Innovation roadbook

Navigating towards a water-resilient economy in Flanders

From innovation to deployment



vito

Investing in water security means investing in Flanders

Reliable access to sufficient, good-quality water underpins our economy and living environment. To safeguard these, it is imperative that businesses and agriculture can continue operating within the limits of the water system. The shared ambition of **Flanders' Blue Deal** [1] is to make our region more resilient to water scarcity and flooding, while maintaining space for nature and economic activity. Since 2024 this long-term ambition has been anchored in the Blue Deal Decree **to support continuity beyond governmental terms**, requiring every new government to develop a Blue Deal with concrete investments to address water quality, flood risk reduction, drought and water scarcity.



Jo Brouns

Flemish Minister for Environment and Agriculture

"Water security is an investment in Flanders' economic future. The Blue Deal sets the direction: healthier water systems, greater resilience to drought and flooding and more efficient water use. We are putting this into practice by restoring natural water retention, reducing demand and pollution, and scaling up proven measures alongside new solutions.

Our strategic water-supply plan for agriculture and industry will help guide investment by identifying alternative sources and priorities for action. By combining innovation, technology and digital tools with public and private investment, we can deliver results on the ground and give businesses greater confidence in their future."

Curious for more?

Colofon

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Innovation to decouple economic growth from water use

A resilient economy depends on reliable water availability. In Flanders, 15 sectors with the highest water use account for 26% of Flemish employment and approximately €70 billion in gross value added [2]. Manufacturing, including chemicals and food processing, agriculture, energy production and logistics all depend on reliable water availability. They share the water system with households, drinking-water suppliers and ecosystems. This reliability, however, cannot be taken for granted. Drought and flooding disrupt activity, while pollution can make water unfit for use even where it remains physically available. These pressures affect production, treatment costs, waterborne transport and investment decisions. The aim is not an economy without water, but one that creates value with less water demand and less exposure to shortages, flooding and pollution.

How can we invest in water security so that economic activity can continue and develop within the limits of the water system, even as conditions change?



Investing now reduces the **future costs of inaction**. The required effort is substantial, and government actions cannot shoulder it alone. We need to mobilise actors, build trust and engage private capital.

In 2021, the former Flemish minister of environment Zuhal Demir initiated Vlaanderen WaterProof as “boots on the ground” innovation project. Coordinated by VITO and supported by €14.75 million from Flanders’ Blue Deal, Vlaanderen WaterProof brought partners together to move water innovation closer to implementation through real-world testing and science-based decision making [3]. Rather than following a fixed project format, Vlaanderen WaterProof was designed as an evolving innovation trajectory, allowing new partners to join and synergies with European projects to develop over time.

This innovation roadbook guides you through four complementary directions for investing in a **water-resilient economy and society**. Inspiring examples from across Flanders show measures already in operation, pilots under evaluation and partnerships preparing further implementation. Together, they illustrate how innovation can guide investment decisions. The roadbook concludes by exploring how **these approaches can be scaled for wider impact**.



DIRECTION 1

Strategic water retention

From rapid drainage to dependable water reserves through natural retention, engineered storage and adaptive management.

Heavy rainfall does not automatically replenish the reserves needed during drought. Rapid runoff and drainage can carry water away before it infiltrates or is stored. Retaining water for longer means combining soil and landscape measures with grey infrastructure.

Retaining more water during wet periods and keeping it usable and accessible helps bridge the gap between water availability and demand during dry periods, supporting industry, cooling, drinking-water production, inland navigation, agriculture and nature. When reserves run low, production, transport and essential services become more vulnerable.

The Blue Deal in Flanders combines reduced water demand with better retention, infiltration and storage: using less water comes first; retaining helps reserves last longer. Decisions should consider how much usable water can be retained, how long it can sustain essential functions and how quickly reserves can recover.

Different uses require different, sometimes conflicting water levels. Retaining water upstream can reduce flows needed downstream, including those that help limit salinity. A full reservoir provides a drought reserve but leaves less room to buffer heavy rainfall.

Understanding these trade-offs helps determine where water can be retained, when it should be released and how storage can be managed as conditions change.

The ambition is to move from providing storage to securing dependable availability.



DIRECTION 1 CASE

Turning a sand quarry into a strategic water buffer



Give existing industrial infrastructure an additional water buffering role, within clear operating limits. Seasonal storage must remain compatible with on-site operations, surrounding land uses and downstream water needs.

The Campine region in Flanders holds high-purity silica sand, a valuable resource for industries such as glass manufacturing. Sibelco, a global producer and supplier of industrial minerals headquartered in Antwerp, extracts sand in the region. Decades of sand extraction have created large quarry lakes which are hydrologically connected to the groundwater system. These lakes offer an opportunity to give industrial sites an additional role: retaining water for dry periods.

Sibelco's active sand quarry in Mol provides a concrete setting to explore this potential [3]. Previously, a fixed overflow maintained the lake at a constant water level, continuously feeding groundwater to a small river downstream. Allowing the lake level to rise could create additional water storage capacity, but must not cause waterlogging on agricultural land nearby, compromise safe quarry operations or leave insufficient water for the river downstream.

How can an active, privately owned sand quarry retain water for dry periods and support rivers downstream, while safeguarding sand extraction activities, groundwater conditions and nearby land uses?



A regional public-private partnership was established to demonstrate flexible water-level management at Sibelco's quarry in Mol. Hydrological analysis informed the design, operating limits and responsibilities [4].

