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Territorial Impact Assessment

European

Water Resilience Strategy

Staff working document



**European Committee
of the Regions**

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TIA REPORT //

European Water Resilience Strategy

Territorial Impact Assessment Workshop

Final report // January 2026

Disclaimer

This territorial impact assessment report is the outcome of an expert workshop held by the European Committee of the Regions and ESPON EGTC on a hypothetical scenario of what the European Water Resilience Strategy could entail.

This report was produced by the secretariat-general of the European Committee of the Regions (CoR) in order to assist co-rapporteurs Kata Tüttö, president of the CoR and member of the General Assembly of Budapest Capital, and Juanma Moreno, 1st vice-president of the CoR and president of Andalucía, in drawing up their opinion on this topic. This report will be shared with the European Commission, the European Parliament and the Council of the European Union.

This report, including the maps, represent the views and experiences of the workshop participants. It is intended solely to support a decision-making process and therefore does not necessarily reflect the opinion of CoR members, nor that of the ESPON 2030 Monitoring Committee. The findings of this report are not binding on the CoR and do not prejudice the final content of its opinions.

Authors

Erich Dallhammer, Roland Gaugitsch, Chien-Hui Hsiung, Michelle Wiest (ÖIR GmbH, Austria)

Florence Thomé, Marta Mansanet Cánovas (European Committee of the Regions)

Acknowledgements

Zintis Hermansons (ESPO EGTC)

Workshop participants

Speakers:

Luca Perez European Commission – DG ENV

Loïc Charpentier Water Europe

Experts:

Gerardo Anzaldúa Ecologic Institute

Manuel Boluda Fernandez General Directorate of Water Murcia, Region of Murcia

Fabio Carella Università Iuav di Venezia (Brussels)

Gábor Dóka Kalocsa Town Municipality

Athénaïs Georges European Environmental Bureau (EEB)

Enora Keromnes Regional Council of Brittany

Vanesa Mateo Pérez Government of the Principality of Asturias

Jordi Molist Gazapo Catalan Water Agency

Gábor Molnár Lake Balaton region

António Monteiro S317 Consulting, SA

Maroš Nikolaj Cluster Envirocentrum Banská Štiavnica

Francesca Pizza MM SpA

Ruben Sansom City of The Hague

Guillermo Zaragoza Plataforma Solar de Almería

Evžen Zeman Global Change Research Institute of the Czech Academy of Sciences – Czech Globe

Facilitators:

Erich Dallhammer ÖIR GmbH

Roland Gaugitsch ÖIR GmbH

Michelle Wiest ÖIR GmbH

Florence Thomé European Committee of the Regions – COTER secretariat

Table of contents

1	Introduction	4
1.1	Context.....	4
1.2	Political mandate	4
1.3	Past CoR work on this topic	5
1.4	The European dimension of water resilience	5
1.4.1	Renewable freshwater resources	5
1.4.2	Aridity index.....	8
1.4.3	Water abstraction by sector	9
1.4.4	Water abstraction for public water supply	10
1.4.5	Water Exploitation Index.....	11
1.4.6	Water prices	12
1.4.7	EU action through Cohesion Policy funds.....	13
2	Methodology: ESPON TIA Quick Check.....	15
2.1	Identifying the potential territorial effects considering economy, society, environment and governance related exposure fields – drafting a conceptual model.....	16
2.2	Depicting the potential territorial effects through relevant exposure fields	16
2.3	Judging the intensity of the potential effects.....	17
2.4	Calculating the potential ‘regional impact’ – Combining the expert judgement with regional sensitivity.....	17
3	Debate and qualitative analysis	19
3.1	Introductory remarks	19
3.2	Policy scenario recap.....	20
3.3	Discussion on effects.....	21
4	Potential territorial impact considering economic aspects.....	26
4.1	Water consumption	26
4.2	Industry workforce	28
4.3	High-technology manufacturing and services.....	31
4.4	Primary sector workforce	34
5	Potential territorial impact considering societal aspects	37
5.1	Water poverty.....	37
6	Potential territorial impact considering environmental aspects	41
6.1	Drought risk.....	41
6.2	Water use in agriculture.....	44
6.3	Satisfaction with water quality	47
7	Potential territorial impact considering governance aspects	50
7.1	Regional innovativeness.....	50
8	Conclusions and recommendations	54
8.1	Conclusions deriving from the territorial impact assessment.....	54
8.2	Recommendations.....	55
	Appendix: Description of the indicators used and regional sensitivity	60

1 Introduction

1.1 Context

The territorial impact assessment (TIA) of the European Water Resilience Strategy, conducted as input to this report, aims to support the drafting of the European Committee of the Regions' (CoR) opinion entitled '[Turning the tide – A local and regional roadmap for water resilience](#)', which is based on the European Commission's Communication on the European Water Resilience Strategy of 4 June 2025. The opinion is scheduled to be adopted at the CoR plenary session of 4-5 March 2026. The assessment focused on a key aspect of the strategy, namely the 'water efficiency first' principle introduced by the Commission's recommendation accompanying the strategy.

The main objective of the assessment is to identify territorial impacts within EU regions (at NUTS¹⁻³ level), where data availability allows. This includes mapping the socio-economic, environmental and governance benefits of the European Water Resilience Strategy. In doing so, the study aims to shed light on the necessary elements of any upcoming strategy as well as on potential territorial imbalances, in order that they can be counteracted. Furthermore, the report highlights, in particular, the data needs and potential, in order to be able to fully understand and address the problem from a territorial perspective.

1.2 Political mandate

Climate change is exacerbating floods and droughts and reducing water quality, posing an increasing threat to the economy and people's health. Water scarcity already affects more than 40% of the EU population and overexploitation of water resources and pollution threatens ecosystems and socio-economic sectors.

The European Water Resilience Strategy responds to this escalating crisis with a strong focus on **prevention, preparedness and sustainability** and places **water efficiency** at the centre of all decision-making processes. Water efficiency is therefore the focus of this TIA workshop.

The 'water efficiency first' principle requires Member States to prioritise demand reduction over the development of new water sources and infrastructure, and to act across the full water supply chain – storage, conveyance, use and reuse – supported by digitalisation, nature-based solutions, transparent governance and capacity building.

Local and regional authorities (LRAs) are critical to implementing the Water Resilience Strategy and operationalising the 'water efficiency first' principle. They manage or regulate water services, land use planning, local infrastructure and public awareness campaigns — all essential levers for fostering efficiency.

¹ '*Nomenclature des unités territoriales*' (common classification of territorial units for statistical purposes).

1.3 Past CoR work on this topic

In the recent past, the CoR has adopted the following opinions and published the following studies on water:

- › [Outlook opinion on the EU Oceans Pact](#) (2025)
- › [Creating an EU Blue deal from an agriculture and rural development perspective across EU Regions](#) (2024)
- › [Towards a resilient water management to fight climate crisis within an EU Blue Deal](#) (2024)
- › [Revision of the Urban Wastewater Treatment Directive](#) (2023)
- › [EU Action Plan: Towards Zero Pollution for Air, Water and Soil](#) (2021)
- › [Local and regional authorities protecting the marine environment](#) (2021)
- › [Fitness check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive](#) (2020)
- › Study on [Integrated water management and policy coherence in regions and cities](#) (2020)
- › [Proposal for a Regulation of the European Parliament and of the Council on minimum requirements for water reuse](#) (2018)
- › Study on [Water reuse: Legislative framework in EU regions](#) (2018)
- › [Quality of water intended for human consumption](#) (2018)
- › [Effective water management system: an approach to innovative solutions](#) (2017)

In addition, the CoR published a study on [Managing flood risks: how to build water resilience in local communities](#) in November 2025.

