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Building water resilience in times of floods and droughts

An Interreg Europe Policy Learning Platform event

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Murcia, Spain

https://www.interregeurope.eu/event/water-resilience

Summary: Interreg Europe community members gathered in Murcia to exchange their experiences with flood and drought prevention, water reuse, nature-based solutions and other initiatives that are building water resilience at a regional level. The event included working sessions on **water availability and water efficiency, resilience to droughts, flood management, river governance and mitigation of extreme weather events.** For each of these themes, good practices were presented to illustrate relevant approaches and workshop participants shared their own local challenges and experiences. The participants shared key recommendations stemming from the exchanges and learnings they benefited from.

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Why Murcia?

Europe faces escalating challenges from rising temperatures, with record heat contributing to drier soils, wildfires, droughts, and flooding. One in eight Europeans lives in areas prone to river floods, while 30% in southern Europe face chronic water stress. In 2023, extreme heat stress reached record levels, amplifying health impacts from climate-related events. Despite this, Europe was 7% wetter than average, with significant river flooding observed. European regions, cities, farms, industries and citizens are not yet adequately prepared for these intensifying extreme weather events and must **build water resilience to adapt, recover, and address issues** like drought, floods, and water pollution.

The event looked into different aspects of water resilience. Murcia offers a unique space to investigate good examples of local policies and solutions, as the region has experience with water reuse and droughts, as well as extreme flash floods. The Interreg Europe community met in Murcia to be inspired by the examples of the success stories and innovative practices implemented in the region, while reflecting on the role of local authorities to foster water resilience.

1.Policy context

Water resilience is seen critical to addressing scarcity, climate change, and desertification. There is a call for a unified approach to align EU policies with regional needs, focusing on **efficiency, sustainability, and governance.** The European Union has established various policies and directives to manage water resources effectively, ensuring sustainability and protection of water quality. These include the Water Framework Directive, Drinking Water Directive, Urban Wastewater Treatment Directive and Floods Directive.

The EU Commission is currently working on designing the future European Water Resilience Strategy. The main goal of the European Water Resilience Strategy is to establish a path towards water security and resilience by ensuring the availability of clean water and **better protecting the EU against water-related risks**. A water resilient system should not only deliver better protection from floods, droughts and extreme weather events, it should also ensure availability of water from different sources and its efficient use for diverse needs.

Water availability pertains to the accessibility of water resources for various uses, including drinking water, agriculture, and industrial processes. Factors affecting water availability include climate conditions, geographical location, and the management of water resources. Improving water availability involves a combination of sustainable management practices, infrastructure development, and community engagement. **Water efficiency** refers to using water in a way that maximises its utility while minimising waste. This can involve practices such as using water-saving fixtures, optimising irrigation techniques in agriculture, and implementing technologies that reduce water consumption in various industries.

2. Water efficiency and water availability

The following good practices have been presented for an increased water efficiency and water availability in times of drought.

Regional policy approaches to increase the resilience to drought

(**Gov4Water** project, **José Sandoval Moreno**, Regional Government of Murcia)

The presentation depicts the water resilient strategies and key priorities for the Mediterranean region. The region emphasises water resilience as critical to addressing scarcity, climate change and desertification. The approach incorporates matching water availability to demand, including using alternative water sources (desalination, water reuse), investing in storage infrastructure and optimising water use across sectors.

The water reuse programme of Murcia (Pedro Simon, Entity of Sanitation and Treatment of Murcia Region)

Despite quite low annual precipitation, more than three million tonnes of agricultural products are grown every year in Murcia region. This is possible thanks to Spain being the country with the highest water reuse in Europe. Fifteen percent of irrigation water in Murcia comes from reclaimed water. The presentation described the main concerns of citizens and how to build trust in water reuse. It highlighted the need for adequate and sufficient water treatment infrastructure, political will and adequate control and management system.

Reducing the effects of drought (**DECA** project, presenter: **Ewa Krolikowska**)

Over 57% of the Mazovia region in Poland is highly vulnerable to agricultural drought, while approximately 30% of its rivers, lakes and water reservoirs are at risk of hydrological drought. To mitigate the effects of drought, Mazovia is building small retention reservoirs, developing irrigation-drainage water management systems, restoring wetlands and rivers, reducing water consumption in urban and industrial areas, supporting blue-green infrastructure, using permeable surfaces, and implementing monitoring, forecasting and early warning systems.