A remotely controlled tilting weir replaced the quarry's fixed overflow, allowing the lake level and releases to the river downstream to be adjusted as conditions change. The potential for additional water storage amounts up to 190,000 m³, within operating limits set to prevent waterlogging on nearby agricultural land and safeguard quarry operations. The actual volume stored depends on rainfall, evaporation and groundwater inflow. During a dry period, with low river levels, a controlled release of 100-150 m³ per hour from the quarry lake helped raise the downstream river level above its minimum target.

From demonstration to deployment

The Province of Antwerp's Integrated Water Policy Service manages the weir, with the aim of supporting the river's baseflow. Sibelco provides access to the active quarry and its infrastructure while VITO contributes water system expertise, real-time monitoring and hydrological analysis. Continued monitoring will help refine the operating regime, balancing water storage with different stakeholder needs.

Beyond Mol, opportunities for wider deployment are being explored across Flanders: 44 existing lakes were mapped and analysed for their water storage potential. The analysis estimated a combined potential of 3-5 million m³ and identified promising sites for further hydro-logical and technical assessment.



"The constructed adjustable weir at the quarry in Mol is a striking example of innovation. It is a practical response to the challenges of climate adaptation. It allows us to capture and store water during wet periods and make it available again during dry spells. This water can then serve multiple purposes, from agricultural irrigation and maintaining flows in ecologically valuable watercourses to supplying water for industrial use."

Bart Daems - Sustainability Director, Sibelco

DIRECTION 1 CASE

Strengthening water retention in soils and the subsurface

Fruit and vegetable cultivation is an important economic asset for Flanders, both for domestic and export markets. Farmers depend on productive soils and reliable water availability. With competing demands for land from housing, industry, infra-structure and nature, strengthening water retention means making better use of agricultural land while keeping it productive. The different soil layers are part of this natural water infrastructure: soils hold water that crops can draw on, while infiltration can also help replenish groundwater reserves.

Field measures can slow surface runoff and give rainfall more time to infiltrate, while also increasing soil water availability to crops. Managed aquifer recharge (MAR) offers a complementary approach to replenish groundwater reserves. Choosing where and how to apply different measures requires understanding soil infiltration capacity, farming practices and water needs, alongside the effects on neighbouring land and downstream users.



A sloping strawberry field in the province of Limburg, with small soil barriers (micro dams) that slow surface runoff (© pcfruit).

How can we retain more water in soils and replenish groundwater to support farming and nature, without creating problems for other water users?

Giving rainfall more time to infiltrate

In Haspengouw, a fruit-growing region in Flanders, sloping terrain and relatively heavy soils make managing surface runoff particularly important [3]. The research centre for fruit growing, pcfruit, demonstrated two practical measures: shallow furrows along orchard tree rows and small soil barriers, known as micro dams, across strawberry picking paths [3]. Both slow down runoff, giving rainfall more time to soak into the soil. During heavy rainstorms, approximately **60% less surface runoff** was recorded in the orchard strip with furrows than in the strip without them. Their effectiveness depends on local soils, slope and cultivation practices. Technical factsheets, site-specific advice and equipment loans help growers put these approaches into practice.

Make water retention part of productive land management. Practical support helps farmers adopt field measures, while monitoring and modelling guide where targeted groundwater recharge can complement them.

Assessing where groundwater recharge can work

Alongside measures that retain rainfall on fields, managed aquifer recharge deliberately replenishes underground water reserves under controlled conditions. Its suitability depends on local geology, groundwater conditions and the quality of the water used. The Flemish Doorgrondkaart [5] maps opportunities for increased infiltration and replenishment of the phreatic groundwater layer using spatial information on soils, groundwater and topography.

In the Campine region, pilot tests explore how controlled drainage can retain water and how subirrigation can supply water to the subsurface [3]. Groundwater levels and water flows are monitored and combined with modelling to assess the potential contribution to regional water availability. Water quality is another key consideration: source water needs to be carefully monitored against appropriate safety thresholds and, where necessary, treated before infiltration to protect soil and groundwater. At the Mol-Postel pilot, nature-based treatment using aerated wetlands is being tested as a pretreatment step before managed aquifer recharge.

"As fruit growers, we want our trees to feel good. Encouraging rich soil life and managing water in a climate-resilient way are essential to that. After all, someone who feels good performs better than someone who drags themselves to work, don't they?"

Karel Vaes - fruit grower, Borgloon



DIRECTION 2

Collective water reuse

From individual investments to connected water flows, shared infrastructure and clear agreements.

Water that is unused by one actor can become a resource for another. This direction brings together shared use of collected rainwater and reuse of treated wastewater, examining when collective collection, treatment, storage and distribution offer a reliable and affordable alternative to individual systems. This requires matching water supply and demand in terms of quality and quantity, and coordinating investment and operation across company boundaries.

Which water flows and needs can be connected?

The starting point is to reduce water needs, then match the remaining demand with suitable sources. One company may have treated wastewater available, while a neighbouring business needs process water. Large roofs may collect rainfall that could supply nearby users. Identifying these opportunities requires companies to share information on volumes and quality throughout the year.

But a promising match on paper needs to work in practice too. Distance, treatment, pumping, storage and backup requirements determine whether the connection is reliable and affordable. The assessment must account for drought, planned maintenance, incidents and unexpected shutdowns at the supplying company, as well as effects on the wider water system.

Which wider benefits can make the investment worthwhile?

The value of cooperation extends beyond the price of water. Shared facilities can avoid separate investments and make better use of limited space. Connecting water investments with heat recovery, redevelopment or planned infrastructure replacement may create further value. The task is to identify where a combined approach meets several needs at a lower cost overall. This requires assessing who benefits, which costs are avoided, and how these benefits and savings can help finance the investment.

