable water management to circular economy and climate adaptation targets as well as to the zero-pollution ambition enshrined in the European Green Deal, governments of the EU-27 should have a clear interest in including water-related projects into their respective National Recovery and Resilience Plans. Such plans will be submitted by April 2021 and will need to outline in detail all projects to be implemented along the way to the recovery up to 2026. The Commission has expressively clarified that each national plan will have to devote at least 37% of the foreseen expenditure to green investments and reforms to stimulate progress towards the achievement of climate action and environmental objectives.

Interreg Europe

Interreg Europe projects entail the sharing of experience and development of regional action plans to improve policy frameworks. Each project gathers and studies policy examples, hundreds of which are available through the Policy Learning Platform's Good Practice Database, some of which have been featured in this brief.

The Interreg Europe Policy Learning Platform is pro-actively supporting learning and exchange of experience and a number of on-demand services which can assist regions in their transition towards a circular economy, including an online helpdesk, matchmakings and a peer review service. The Peer Reviews are a constructive way for managing authorities and regions to obtain input and feedback on the challenges that policy makers are facing. Carefully selected European peers are invited to the host region for a structured exchange of experiences and to provide input and recommendations addressing the specific local challenge.

Recommendations and key learnings

While the next generation of Regional Funds are presently being negotiated, interregional cooperation provides already a great deal of inspiration for future action on sustainable water management. Indeed it offers the possibility to learn about good practices and policies, explore synergies and discover new perspectives for the water sector in the transition towards the circular economy.

Thanks to Interreg Europe projects a plurality of forward-looking and innovative solutions on water reuse, urban wastewater treatment and remedying groundwater pollution are already circulating and being adopted across the continent. In the next 7 years they will certainly need to gain further ground in order to make sure that pressures on water resources are substantially reduced, both in the shift to the circular economy and in the context of climate adaptation.

Water Reuse

- Make inventories of reclaimed water resources available for reuse and enhance this practice into your river basin management planning;
- Formulate strategies to make sure reclaimed water is used rationally;
- Develop the infrastructure for ensuring that reclaimed water can be properly distributed to farmers in regions affected by water scarcity as in the case of Murcia (ES);
- Learn from the Multi-ReUse project to carry out a risk assessment to choose where and how to conduct water reuse while ensuring the full protection of drinking water reservoirs and aquifers in your region;
- Invest in alternative sources for agricultural irrigation as it was done in Uelzen (DE);
- Disseminate information and raise awareness about the benefits of water reuse among farmers and the wider community. Get inspired by AQUARES to see how children can learn about water reuse;
- Favour water reuse in industrial processes such as textiles production where novel technologies can be cost-effectively applied thereby increasing resource efficiency;
- Support pilot projects (like the Wesermarsch plant) and innovation (see e.g. the LIFE RusaLCA project in Slovenia) to foster water reuse;
- Include the reduction of water consumption as one of the environmental criteria under Operational Programmes calls for proposals and for tenders for companies, with the view to reward greener projects;
- Consider rainwater harvesting for decreasing drinking water consumption in the offices of the public administration and the reuse of treated rainwater for cleaning your fleet (e.g. road maintenance vehicles, school buses, garbage trucks, etc.);
- Invest to untap the potential of water reuse solutions in your sport facilities;

Urban waste water & sewage sludge

- Design your UWWT plant according to circular economy principles and turn the existing UWWT plants in your city or region into resource-efficient facilities;
- Encourage the formation of small industrial pools to minimise sludge production or improve overall energy efficiency;
- Choose a site for your new UWWT and water reuse plant that is protected from flash flooding;
- Adopt technical solutions to address pollutants of emerging concern such as microplastics, pharmaceutical residues and other persistent compounds in your waste water;
- See how emerging contaminants are screened and monitored at the level of a river basin to improve wastewater management and take action against illegal industrial discharges in the BIGDATA4RIVERS project;
- Commit to the safe use of treated sewage sludge in agriculture and adopt techniques to valorise it as biowaste product in a circular economy logic (i.e. high-quality compost);
- Learn from the SYMBI project how wastewater produces biogas and contributes to local energy needs in Hungary;
- See how the use of nanotechnologies to remove pathogenic microorganisms from wastewater is being promoted in Crete under the aegis of the TANIA project;
- Implement measure that contribute to the actual reduction of wastewater;
- Get inspired by the Łódź Rain Gardens and the bioswales in Riga to implement nature-based solutions for better stormwater management and decreasing the volume of water treated by UWWT plants;

Combating groundwater pollution

- Focus on preventing groundwater pollution at source with the view to facilitate the achievement of the water quality targets and ecological objectives of the Water Framework Directive;
- Carry out a comprehensive assessment on the sources of ground water pollution in your region and implement a remediation strategy;
- Prioritise remediation over control and containment actions to eradicate pollution of sites severely contaminated by hazardous substances that jeopardise the safe supply of drinking water as it is presently done in Aragon in the framework of the LINDANET project;
- Develop a landfill rehabilitation strategy and implement an action plan to accelerate the elimination of ground water pollution from leachate;
- Check the COCOON handbook of good practices showcasing the avoidance of groundwater contamination on landfill sites throughout the continent;
- Promote the cleaning of heavy polluted industrial sites and disseminate remediation know-how considering new approaches such as the use of nanotechnologies promoted by the TANIA project;

EU Funding

- EU budget lines, such as the European Regional Development Fund (ERDF), will keep on fostering sustainable water management in the 2021-2027 period;
- Projects on water protection and management will still be eligible for direct EU funding under instruments such as LIFE and Horizon Europe;
- National governments may use grants and loans under the Recovery and Resilience Facility for accelerating the shift towards a more circular water management at regional level, thereby supporting the implementation of the European Green Deal.

Sources for further information

Policy Learning Platform information:

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Other sources:

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- European Environmental Agency, Sustainable water management
- European Environmental Agency, Urban waste water treatment in Europe
- European Parliament, Resolution on the implementation of EU water legislation (2020)
- European Parliament, Water Reuse. Setting minimum requirements (2020)
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- Aqua Publica Europea, Key points for a strong Water Framework Directive and its implementation (2020)
- Aqua Publica Europea, Public water operators welcome approved EU rules for water reuse in a circular economy (2020)
- Eureau, Innovating for a greener future: European water services priorities (2020)
- Eureau, Europe's water in figures. An overview of the European drinking water and waste water sectors (2017)
- European Water Association, Water Manifesto (2020)
- OECD, Financing Water Supply, Sanitation and Flood Protection. Challenges in EU Member States and Policy Options (2020)
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Interreg Europe Policy Learning Platform on

Environment and resource efficiency

Thematic experts:

Marco Citelli & Astrid Severin

m.citelli@policylearning.eu a.severin@policylearning.eu

Contact us to share your views on this policy brief!

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