1.4 The European dimension of water resilience

Water management in Europe is largely a national and regional responsibility; however, there are wide variations between individual countries across numerous indicators. The following section provides a European dimension of water resilience based on indicators which could not be fully applied in the context of the TIA Quick Check, yet which shed important light on the topic.

1.4.1 Renewable freshwater resources

Renewable freshwater resources in Europe vary widely between countries. The largest freshwater resources are observed in northern and western Europe, notably in Sweden, Finland and France (albeit rating low on a per capita basis), while southern and central European countries generally record lower volumes. As an outlier at the upper end of the scale, Norway records over 381 000 million m³ of freshwater resources (and has also the highest per capita value, except for Iceland). At the other end of the scale, Malta and Cyprus show the lowest levels at 63 million m³ and 250 million m³ of resources, respectively, which also equate to very low per capita values.

Table 1.1: Renewable freshwater resources in m³ per capita, 1992-2022, by country

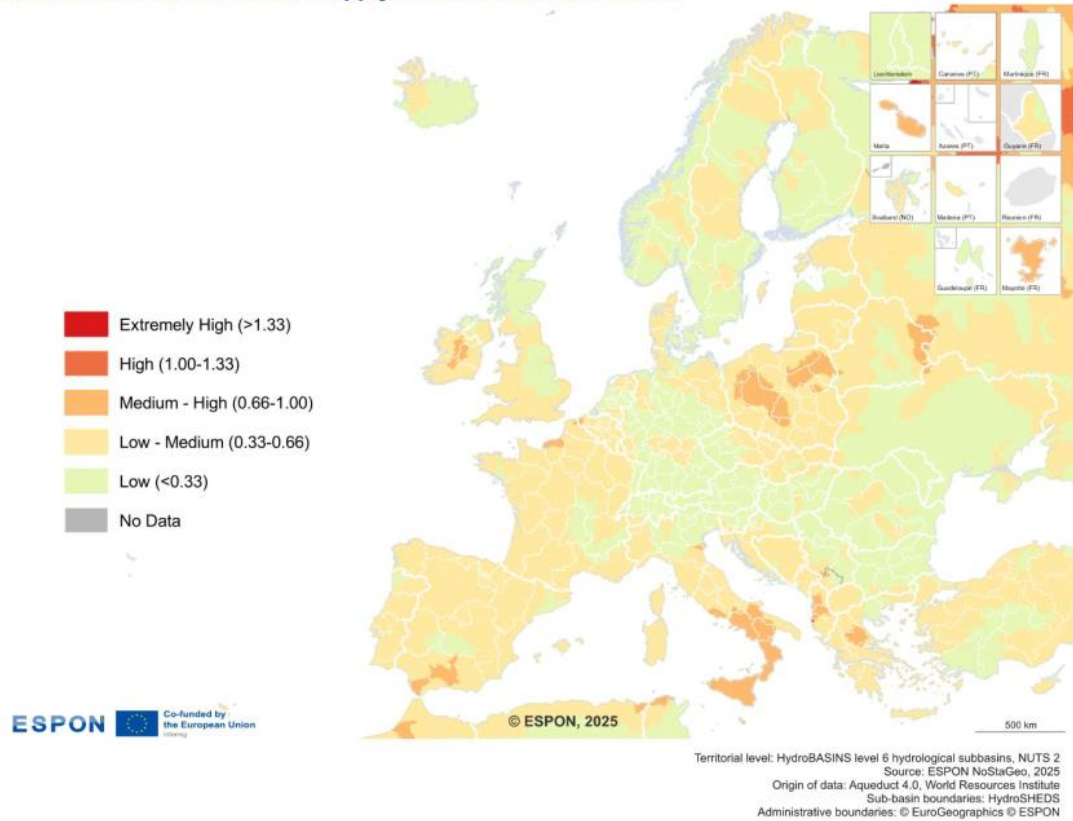
	1992	2002	2012	2022	Change 92-22
Luxembourg	2 549	2 241	1 883	1 531	60%
Cyprus	962	794	669	585	61%
Ireland	13 770	12 462	10 653	9 399	68%
Iceland	651 198	591 257	530 063	445 022	68%
Malta	137	127	120	95	69%
Switzerland	5 876	5 545	5 051	4 602	78%
Norway	89 119	84 175	76 117	70 000	79%
Spain	2 839	2 683	2 377	2 327	82%
Sweden	19 727	19 159	17 963	16 305	83%
France	3 398	3 235	3 046	2 938	86%
Netherlands	724	681	656	621	86%
Belgium	1 194	1 161	1 080	1 027	86%
Austria	7 014	6 805	6 524	6 082	87%
Denmark	1 160	1 116	1 073	1 016	88%
Finland	21 221	20 574	19 763	19 258	91%
EU	3 166	3 088	2 959	2 887	91%
Portugal	3 818	3 646	3 613	3 641	95%
Slovenia	9 351	9 360	9 075	8 839	95%
Germany	1 327	1 297	1 330	1 276	96%
Italy	3 213	3 196	3 032	3 092	96%
Czechia	1 273	1 289	1 251	1 232	97%
Slovakia	2 366	2 343	2 330	2 319	98%
Poland	1 397	1 402	1 408	1 455	104%
Hungary	578	590	604	624	108%
Estonia	8 290	9 214	9 609	9 422	114%
Croatia	8 238	8 763	8 849	9 777	119%
Romania	1 859	1 950	2 112	2 224	120%
Lithuania	4 178	4 490	5 172	5 459	131%
Bulgaria	2 458	2 679	2 874	3 248	132%
Latvia	6 479	7 332	8 327	9 013	139%

Source: [World Bank](#)

This table illustrates the evolution of renewable freshwater resources per capita between 1992 and 2022, as reported by the World Bank. Overall, freshwater resources per person across the

EU27 have declined by around 9% over the past 30 years (15% if Norway, Switzerland and Iceland are included). Declines in renewable freshwater resources were observed in 19 out of the 27 Member States. The most severe declines per capita occurred in Cyprus, Luxembourg, Malta, Spain and Sweden. On the other hand, notable increases were recorded in Bulgaria, Romania, Latvia, Lithuania and Croatia. Several other Member States show relatively stable trends, with only minor long-term fluctuations.

Seasonal variations in water supply at the level of sub-basins



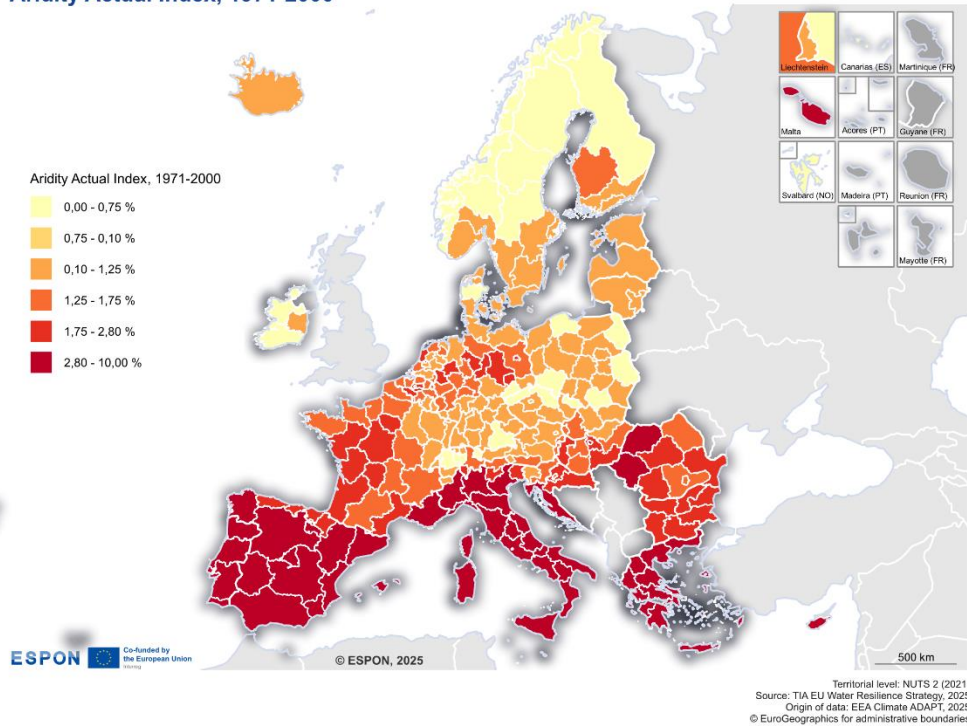
Source: ESPON NoStaGeo (unpublished)

In the wider European context, reductions exceeding 20% were also recorded in Switzerland, Norway and Iceland.