How can costs, responsibilities and risks be shared?

Lasting cooperation depends on clear commitments. Who owns and operates the infrastructure? Who is responsible for water quality, supply continuity and backup? What happens if demand changes or a participant leaves? Agreements on investment, price setting, maintenance and liability must make participation worthwhile and distribute costs and risks fairly.





2

DIRECTION 2 CASE

Deploying rainwater networks in industrial zones

Flanders has almost 48,000 hectares designated for business parks. Roofs, roads and car parks generate substantial rainwater runoff, while businesses need reliable water sources. Connecting these flows with nearby demand creates opportunities for collaboration across property boundaries.

Flanders' regional rainwater regulations [6] require construction projects covered by the regulations to include rainwater use, infiltration and buffering measures. These obligations create an opportunity to consider shared infrastructure beyond measures on individual plots.

When can investments in collective rainwater infrastructure offer businesses a better alternative to separate systems on individual plots?

Connect planned infrastructure works with the water needs of local companies. A shared supply becomes an investment option when its costs, benefits and management arrangements compare favourably to individual alternatives.

At a demonstration site in a Flemish business park (Tielt Noord) a planned bicycle path project created an opportunity to combine roadworks with the installation of a stormwater sewer designed for smart rainwater storage [3]. Weather-based control manages temporary rainwater storage, while a pressurised pipeline supplies rainwater to nearby users. The network makes an average of **20,000 m³ of rainwater available each year.**

Aquafin, the Flemish wastewater treatment and sewer management company, implemented the system and signed agreements with participating businesses covering rainwater supply and the associated user fees.

Whether a shared network offers a better alternative to individual systems depends on both **economics and organisation**. To support this assessment, VITO combined cost-benefit analyses with a data dashboard drawing on several Flemish reference cases [7]. Making costs, benefits, risks and management responsibilities transparent helps businesses and public partners assess whether investing together offers more value than separate systems.



"Clear agreements on water offtake, costs and management provide the basis for a local water source. A workable pricing model can help make similar projects feasible elsewhere."

Marjolein Weemaes - Director of Operations, Aquafin



DIRECTION 2 CASE

Demonstrating collective industrial wastewater reuse

The Flemish chemical sector consumes over 100 billion m³ water per year [2], reuse scenario's correspond to a saving potential of over 20 billion m³ water per year.

In the chemical cluster of the Port of Antwerp-Bruges, large process water needs coexist with substantial flows of treated wastewater. The proximity of chemical plants and refineries creates opportunities for effluent reuse between companies, where individual solutions face possible technical or economic limits.



How can companies jointly treat and reuse wastewater as process water, with reliable operations, effective management of residual discharges and a viable shared business model?

Test shared treatment under real industrial conditions to inform future investment decisions.

Different companies, one real-world test

A joint demonstration [8] tests the feasibility of shared industrial water reuse in the Port of Antwerp-Bruges. Wastewater from five chemical companies was brought together at the TotalEnergies refinery. A modular pilot installation treats 1.5 m³ per hour, allowing the partners to assess whether different industrial wastewater streams can be turned into a reliable alternative source of process water.

Testing the full water chain

The pilot combines storage and mixing, multimedia filtration, ultrafiltration and reverse osmosis. Its modular design allows different treatment configurations to be tested under real industrial conditions. The project also examines the concentrate stream and the additional treatment needed before discharge.

Bringing industrial, technical and regulatory expertise together

TotalEnergies hosts the pilot at an operational refinery, while the participating companies provide wastewater, process data and practical expertise. Port of Antwerp-Bruges and the chemical sector federation essenscia bring the companies together. VITO evaluates the treatment performance and scale-up potential; Antea Group supports the network and feasibility analysis; and the Flemish Environment Agency (VMM) contributes expertise on environmental and regulatory conditions.

From pilot to shared infrastructure

Pilot results and feasibility analysis will inform decisions on participating companies, treatment locations, pipeline routes and environmental performance. A viable network also requires agreements on costs, risks, operating responsibilities and water offtake. Together with project partners and participating chemical companies, VITO explores different business and financing models for the shared infrastructure and operation.

The demonstration project does not yet represent a full-scale network or realised water savings; it builds the evidence and partnerships needed to make that next step possible.



"It is unique to work with so many different companies on one major project. Reusing wastewater in industry and reducing pressure on the drinking-water system benefits everyone."

Tomas Thiels - Senior Project Manager Sustainable Transition, Port of Antwerp-Bruges

DIRECTION 3

Grip on pollution

From isolated measures to a coordinated approach linking prevention, treatment, reuse and downstream effects.

Pollutants in surface water, groundwater and wastewater increasingly constrain how water can be used. Where environmental quality limits are approached or exceeded, there is little room for additional emissions.

A healthy water environment is both an ecological objective and a strategic economic asset. The ability to discharge within permitted limits has tangible value for business continuity and a company's licence to operate. Heavily polluted water systems can make business operations more difficult, risky and costly. Restoring and protecting water quality therefore not only supports human health and ecosystems, but also long-term economic viability.

Yet pollution management is still too often centred on end-of-pipe treatment. Treatment remains essential but cannot provide a lasting answer while avoidable contamination continues upstream. Simultaneously, treatment can consume substantial energy and materials or simply transfer pollutants to sludge and concentrates.