Key learnings – Water efficiency and water availability

Water efficiency and availability require a change in mindset

It is essential to educate as many people as possible about sustainable practices to foster a collective approach to water availability. Maintaining an open mindset to the needs and challenges helps to work towards future water resilience. This may include acceptance of nature-based solutions and blue green infrastructure, revitalisation of floodplains, not building in flood prone areas, higher water conservation efforts, etc.

Local communities should be involved in water management decisions and gain better understanding about water management, for example how is water collected and used and what is the water quality needed for different processes. Using financial tools to demonstrate that wasting water equals wasting money can make things easier to understand. It is important to use a range of incentives (including financial) to motivate people to change their behaviour.

In many regions, there is still **low awareness** among policy makers for the necessity of a resilient water system and it is crucial to communicate the benefits, the goals to achieve, but also the problems to be tackled and put the topic on a political agenda.

A combination of measures for water availability

Improving water availability involves a combination of sustainable management practices, infrastructure development and measures. Encouraging water-saving practices in households, agriculture, and industries results in efficient use of existing water resources and drought prevention. Systems to collect and store rainwater can supplement existing water supplies, especially in arid regions. Coastal regions facing freshwater shortages can explore desalination technologies to convert seawater into potable water.

Reusing wastewater for irrigation, industrial processes, or even potable use after proper treatment should become a much more used resource. Modernisation of water distribution systems will reduce leaks and losses, ensuring that more water reaches its intended users. Setting higher pricing for the use of water, as well as incentives for water retention and reuse can also help in sustainable water management.

3. Floods and extreme weather events

The following good practice have been presented for a better resilience and preparedness for floods and extreme weather events.

New governance for rivers to counteract floods
(**RIWET** project, presenter: **David Campos**)
The presentation provides a comprehensive overview of the Spanish water governance structure and pointed out some discrepancies and problems that can happen between local authorities and the River Basin Authority. The presentation talked about the recent catastrophic DANA flood, which affected 78 municipalities including Valencia and resulted in the death of 230 people. The observations from DANA indicated a necessary transformation of the water governance model, including actions such as enhancing the strength of public administrations, improving coordination of sectoral policies, increasing transparency and coherence between different administrative levels. A need for free from obstacles floodplains and a basin-wide approach to river water management was highlighted.

Managing climate risks: drainage and flood management
(**ADAPTO** project, presenter: **Adam Coffey**)
The presentation describes the Clonmel Flood Scheme built in Tipperary County Council, Ireland. The Municipality of Clonmel has often been experiencing significant flooding. The town has

investigated various options and finally decided to construct a combination of permanent and demountable flood defences. The permanent structure took the form of a 1.2m high reinforced concrete wall, which incorporated receiving arrangements into which a demountable system is installed when required. The solution is combined with a flood warning system based on forecast rainfall and actual river levels. When a predicted level crosses pre-determined thresholds, an alert is issued, and the barrier is erected.

Flood plain 'Lebendige Luppe'

(**GIFT** project, presenter: **Mathias Scholz**)

The purpose of the "Lebendige Luppe" project is to counteract the conditions that have led to a lack of water in the floodplain and to restore the function of the regularly flooded areas. This includes revitalising former stream courses, protecting oxbow lakes, and conserving floodplain biodiversity. It is hoped that this work will be a foundation for future, complimentary revitalisation projects and measures which will also promote and further the creation of dynamic water systems, typical of floodplains.