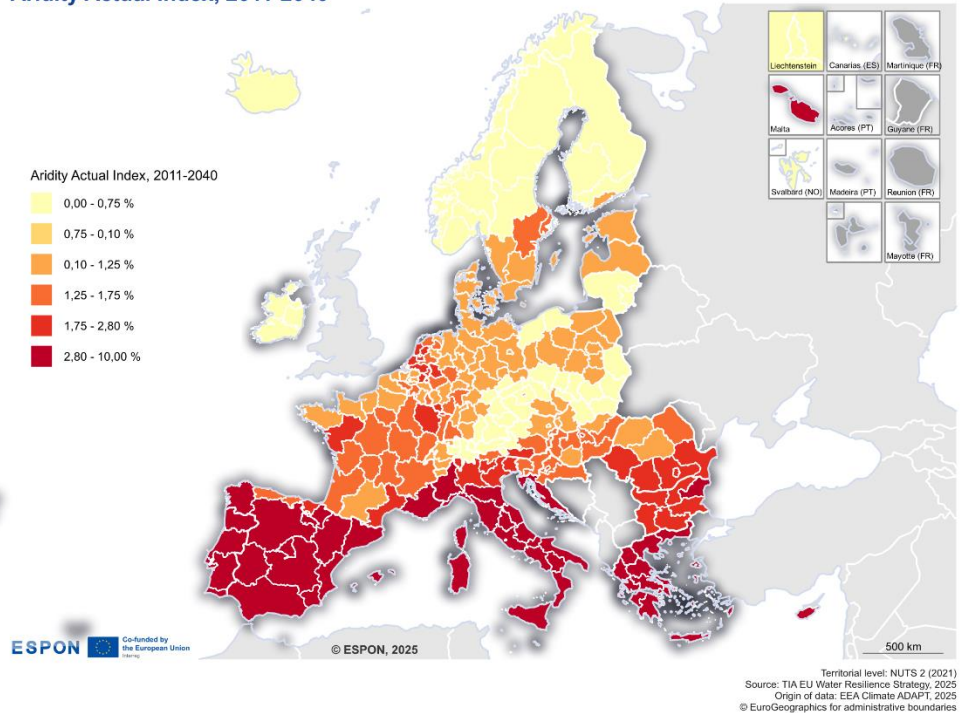
In addition to the long-term annual perspective, variations due to seasonal effects can enrich the picture of water scarcity. The map below, taken from the ESPON NoStaGeo project, provides an overview of these variations at the sub-basin level. The strongest seasonal variations can be observed in southern Spain, central and eastern Poland, southern Italy, Ireland, Malta and several regions of Greece.

1.4.2 Aridity index

Aridity Actual Index, 1971-2000



Aridity Actual Index, 2011-2040

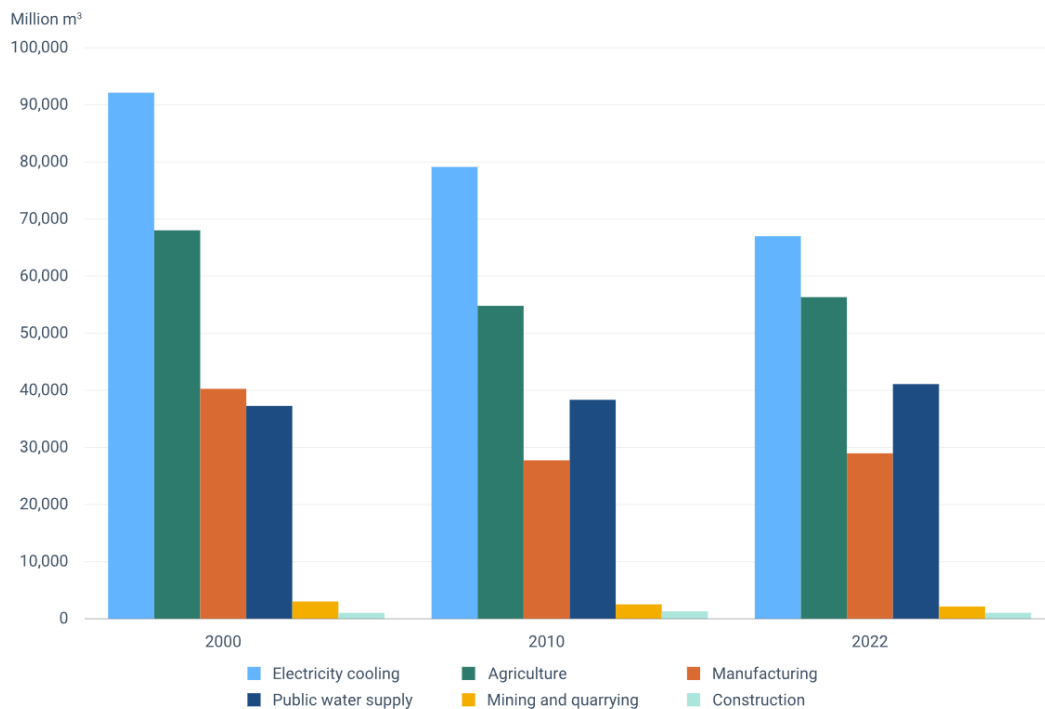


Source: [EEA](#)

These maps depict the aridity index for 1971-2000 as well as for the (projected) period 2011-2040. The index measures the ratio of potential evapotranspiration to precipitation, whereby higher values indicate drier conditions. Regions are classified into six categories ranging from 0.00-0.75% (humid) to 2.80-10.00% (very dry).

The baseline map until 2000 highlights pronounced aridity in southern Europe, with the highest values notable in Spain, southern France, Italy, Greece and Bulgaria, as well as in parts of Portugal and Romania. Central and northern Europe show moderate to low aridity, while Scandinavia and the Baltic countries record the lowest values. The projections towards 2040 show generally similar patterns, but when combined with seasonal assessments indicate a northward shift of drier conditions. Southern and south-eastern Europe – especially Spain, Italy, Greece, Bulgaria and southern France – remain the most arid areas, with index values above 2.80%. Central and eastern Europe show fewer developments overall, with some regions improving and others staying stable or even worsening. For northern Europe, wider patterns indicate an increase in precipitation in general, but at the same time with much drier summers than before.