A value-chain approach connects action on historical contamination with reducing emissions from substances already in use and designing safer alternatives for the future. It involves three complementary priorities:

— **Cleaning up the past:** addressing historical contamination, determining what "clean enough" means and scaling up effective remediation solutions. Monitoring helps to determine whether risks are reduced and improvements are maintained.

— **Reducing life-cycle risks:** tackling emissions from substances and products already in use. This starts with understanding which substances enter processes, where they are released and which sources contribute most to environmental and health risks.

— Designing safer substances and products: **integrating safety and sustainability into the design** of future chemicals, materials and products. Safe and Sustainable by Design [9] helps identify potential risks early, compare alternatives and avoid replacing one problem with another.

Across Flanders, partners are developing these approaches together [10]. Restoring water quality, reducing current risks and designing safer alternatives support a licence to operate, licence to invest and ultimately a **licence to lead**.



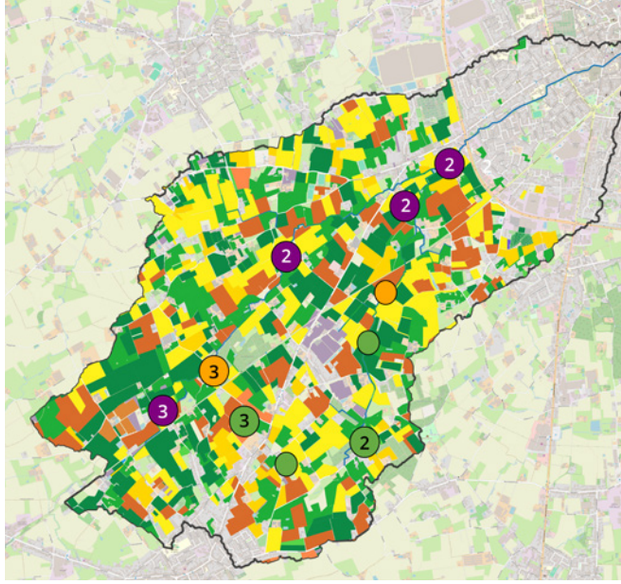


3

DIRECTION 3 CASE

Connecting river basin management with local pollution control

Use shared evidence to connect pollution control with practical farming and industrial decisions. Assess local measures against river-basin objectives so that economic activity and water-quality protection are considered together.



In the Leie-Mandel catchment in West Flanders, low river flows compound water-quality pressures from nutrients, crop protection products, historical pollution and industrial discharges. Pollution upstream can constrain ecosystems and water use downstream.

The EU Water Framework Directive [11] provides a framework for managing water at river basin scale. The practical challenge is to **translate river basin objectives into decisions** at individual sources and sites. This requires understanding where pollution originates, how it reaches the water and which combination of prevention, process changes, treatment or discharge management can reduce its effects.



How can shared evidence guide coordinated action targeting pollution sources to meet river basin water quality objectives, while safeguarding water availability and economic activity?

In Leie-Mandel, initiatives combine sensor data with local knowledge to guide measures addressing agricultural pollution and industrial water use. With inflows from France and a downstream connection to the Scheldt, the catchment links these local choices to a wider, cross-border water system.

Farmers, water managers, researchers and public authorities in France, Wallonia and Flanders collaborate to reduce agricultural water pollution. Water quality monitoring, spatial tools and local know-how help them trace how nutrients and crop protection products reach watercourses, identify feasible preventive measures and coordinate action across the catchment [12]. VITO's WaterProtect tool [14], for example, combines monitoring with spatial data to map potential pathways through which nutrients and crop protection products reach surface water.



"Agriculture, industry, households and nature depend on the same water. We therefore need to assess measures not only by their local effects, but also by what they mean downstream. Shared monitoring data help us make those choices together."

Bart Naeyaert - Provincial Deputy, Province of West Flanders

Real-time sensors, targeted sampling and company data reveal how industrial water abstraction and discharge affect river flow and water quality. By linking operational data with the conditions in the river, critical situations can be anticipated and informed decisions on water use and discharge can be made. This shared evidence helps ensure that industrial activity and future development remain compatible with the river's environmental limits [13, 14].

From monitoring to coordinated choices

Monitoring alone does not determine which measures will work. Farmers, companies and local organisations contribute practical knowledge and perspectives; researchers, water managers and public authorities connect these insights to the wider water system. Jointly defining monitoring needs and reviewing measures helps identify constraints, improve feasibility and build support for river-basin objectives.

In 2026, the Province of West Flanders received the Water-Smart River Basin Award at the Water Europe Innovation Awards for its integrated and innovative approach to water management in the Leie-Mandel river basin.