Key learnings – Floods and extreme weather events

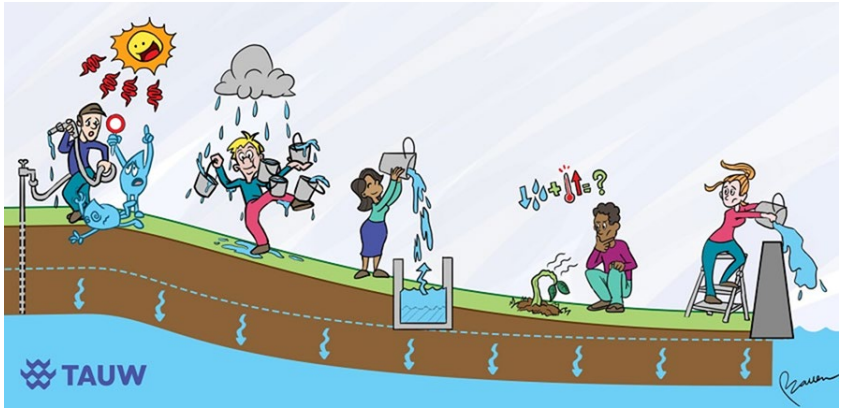
Natural watersheds should be protected and restored to enhance groundwater recharge and maintain healthy ecosystems that contribute to water availability. **Nature-based solutions** help in flood management but also contribute to biodiversity, water quality improvement, and climate adaptation. These solutions could be encouraged through subsidies.

Restoring wetlands can absorb excess rainwater and reduce flood peaks, acting as natural sponges that slow down and store water. Planting trees in watersheds can enhance soil stability, increase water retention, and reduce runoff, thereby lowering the risk of flooding downstream. Implementing green roofs, permeable pavements, and rain gardens in urban areas can help manage stormwater by allowing it to infiltrate the ground rather than overwhelming drainage systems. This prevents floods but also droughts, as vegetation and water bodies help to restore the small water cycle. Reconnecting rivers to their floodplains can provide space for floodwaters to spread out, reducing the impact of floods on nearby communities and infrastructure.

For successful **flood prevention and management**, potential flood zones should be reflected in spatial planning. Collection and availability of data about water levels are needed to make strong prediction models, making the municipalities better prepared for floods.

Preparation and prevention

Well-developed **early warning systems**, emergency plans and protocols, guidelines for the actual event of floods and a good monitoring system are crucial for a fast reaction. Cooperation between administrations, a multisectoral approach, improved drainage systems, nature-based solutions and floodplains are all important measures in flood prevention.



Source: Rob van der Most, Delfland

4. Study visit

During our study visit we explored three different areas. First stop was the rain garden in San Javier, where water is collected during periods of heavy rain. The raingarden is hidden below the surface, reducing visual impact. The second stop was the retention catchment basin in San Javier, which reduces overflow, improves the wastewater treatment plant (WWTP) management as the water is stored in the reservoir and does not overwhelm the WWTP, and is used for agricultural purposes. At the third stop we explored a storm tank in Torre-Pacheco, where we have seen a pre-tank with autocleaning and a pond that saves water before it enters the WWTP. The aim of the facility was to avoid discharges of the excess flow without treatment.

5. Conclusions and recommendations

The participants of the workshop 'Building water resilience in times of floods and droughts' put forward a set of conclusions and recommendations that should help European regions and municipalities achieve greater water resilience.

Setting multilevel and integrated governance

To achieve water resilience, a multilevel and integrated governance is desirable. There needs to be an alignment of the strategic planning and policies, a good understanding of land use for different purposes (natural areas, agriculture, industry, urban areas, etc.) as well as water supply and demand. Elected water boards are a democratic means to involve a large base of stakeholders and responsibility at a political level. As a first step, local and regional authorities need to assess the availability of water and the water needs in their area.

Collaboration is needed across private and public organisations

Water management is a complex process, which requires joint efforts from policymakers, agricultural and industrial sectors, academia and research, and consumers. Especially strong collaboration between public (policy, academia) and private (farms, industries, water companies) organisations is needed to trigger significant changes at the level of entire economic sectors.

Integrated spatial planning

Spatial planning and river management are still mostly working in silos. Better integrated spatial, urban and land use planning for example in a sustainable water management plan or a local resilience plan will be required. Spatial planning needs to be data-driven basis and make use of analysis models for future forecasting and integrated land use planning. Any spatial planning should be site-specific considering both current and future scenarios.

Managing the complex stakeholder environment

The water sector has many different stakeholders with various needs. Agriculture, industry and citizens are the key ones. It is important to create a water community, where a wide range of stakeholders can be involved, and many sides of the problem can be discussed. The goal is to meet their needs without sacrificing long-term sustainability. Working groups and regular forums with stakeholders and all sector participation will build trust and collaboration in the sector.