1.4.3 Water abstraction by sector

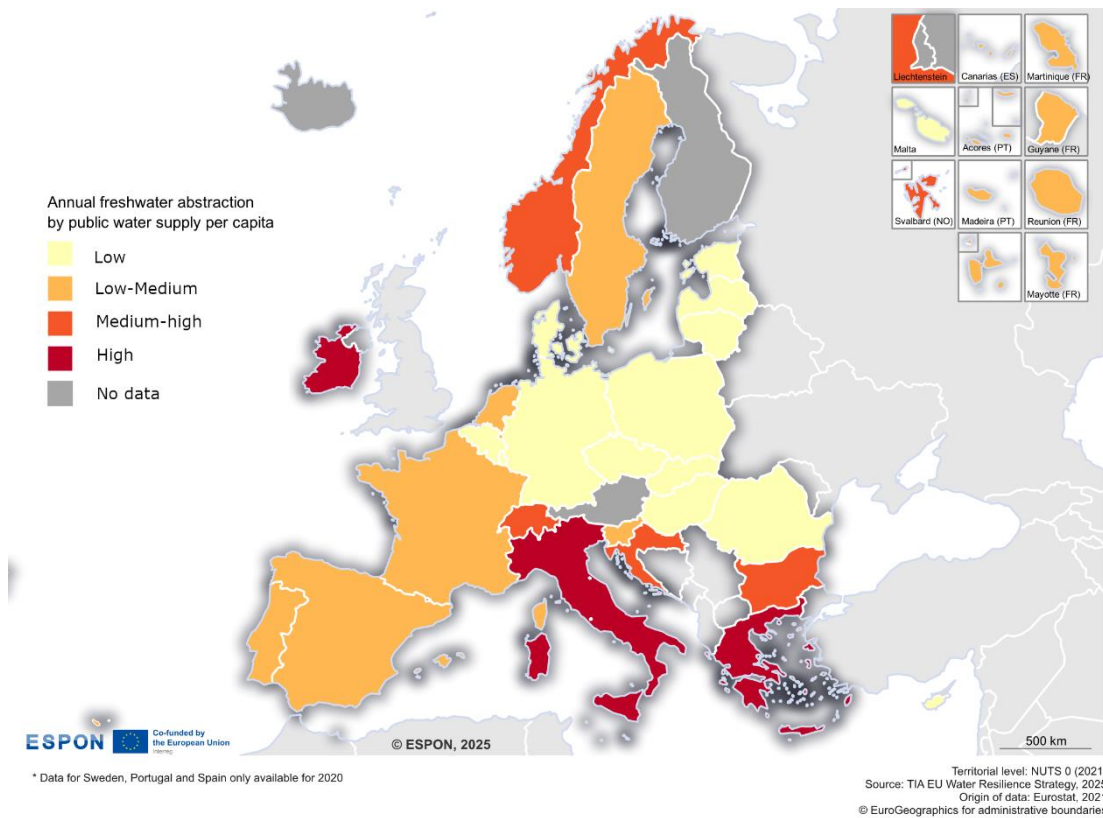


Source: [EEA](#)

Freshwater is mainly abstracted from surface water (~75%) and groundwater (~25%) alike, thereby depleting sources over time if they are not sufficiently renewed. The overall water abstraction of the EU27 today is approximately 200 million m³ per year, a decrease of approximately 20% over 25 years. However, developments differ considerably between sectors. Cooling in electricity generation was the largest contributor to total annual water abstraction in 2022 (34%). This was followed by abstraction for agriculture (29%), public water supply (21%) and manufacturing (15%). Construction, mining and quarrying each accounted for only 1%.

In terms of developments, abstraction declined in mining and quarrying (-29%), manufacturing (-28%), cooling in electricity generation (-27%) and agriculture (-17%). On the other hand, it has increased in public water supply (+10%) and construction (+2%) over the past 25 years.

1.4.4 Water abstraction for public water supply

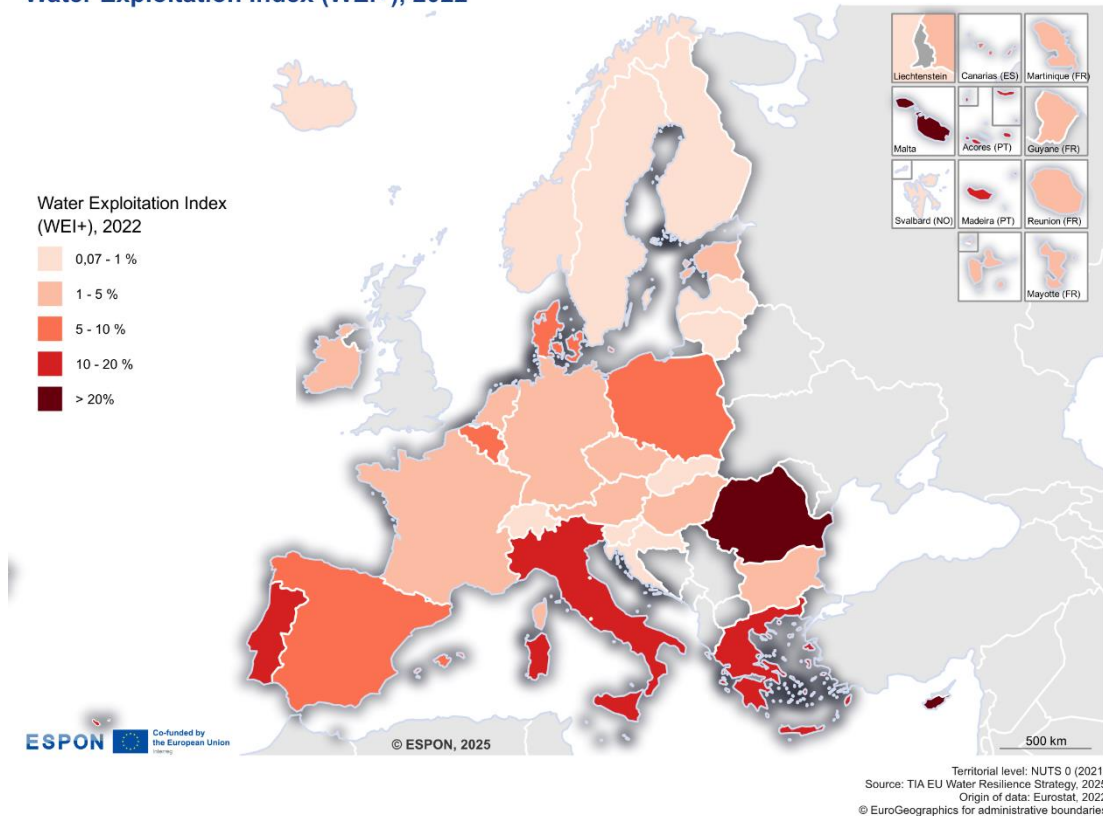


Source: [Eurostat](https://ec.europa.eu/eurostat)

As water use for the public water supply is growing, this map shows the annual freshwater abstraction for public water supply per capita across European countries at NUTS-0 level (2021). Countries are grouped into four classes from low (starting from ~50m³ per inhabitant per year) to high (up to 200m³ per inhabitant per year). The highest relative abstraction rates are recorded in southern and south-eastern Europe, notably in Greece, Italy and Croatia. Moderate levels are to be found in France, Spain and parts of central Europe, while northern and eastern European countries such as Finland, Sweden and the Baltic countries show lower abstraction rates on a per capita basis.