DIRECTION 3 CASE

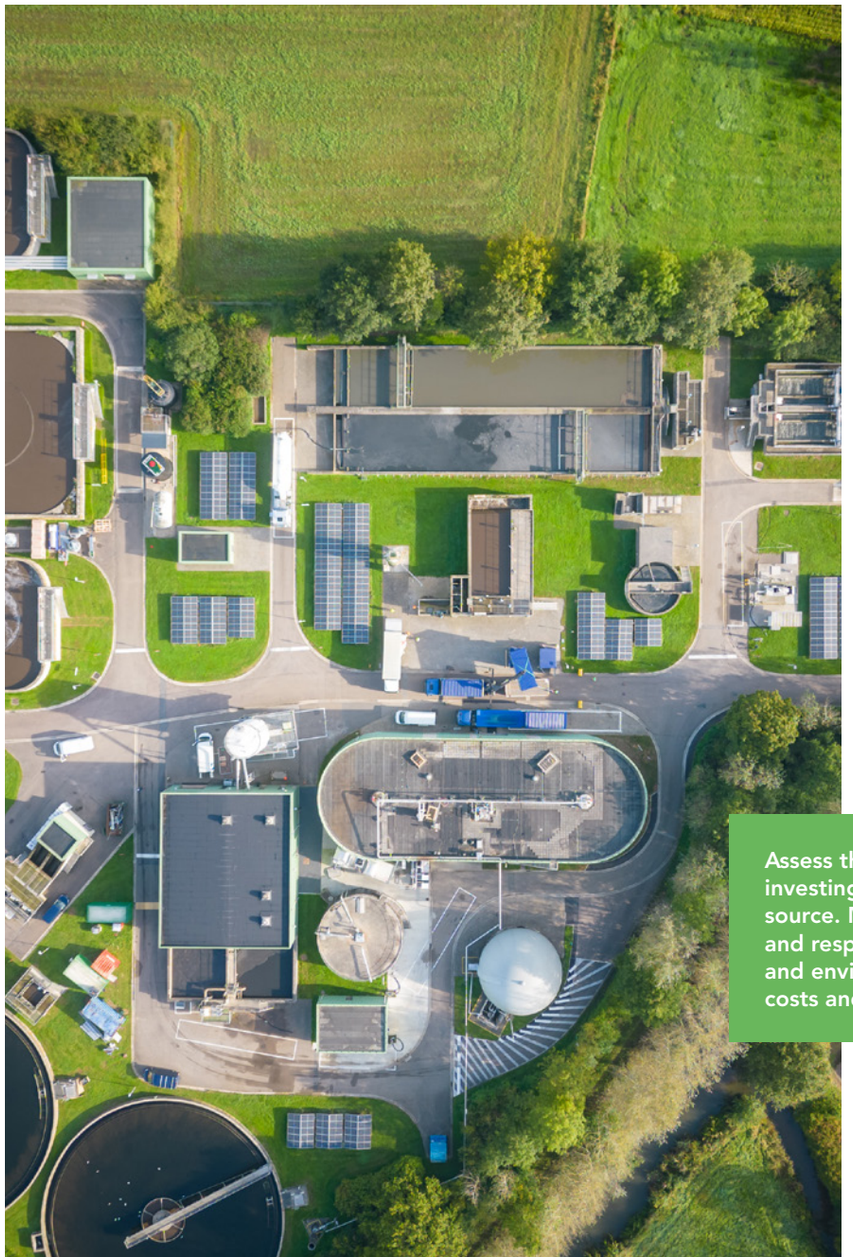
Tuning wastewater treatment to match quality for reuse

Treated municipal wastewater offers a potential alternative for irrigation, industrial processes and other non-potable uses. Existing infrastructure provides a starting point, but additional treatment may be needed to meet users' needs.

Beyond connecting supply and demand, water reuse requires matching water quality to the intended application without spreading contaminants into soils, groundwater, surface water or the food chain. Even after treatment, wastewater can contain nutrients, salts, pathogens and micropollutants. Risks depend on the full reuse system, including treatment, storage, distribution and application.

For irrigation, the European Water Reuse Regulation [15] and the Flemish framework for reclaimed water [16] require a risk-based approach, with preventive measures, monitoring and clear responsibilities between producer, supplier and user.

How can treated municipal wastewater become a reliable water source for agriculture and industry while managing risks to people and the environment?



Testing additional treatment for fruit crop irrigation.

At a municipal wastewater treatment plant in Hasselt, in the Flemish province of Limburg, a pilot tested additional treatment for irrigating fruit crops [3]. Source water monitoring and a preliminary risk assessment guided technology selection. Seasonal and rainfall variations highlighted the need to assess water quality specifically for the intended use.

Five automated, modular units enabled trials of multimedia and activated carbon filtration with UV disinfection, direct nanofiltration, and ultrafiltration followed by reverse osmosis. The trials identified promising options, with performance varying by substance and operating conditions. Longer-term testing and validation remain necessary; pilot results alone cannot verify that the complete reuse system is safe or authorised.

Risk assessment must cover production, storage, distribution and application, with clear responsibilities and monitoring before and during use. Environmental monitoring can help assess effects on soil and receiving waters. Together, these requirements help inform a site- and use-specific reuse plan.

Assess the full reuse system before investing in a non-conventional water source. Match treatment, monitoring and responsibilities to users' needs and environmental risks, alongside costs and operational requirements.

Chemical evidence for treatment choices

Choosing a treatment starts with understanding the contamination. Other projects illustrate the same approach in different contexts. VITO and the Flemish Environment Agency (VMM) use advanced analysis to identify environmental PFAS fingerprints. Separate projects test PFAS removal, including membranes and regenerable ion exchange for industrial laundry wastewater [17, 18]. These initiatives are distinct from the Hasselt pilot, but underline a common principle: combine chemical analysis with treatment testing to support technology and investment choices.



"Targeted action on pollution starts with understanding which substances are present, where they come from and how they spread. That evidence allows us to target remediation where it can make the greatest difference, while avoiding solutions that simply shift the problem elsewhere."

Leen Bastiaens - Manager, KIS – Knowledge centre Innovative remediation Solutions

DIRECTION 4

People-centred approach

From reactive responses to proactive decisions and coordinated action.

A resilient water system depends on people who understand the challenges, see how they can contribute and have the knowledge and means to act. Involving local actors from the outset helps turn water concerns into practical action before shortages, flooding or conflicts force decisions. This people-centred approach helps put water retention, collective reuse and pollution management into practice.