Involving civil society

To establish greater transparency and acceptance of the implementation of water resilience measures, civil society should be involved early in addressing water resilience processes and take responsibility for the development of their direct living environment. Municipalities can start by consulting their citizens on the type of environment they want to live in now and in the future. Low-cost support for citizens in greening streets, roofs and neighbourhoods, competitions to unseal surfaces and increase soil infiltration as well as educational activities and study visits considerably enhance local water resilience.

Prepare, prepare, prepare!

Society and public administrations are not yet prepared for extreme weather events occurring more frequently and severely. On a long-term basis, local authorities and civil society need to increase their preparedness and protection measures. Early Warning Systems (EWS), guidelines and protocols need to be developed and put in place accompanied by regular, public information as well as training.

Capacity building and communication

Capacity building, education and awareness-raising about the issues of floods and droughts are needed at regional and local levels for all actors (public administrations, civil society, land use / urban planners, farmers, engineers, industry, academia, insurance companies, etc.) to better understand related risks, the impact of different prevention measures and the related costs. Communication is best organised at river basin level, aiming to establish a more effective local collaboration. It should focus on the value of landscapes / urban environments and a better quality of life for all citizens as well as the individual contribution that one can make to greater water resilience. This will also help establish an

emotional connection between citizens and the landscapes in which they live.

Planning and working at river basin level

To ensure future water availability, it will be crucial to untap new water resources, high water retention and efficient use of groundwater. Due to its strategic role in terms of food production and safety as well as its important water consumption, the agricultural sector is considered an important factor for increasing water resilience.

Free-flowing rivers and floodplains

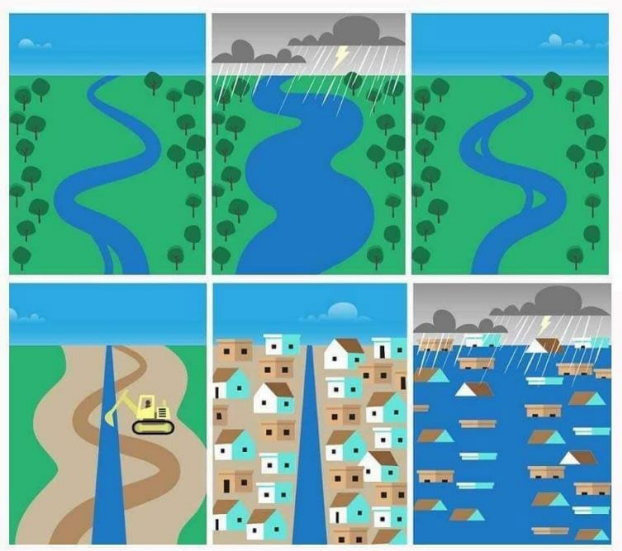
Many rivers have disappeared due to the introduction of technical solutions and the drying of wetlands and floodplains. Often housing, infrastructure and industries have been built on former flood plains and are at risk of flooding. To increase water resilience, water should be brought back to the flood plains wherever possible and eco-systems should be restored. A mixed implementation of nature-based solutions and grey infrastructure is thought to be the most resilient and cost-effective approach, also considering short-term storage options upstream of urban environments. Many small, cost-effective measures are readily available and can be implemented.

Water efficiency and storage solutions

Keep (rain)water locally and favour water storage solutions, also in the landscape through planting and afforestation that help prevent erosion and increase soil infiltration. Discharging of water should be the last solution. Forests, hedges and green areas in urban environments play a very important role in keeping the water, in improving soil quality and the local climate.

Activities towards unsealing surfaces such as street planting and tile whipping competitions improve the living environment and directly encourage the participation of citizens.

A more efficient use of water and the reduction of water consumption is key to increasing water availability. The diversification of water resources e.g. through water reuse and storage can help ensure the availability of water. Water reuse processes need to be well managed and controlled to establish trust of the users and to ensure water safety. Finally, pricing is an important factor to steer the use of water and to underline the value of this precious resource.



Source: https://www.chj.es/es-es/medioambiente/Paginas/Obras-de-conservaci%C3%B3n-y-mejora-ambiental-de-cauces-ejecutadas-por-la-CHJ.aspx

The workshop concept and overall moderation were ensured by **Astrid Severin** and **Magda Michaliková**, Policy Learning Platform thematic experts.

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