1.4.5 Water Exploitation Index

Water Exploitation Index (WEI+), 2022



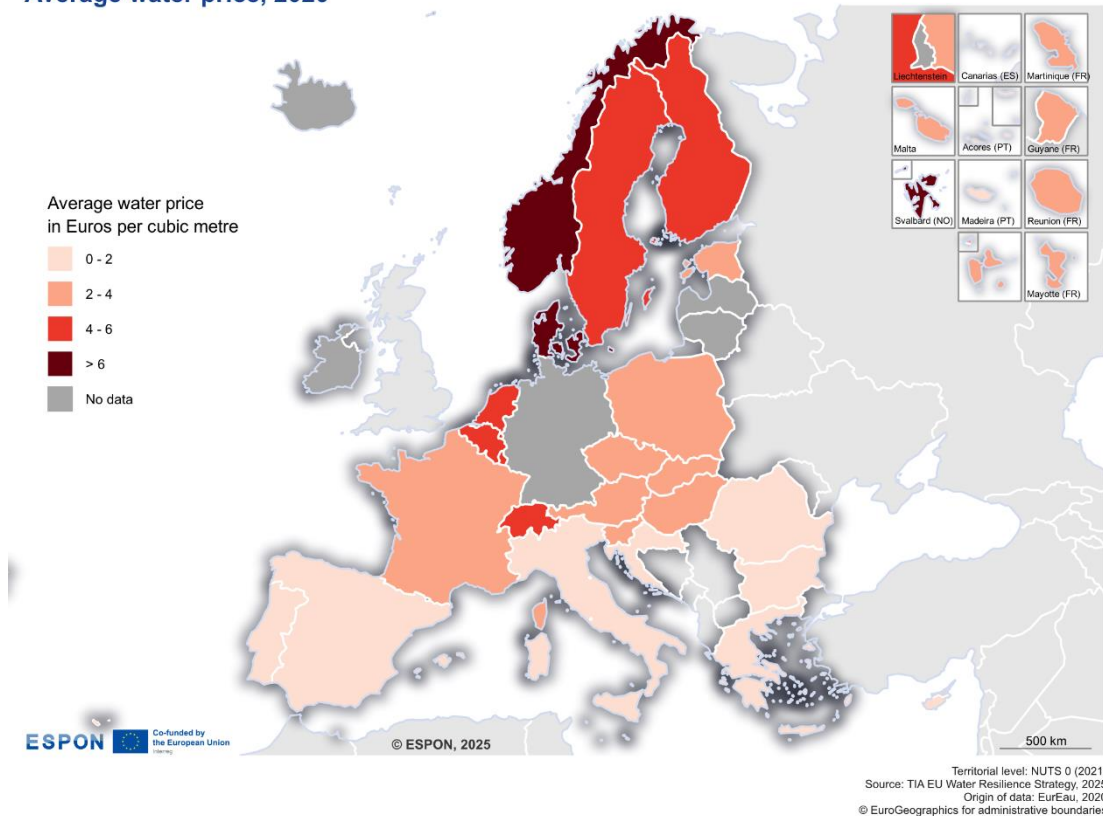
Source: [Eurostat](#)

The map shows the Water Exploitation Index (WEI+) at country level (NUTS-0) for 2022. The WEI+ is the ratio of water use to renewable freshwater resources, whereby higher values indicate higher pressure on water resources. It quantifies how much water is abstracted and how much water is returned to the environment by economic sectors before or after use. The difference between water abstraction and water return is regarded as 'water consumption'. Countries are grouped into five classes: 0.07-1%, 1-5%, 5-10%, 10-20% and >20%. Values above 20% are generally considered to be a sign of water scarcity, while values equal to or greater than 40% indicate a situation of severe water scarcity, meaning the use of freshwater resources is unsustainable.

High WEI+ values are observed in southern Europe, particularly in Spain, Italy and Greece, as well as in parts of Portugal, France and Poland, where agricultural and urban demand is high. Extreme outliers are Cyprus (71%) and Malta (34%), with further very high values above the critical 20% rate also observed in Romania (21%). Low values occur in northern and western Europe, including in Scandinavia, Ireland and parts of central Europe, where renewable water availability is rather high and at the same time population density is lower in most cases.

1.4.6 Water prices

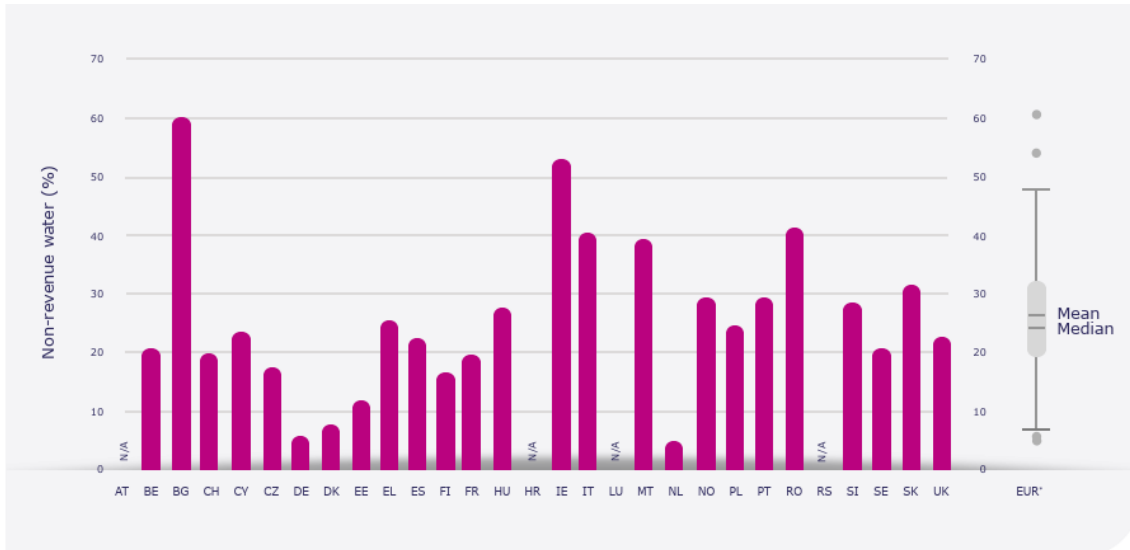
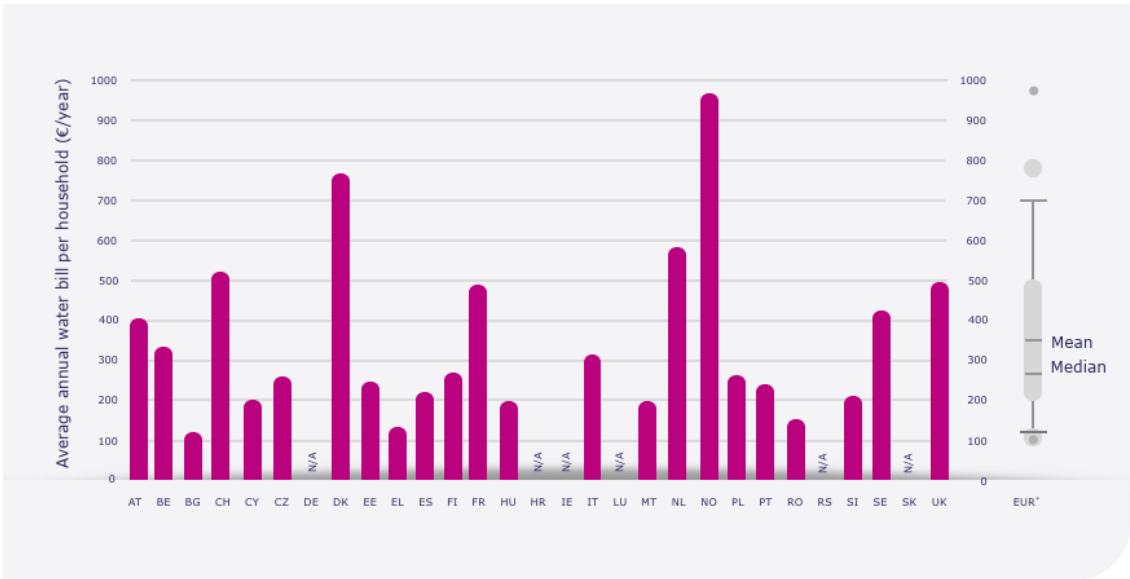
Average water price, 2020



Source: [EurEau](#)

This map shows the average water price per cubic metre across European countries at NUTS-0 level for the year 2020. Countries are grouped into four categories: EUR 0-2, EUR 2-4, EUR 4-6 and over EUR 6/m³. The highest water prices are recorded in northern Europe, Denmark and Norway. Further high prices are recorded in Finland, Sweden, the Netherlands, Belgium, Switzerland and Luxembourg. Most central European countries, such as France, Austria, Poland, Czechia and others, show intermediate levels between EUR 2-4/m³. Southern and eastern Europe, including Spain, Portugal, Greece and most Balkan countries, record lower prices below EUR 2/m³. The data is based on an EurEau survey.