Building a shared understanding

Monitoring, maps and models provide a starting point for discussion, while local knowledge helps interpret these insights and test them against conditions on the ground. Exploring different scenarios then helps partners understand who may be affected as conditions change, how impacts can spread and where action is most needed.

From understanding to informed action

Partners can then explore solutions and recognise what participation means for them. Making benefits, burdens and trade-offs explicit helps identify opportunities to combine measures and agree on fair contributions. Knowledge and practical support also matter: advice, demonstrations, peer learning and training help local actors choose and apply suitable measures.

Organising cooperation that delivers

Turning individual willingness into coordinated action requires a clear way of working. Who coordinates, who decides, who pays, and who implements and maintains the measures? Those expected to provide land, change practices, invest or maintain infrastructure need a voice in shaping the solution and clarity about their role. Agreements on responsibilities, financing and review provide the basis for action, while monitoring helps partners assess results and adjust where needed.

The **Local Blue Deals** [19] illustrate this approach in practice. The programme brings together more than 200 partners around area visions and action plans, supported by the Flemish land and environment agencies VLM and VMM through scientific knowledge, guidance and exchange of experience between areas.

04
PEOPLE-CENTRED APPROACH



4

DIRECTION 4 CASE

Aligning perspectives for impactful water decisions

Interactive experiences, maps and systems-thinking activities help people explore different perspectives, understand local opportunities and make informed water choices.



Invest in accessible tools, learning opportunities and facilitation that help people understand water challenges, explore different perspectives and make informed choices.

Explore perspectives and solutions through interactive discussions

An interactive exhibition housed in an experience container introduces visitors to blue-green measures and collective water reuse through a fictional story told from the perspectives of farmers, researchers, industry and policymakers [3]. It also provides a setting for discussion and co-creation with local stakeholders, helping participants explore how different perspectives shape water choices.



Build understanding and skills through systems thinking

Systems thinking helps uncover the underlying causes of complex water challenges. As an example, the Flemish water transition arena [20] brought together people from engineering, history, business, philosophy, economics and civil society to build a shared understanding and develop directions for change, known as *doordrijvers*. The term refers both to ideas that drive change and to people willing to put them into practice. Inspiring communication activities brought these perspectives into the wider debate.

Dedicated training materials help stakeholders and decision-makers apply systems thinking to water challenges [21, 22].



Sharing and valorising knowledge

VITO Kennispunt Water facilitates interaction with stakeholders and captures the needs of individual companies and sectors. Waterinnovators build on these insights, making knowledge accessible and actionable through guidance documents, thematic events and first-line advice. Matchmaking activities help companies take the next step by connecting them with suitable partners and financing opportunities.



Engage young people in caring for water

Engaging young people requires formats that connect water challenges to their interests and experiences. At the Love Tomorrow conference, age-appropriate interactive activities use the accessible setting of a festival to spark curiosity and conversation about water, linking it to everyday life and wider societal challenges.

DIRECTION 4 CASE

Organising cooperation for local water action



"The future of an industrial zone cannot be planned plot by plot. We need to bring companies and public partners together early, so that individual investment decisions leave room for shared water solutions."

Jurgen Bonte - Head of the unit 'Bedrijventerreinen van de toekomst', POM West Flanders



"A water coalition proves its value long before the next drought or flood: by keeping partners committed, making difficult choices together and preparing measures in time. "

Cathy Berx - Governor of the Province of Antwerp

Turning shared water goals into practical measures requires sustained coordination. Regional organisations and public authorities can help partners align priorities, connect knowledge and resources, and prepare implementation. The following examples show how this takes shape in industrial zones, catchments and rural landscapes.

Future-ready industrial zones in West Flanders

Pressure on open space in Flanders calls for a coordinated approach to developing sustainable industrial zones. In the province of West Flanders, the Provincial Development Company (POM West-Vlaanderen) coordinates the 'Bedrijventerreinen van de Toekomst' programme (Future-ready industrial zones). POM supports partners in developing transition plans and investment pathways that connect water, energy, mobility, ecology and land use. This helps align collective water measures with planned infrastructure renewal and other investments, while identifying funding opportunities for measures that address drought and heavy rainfall.

Aligning water action in the Kleine Nete catchment

Strategic projects in the Kleine Nete valley connect water management, nature restoration, agriculture and spatial planning to build a climate-resilient landscape. The Governor of Antwerp facilitates coordination, bringing Flemish agencies, municipalities and local stakeholders together to align priorities and measures. The Province of Antwerp contributes water management expertise and implements stream restoration and water retention measures.

Within this framework, the Local Blue Deal coalition for the upper Kleine Nete and Wamp is preparing an action plan to retain more water in soils, farmland and wetlands to reduce drought and downstream flood risks [19]. KlimaatPlassen, part of Vlaanderen WaterProof [3], complements this work by exploring the water-buffering role of quarry lakes in the Campine region.



Invest in sustained coordination, not only shared plans. Build on existing partnerships and connect local knowledge with expertise, funding and clear responsibilities to prepare and deliver water measures.



"Working with landowners has made river restoration possible in Herk and Mombeek. Seeing these measures on the ground has encouraged other land-owners to consider similar work on their own land."

Jan Vanvelk - Herk and Mombeek Living Lab, Demer River Basin Coordinator

Strengthening a local water coalition in Herk and Mombeek

In the Herk and Mombeek valleys, the regional landscape and Demer River Basin organisations help strengthen long-standing cooperation between local authorities, farmers, landowners, nature organisations and water managers. The Flemish Water+Land+Schap programme [23] supports this cooperation with expertise, funding and guidance. Within this partnership, Living Lab Herk and Mombeek [24] brings hydrological modelling and local knowledge together to develop shared water goals and a sponge landscape action plan: coordinated measures to retain more water on farmland, along streams and in valleys. Findings from Vlaanderen WaterProof [3] informed the plan.

Selected as a frontrunner under Flanders' Local Blue Deals programme, the coalition will receive additional guidance and resources to turn shared water ambitions into coordinated action.

Future directions
Scaling for impact

Ripple effects in our economy and society

The leading examples in this roadbook demonstrate how partners across Flanders are putting water resilience into practice. Some solutions are already in operation; others are being tested to understand what they could deliver. Building on this experience is essential to reach more businesses, communities and ecosystems.

Ripple effect

Water resilience is an economy-wide concern. Disruptions can spread through production, supply chains and investment decisions. Assessing these wider effects reveals benefits beyond the direct water user and helps identify who gains from resilience investments and how costs might be shared.

At EU level, the Water Framework Directive is in place. The investment gap for implementing water legislation is estimated at around €23 billion per year or 0.1% of EU GDP [25]. That figure is expected to grow further, considering climate mitigation and the PFAS crisis. The incentive for private investment is low since the market price of water does not reflect its real value. To implement new business models, we need to apply correct valuation methodologies to establish who is benefitting and who can bear the costs.

Water challenges are growing, and so is the need for investment.





Scaling strategies

Scaling means creating the conditions for promising solutions to be adopted, financed and managed over time, not simply building larger installations or repeating pilots. **Scaling up** strengthens infrastructure, digital capabilities and skills to develop and deliver solutions. **Scaling out** connects innovation ecosystems and brings knowledge and experience to new users, regions and markets, adapting solutions to local needs. **Scaling across** links water innovation with wider societal challenges, including energy, climate and land use.

Scaling up

Adding resources by investing in infrastructure and people

Investing in physical and digital infrastructure

Technological infrastructure is the cornerstone of the test-to-invest approach. Having access to pilot equipment to generate case-specific performance metrics reduces uncertainty before companies commit to full-scale implementation. VITO's new water infrastructure at Ostend Science Park brings laboratories, a flexible pilot hall and mobile treatment units together in one open-innovation environment. Across Flanders, large-scale demonstrations of engineered and nature-based solutions are set up to test new technologies and validate their impact [24].

Monitoring infrastructure and analytics across scales, from advanced chemical analysis and sensor networks to earth observation, provide the data needed to understand changing water systems. Long-term monitoring, trusted datasets and reproducible modelling workflows underpin a data-to-decision approach supporting forecasting, digital twins and AI-supported water decisions.

Investing in people

Scaling requires domain expertise, technical skills and the ability to work across disciplines. Living labs build these capabilities through practical collaboration around local needs, demonstration sites and financing strategies. By cooperating, laboratories and knowledge partners can align research priorities, share facilities and make better use of available expertise.

Scaling out

Making transboundary connections for efficient use of resources

Connecting freshwater and the blue economy

Water challenges extend from **source to sea**. Freshwater availability and quality affect ports, coastal ecosystems and maritime activities. Connecting innovation expertise from source to sea helps address these interdependencies. VITO and the Blue Cluster are building a shared strategy, while **EIT Water** [26] gains momentum to strengthen skills, entrepreneurship and innovation. Its Regional Hub West, coordinated by Blue Cluster, connects Belgium, France, the Netherlands and Luxembourg.

Connecting international ambition to local implementation

Water does not stop at the border of Flanders, and neither should innovation. **Transboundary cooperation** is an essential and integral part of water resilience. Cross-border organisations such as North Sea Port and interregional demonstration projects such as Eau Secours and CARE+ [12, 13] connect Flanders with neighbouring regions around shared water challenges.

Efforts to strengthen water resilience in Flanders and Europe aim to **(imp)act globally**. Scaling out means adapting knowledge and approaches to different contexts. Projects such as Capitan Taki [27] and Pavitra Ganga [28] demonstrate how Flemish and European expertise can be adapted internationally, from water-quality monitoring to wastewater reuse. This exchange works both ways: experience from Flanders supports solutions abroad, while international lessons help strengthen water resilience at home.

Fluid Crew [29] brings Flemish public and private water actors together for international activities and gives their combined expertise a shared profile. Facilitated by VITO Kennispunt Water, the network collaborates with Flanders Investment & Trade on international cooperation and market development.



"Protecting our water systems and growing the blue economy are not competing ambitions. By connecting freshwater, marine and maritime expertise, we can turn shared challenges into new value chains, stronger companies and scalable solutions for Europe."

Piet Opstaele - CEO, Blue Cluster



"Flanders combines water technology with a strong culture of collaboration and real-world demonstration. Fluid Crew creates international visibility for that integrated expertise and it supports Flemish companies in turning their know-how into partnerships and market opportunities."

Piet Demunter - CEO, Flanders Investment and Trade



"Scaling for impact is part of VITO's DNA. Our mission-driven approach represents a long-term ambition to tackle complex societal challenges. It is our role as an RTO to connect knowledge, technology and innovation ecosystems to realise the needed systemic change."

Inge Neven - CEO, VITO

Scaling across

Breaking silos to accelerate societal transitions

Pathways for water, energy and digital transitions

Water is a strategic asset and is considered **critical infrastructure**. Energy production depends on water, water services need energy, and digital systems create both new demands and opportunities for smarter management. Connecting these systems helps anticipate vulnerabilities and use data and AI to inform operational and investment decisions.