Interestingly, some countries showing very low water prices also show high shares of non-revenue water (e.g. Bulgaria and Italy), while for others the opposite holds true (e.g. the Netherlands and Denmark), as illustrated in the graphs below.



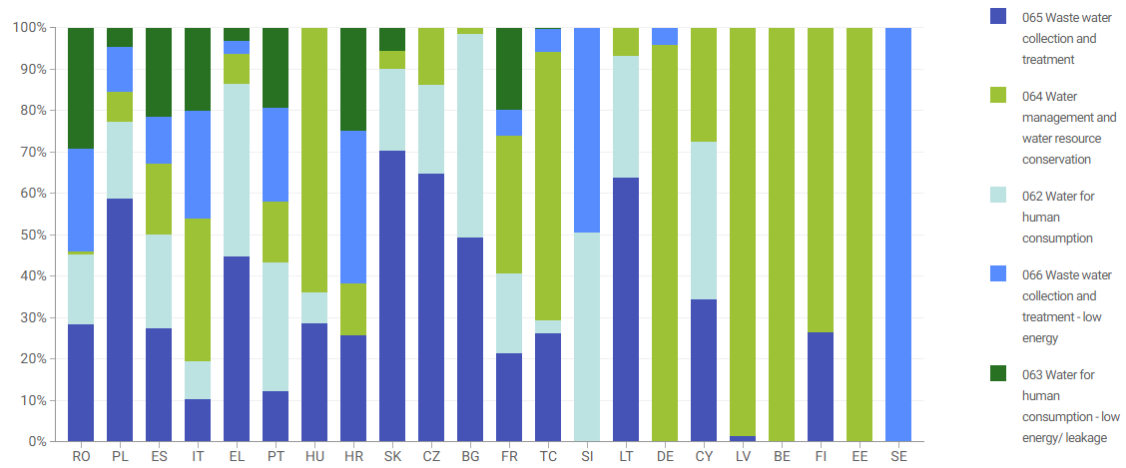
Source: [EurEau](#)

1.4.7 EU action through Cohesion Policy funds

Under Cohesion Policy programmes for 2021-2027, EUR 16.9 billion of investment is planned for supporting access to water and sustainable water management, of which more than EUR 13.2 billion comes from EU funding².

Investments focus in particular on wastewater collection and treatment (EUR 6.3 billion) and water for human consumption (EUR 3.5 billion). The figure below is based on [cohesion open data](#) and shows the relative focus of funding per member state.

² See [21-27 Sustainable water management | Cohesion Open Data](#)



Source: [cohesion open data](#)

2 Methodology: ESPON TIA Quick Check

The concept of territorial impact assessment (TIA) aims to show the regional differentiation in the impact of EU policies. The ESPON TIA tool³ is an interactive web application that can be used to support policymakers and practitioners in identifying potential ex-ante territorial impacts of new EU legislation and policies. The 'ESPON TIA Quick Check' approach combines a workshop setting for identifying systemic relations between a policy and its territorial consequences on a set of indicators describing the sensitivity of European regions. It is one of the methodologies approved by the European Commission in its Better Regulation guidelines for assessing potential territorial impacts.

This approach helps to steer an expert discussion about the potential territorial effects of an EU policy proposal by checking all relevant indicators in a workshop setting. The results of the guided expert discussion are judgements about the potential territorial impact of an EU policy across different thematic fields (economy, society, environment and governance) for a range of exposure fields. These results are fed into the ESPON TIA Quick Check web tool.

The web tool translates the combination of the expert judgements on exposure and the different sensitivity of regions based on statistical data into maps showing the potential territorial impact of EU policy at NUTS-3 level. These maps serve as a starting point for further discussions on different impacts of a specific EU policy on different regions.

The workshop on the European Water Resilience Strategy brought together a number of experts from diverse backgrounds. Three moderators from ÖIR, provided by ESPON, prepared and facilitated the workshop and also managed the technical support tools.

Figure 2.1: Workshop discussion



Source: Territorial impact assessment expert workshop, 22 October 2025, ÖIR

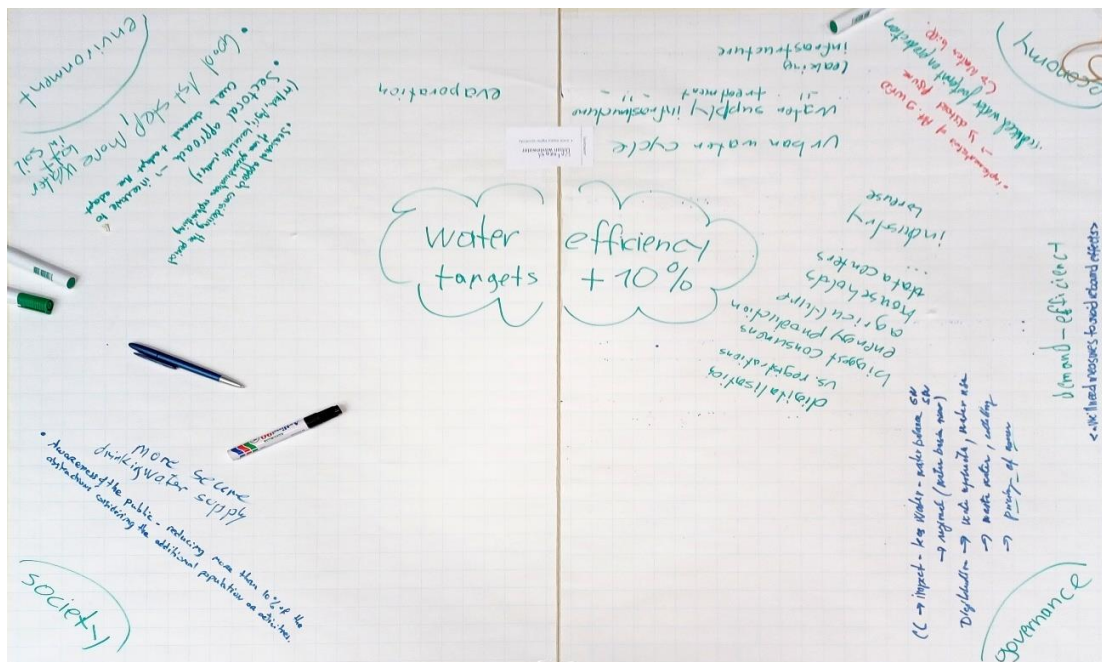
3 See <https://archive.espon.eu/tools-maps/espon-tia-tool>.