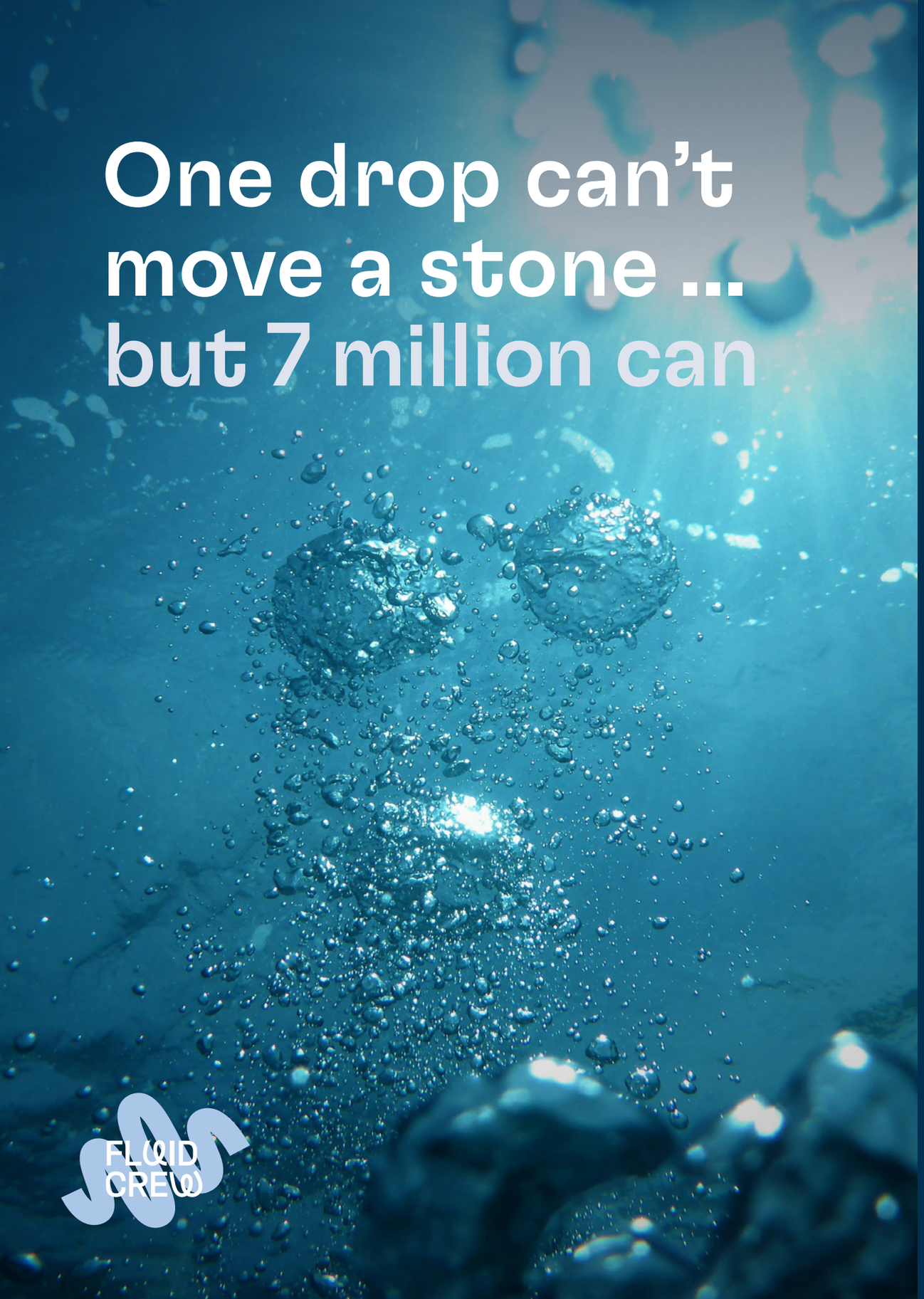
Investment pathways must leave room to adapt: act where it makes sense now, prepare future options and define when to take the next step. Planned infrastructure renewal and redevelopment offer opportunities to integrate water measures, backed by clear responsibilities, financing, permits and monitoring.

Missions addressing societal transitions

Water resilience needs an innovation ecosystem around water, not just a water innovation ecosystem. Decisions on industrial production, energy, land use, materials and the built environment all shape water demand, availability and quality. VITO's mission-driven partnerships illustrate these connections. In **circular port regions**, water reuse is considered alongside material recovery and energy flows. In **fossil-free, climate-resilient neighbourhoods**, water management is integrated with energy systems, renovation and public space to create healthy, climate resilient places to live. The mission **carefree living environment** connects water quality with pollution prevention, safer substances and sustainable economic activity (licence to operate). And the mission on **regenerative land use** connects water management with competing land needs for agriculture, nature, business and housing.

Investing across these transitions can deliver **co-benefits**: lower freshwater demand, less pollution and stronger water retention. Realising them means aligning technology, knowledge, financing and governance through cooperation between business, government, research and society.

One drop can't move a stone ... but 7 million can



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How can investment in water resilience help secure our economic future? Across Flanders, partners are already putting new approaches into practice. This innovation roadbook explores four complementary directions for investment: strategic water retention, collective water reuse, grip on pollution and a people-centred approach. Through practical cases, it shows what is already being achieved, what is still being tested and how ongoing initiatives can be taken further. It offers lessons and inspiration for stakeholders everywhere to make informed decisions and invest in a water-resilient economy.

Water always finds a way. So do we!

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