2.1 Identifying the potential territorial effects considering economy, society, environment and governance related exposure fields – drafting a conceptual model

In the first stage of the TIA workshop, the participating experts discussed the potential effects of a hypothetical scenario of what the European Water Resilience Strategy could entail, using a territorial or place-based approach.

This discussion revealed potential territorial impacts using economic, societal, environmental and governance-related exposure fields. The participants identified potential linkages between the implementation of the strategy and the effect on territories, including interdependencies and feedback loops between different effects (see figure below).

Figure 2.2: Workshop findings: Systemic picture



Source: Territorial impact assessment expert workshop, 22 October 2025, ÖIR

2.2 Depicting the potential territorial effects through relevant exposure fields

In order to assess the potential effects identified by the experts and illustrated in the conceptual model, suitable exposure fields need to be selected for the parameters that the experts discussed in the fields of economy, society, environment and governance. The availability of data for all NUTS-3 regions for all EU Member States imposes certain limitations on the indicators that can be used. From the available indicators that the ESPON TIA Quick Check web tool offers, the experts chose the following exposure fields to describe the effects identified (a detailed description of the indicators behind them is provided in the appendix):

Depicting potential territorial impacts in terms of economic indicators

- › Water consumption
- › Industry workforce
- › High-technology manufacturing and services
- › Primary sector workforce

Depicting potential territorial impacts on the basis of societal indicators

- › Water poverty

Depicting potential territorial impacts on the basis of environmental indicators

- › Drought risk
- › Water use in agriculture
- › Satisfaction with water quality

Depicting potential territorial impacts on the basis of governance indicators

- › Regional innovativeness

Some exposure fields which were requested could not be covered with the information available. For example, information on water pollution by agriculture, which was deemed highly relevant, is not available at NUTS-2 or NUTS-3 level in a form which allows the TIA tool to work with it. Furthermore, initially discussed effects on flood risk were ultimately discarded in the voting process and are thus not further visualised.

2.3 Judging the intensity of the potential effects

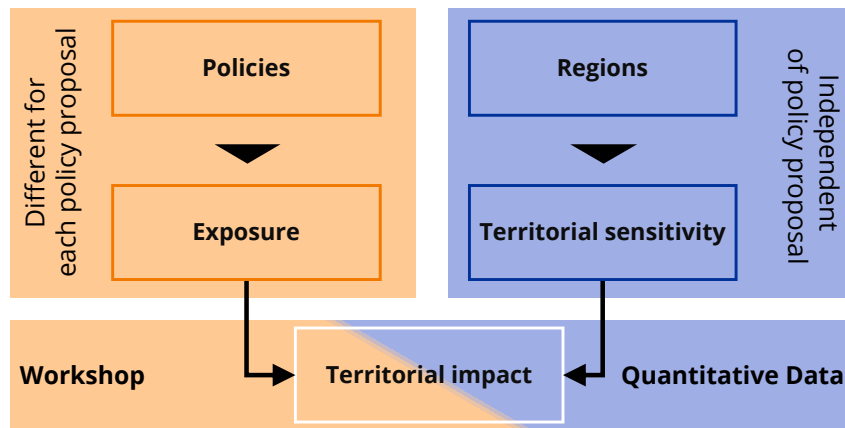
The workshop participants were asked to estimate the potential effects of a hypothetical scenario of what the European Water Resilience Strategy could entail. They judged the potential territorial effects by assessing the weight for each exposure field as follows:

- › ++ strong positive effect on territorial welfare (strong increase)
- › + moderate positive effect on territorial welfare (increase)
- › o no effect/unknown effect/effect cannot be specified
- › - moderate negative effect on territorial welfare (decrease)
- › -- strong negative effect on territorial welfare (strong decrease)

2.4 Calculating the potential 'regional impact' – Combining the expert judgement with regional sensitivity

The ESPON TIA Quick Check combines the expert judgement concerning the potential impact of the European Water Resilience Strategy (**exposure**) with exposure fields and underlying indicators describing the sensitivity of regions (**territorial sensitivity**), resulting in maps showing a territorially differentiated impact (see illustration below).

Figure 2.3: Exposure x territorial sensitivity = territorial impact



Source: ÖIR, 2015

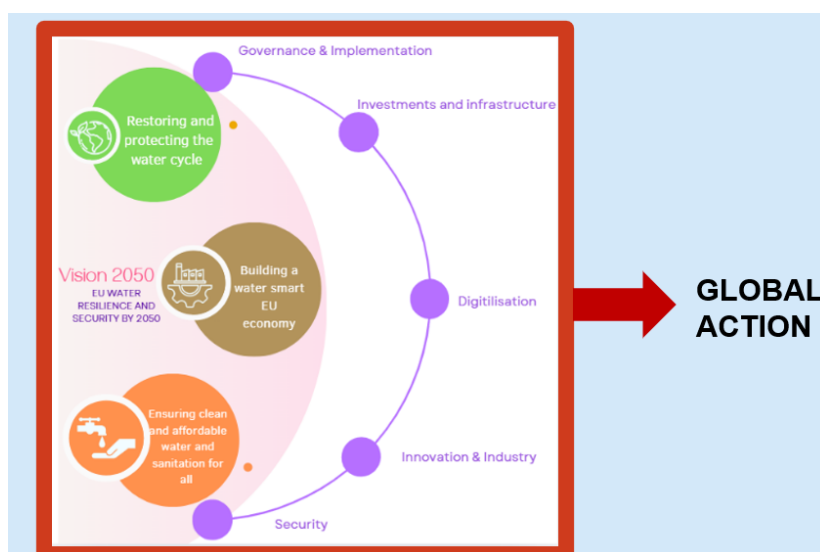
- > **'Territorial sensitivity'** is the baseline situation of the region according to its ability to cope with external effects. It is a characteristic of a region that can be described by different indicators, regardless of the topic analysed.
- > **'Exposure'** describes the intensity of the potential effect of the programmes on a specific indicator. Exposure illustrates the expert judgement, i.e. the main findings of the expert discussion at the TIA workshop.

3 Debate and qualitative analysis

3.1 Introductory remarks

The workshop opened with a presentation by **Luca Perez**, deputy head of the Sustainable Freshwater Management Unit at the European Commission's Directorate-General for Environment (DG ENV), who introduced the key elements of the European Water Resilience Strategy.

Figure 3.1: Vision, objectives and actions of the European Water Resilience Strategy



Source: Presentation by Luca Perez on the European Water Resilience Strategy, 22 October 2025

As shown in Figure 3.1, the European Water Resilience Strategy is built around three core principles that aim to strengthen the sustainable management of Europe's water resources:

- › restoring and protecting the water cycle
- › building a water-smart EU economy
- › securing clean and affordable water sanitation for all

To achieve these goals, the strategy sets out five enabling areas or key fields of action: governance and implementation; finance, investments and infrastructure; digitalisation; innovation, industry and skills; and security and preparedness.

Recognising that water is a shared resource and therefore a shared responsibility, the strategy emphasises the need for collective and global action to ensure long-term water resilience and equitable access for current and future generations.

The second presentation was provided by **Loïc Charpentier**, Kata Tüttö's expert for the CoR opinion *Turning the tide – a local and regional roadmap for water resilience* and head of advocacy at Water Europe.

Mr Charpentier explained the timeline and context of the opinion, which is due to be adopted at the ENVE commission meeting on 5 December and at the CoR plenary session on 4-5 March 2026. The opinion aims at highlighting the key role of LRAs in implementing the European Water Resilience Strategy and identifying potential challenges and obstacles for its success.

The draft opinion mentions, in particular, the importance of the subsidiarity principle (considering the local context and transboundary cooperation), simplification (without creating legal insecurity and maintaining environmental standards), digitalisation (as a cost but also an opportunity), civil protection and preparedness, ecosystem restoration and nature-based solutions, and the need to fully implement the Water Framework Directive and its daughter directives. Regarding funding, the draft opinion indicates that there is a structural gap in investments on water-related infrastructure and services necessary to comply with the requirements under the Drinking Water and Wastewater Treatment Directives, and emphasises that the next multi-annual financial framework is an opportunity to finance these investments.

Finally, Mr Charpentier stated that CoR will host the first Water Resilience Forum on 8 December and invited the participants to attend⁴.

3.2 Policy scenario recap

The European Commission presented its Communication on the European Water Resilience Strategy on 4 June 2025. Participants in the TIA workshop discussed the expected spatially differentiated effects in a policy scenario in which the EU Water Resilience Strategy has already been implemented. Under this scenario, there are different regional governance structures in place, focusing on prevention, preparedness and sustainability across all sectors and placing water efficiency at the centre of all decision-making processes. The ‘water efficiency first’ principle requires Member States to prioritise demand reduction over the development of new water sources and infrastructure, and to act across the full water supply chain – storage, conveyance, use and reuse – supported by digitalisation, nature-based solutions, transparent governance and capacity building.

The European Commission’s recommendation sets out the following key principles for applying the ‘water efficiency first’ approach:

- › **Reduce water demand before increasing supply**, prioritising consumption reduction, then efficiency improvements, followed by reuse and only lastly expansion of supply. This includes tackling leakages, enhancing reuse and adapting infrastructure to climate change;
- › **Encourage Member States** to set voluntary national targets, with a suggested EU-wide ambition of +10% water efficiency by 2030;
- › **Integrate water efficiency into river basin management** and align it with strategies on climate adaptation, preparedness, biodiversity, and agricultural and industrial policy;
- › **Address all major water-using sectors**, including agriculture, energy, industry, commerce, public water supply, the digital economy, health, tourism and mobility;
- › **Promote governance reforms** to ensure fair allocation during periods of scarcity and safeguard the access of vulnerable groups. This also includes coordinating efforts to prevent conflicts between sectors competing for limited resources;

⁴ The forum is organised by the European Commission in cooperation with the Economic and Social Committee (EESC) and the Committee of the Regions (CoR), and involves the participation of the Commissioner for the Environment, Water Resilience and a Competitive Circular Economy, Jessika Roswall, the President of the CoR, Kata Tüttö, and the President of the EESC, Séamus Boland.

Europe is facing increasing water scarcity, water quality degradation and climate-related threats to both human well-being and economic competitiveness. The forum will tackle these challenges head-on through dedicated sessions on financing innovative water solutions, strengthening industrial competitiveness through water resilience and scaling water efficiency from local to global action. The forum will also address urban water challenges, digital transformation opportunities and upskilling initiatives that are essential for building the water-secure Europe envisioned by 2050.

- › **Strengthen skills, awareness, innovation and digital tools** to reduce losses and manage demand, while building trust and public acceptance for measures such as pricing reforms;
- › **Support transboundary and international cooperation** and mobilise investment to implement water-efficiency measures effectively.

In the policy scenario discussed in the workshop, it is assumed that these principles have been implemented and have led to an overall 10% improvement in water efficiency, achieved through decreased water demand, increased water reuse and wider adoption of digital technologies.

However, the territorial impact of these improvements differs significantly across regions, reflecting variations in environmental, economic and institutional conditions. During the discussion, participants emphasised that a 10% increase represents only an initial step towards greater water resilience and that further, more ambitious measures will be required to address long-term water challenges across the EU.

3.3 Discussion on effects

The following points in this section, as well as in chapters 4, 5, 6 and 7, relate to effects deemed by the experts as likely to be created by *the scenario described above*, in which the European Water Resilience Strategy is implemented and an overall 10% improvement in water efficiency is achieved.

Experts discussed the policy scenario, focusing on the implementation of the ‘water efficiency first’ principle, but also considering the relevant measures accompanying it outlined by in Commission’s communication.

A recurrent element in the discussion was that **the target of 10% water efficiency by 2030 may not be sufficient** because of climate change (10% may only compensate for climate change impacts on water by 2030) and additional uses of water.

The discussion revealed that improvements in water efficiency, reuse and digitalisation are likely to trigger a range of interlinked effects. Some of these effects are expected to be positive and even mutually reinforcing, while others may lead to trade-offs, where gains in one dimension are offset by losses in another. The experts also noted that several effects may prove positive or negative depending on the implementation in the specific national and regional circumstances and it was therefore not always possible to reach a clear consensus on the effects.

Experts also highlighted that discussions on water resilience should consistently consider all major freshwater resources — rivers, lakes and groundwater — recognising their equal relevance and interdependence within the hydrological cycle.

Economic effects

Generally, experts agreed that water leakage – owing to old water infrastructure – is a major issue, in some cases reaching rates of 60%. Experts emphasised that the economic implications of the strategy would differ considerably between sectors. For water-dependent industries such as food processing, chemicals, textiles, energy production and advanced manufacturing, **improvements in efficiency, leakage control and reuse could reduce operational losses and lower long-term costs**. It is also worth mentioning that water pollution is a driver for water scarcity; industries need clean water and polluted water represents a shortage in usable water.

Where industries face rising pressure as well as costs linked to droughts or supply uncertainty, efficiency measures could also reduce exposure to disruptions and provide increased certainty for investments.

At the same time, industries could face an increased burden if the reductions aimed at cannot be achieved in a cost-efficient manner. Whether or not measures improve conditions from an economic production perspective will therefore be **sector- and even location-specific**. In some cases, lower water abstraction costs or increased predictability may also lead to expanded activity or higher consumption in industry overall, which could undermine the intended effect of reducing overall pressure on resources (from an ecological perspective). Participants also noted that some high-technology sectors, especially those requiring significant cooling, may face cost increases, hurting regions which currently depend heavily on such industries.

In agriculture, experts expected that more efficient water use and reuse technologies could support more stable production, particularly in areas experiencing seasonal scarcity. However, the deployment of water efficiency technologies doesn't systematically result in consumption reduction, which contradicts the hierarchy of the 'Water Efficiency First' principle⁵. Lower losses in the distribution system and better availability during low supply periods could improve agricultural yield. However, there was also agreement that these benefits depend on **farmers' capacity to adopt new practices and technologies** or even new agricultural models (using different kind of less water-consuming crops, or different models of livestock farming management), both from the perspective of their actual willingness to do so as well as from a financial point of view.

Water pricing was a further important topic in the discussion, with **complex and dynamic water pricing systems, supported by digitalisation**, being mentioned as a possible key measure for supporting the implementation of the Water Resilience Strategy. This would mean possibly having different water prices per region in each Member State, depending on volume, time, season, type of use/industry – without giving the impression that water is available because it is cheap. While such pricing could encourage conservation and generate funds for reinvestment, several experts cautioned that poorly designed models risk creating distortions or undermining the economic viability of water-intensive SMEs.

The lack of implementation of the cost recovery principle in the Water Framework Directive (WFD), especially for sectors such as agriculture, was mentioned⁶.

Societal effects

An expert referred to the Human Right to Water and Sanitation and its 5 core pillars⁷, underlining there are many cases in the EU where it is not respected due to overabstraction or pollution.

Participants stressed the importance of curbing demand. Illegal abstraction, namely through private wells, is a huge issue on the EU level, with no control neither overview of the overall abstraction and its impacts. Raising public awareness and improving understanding of the value of water as a shared and limited resource not only has the potential to encourage behavioural

⁵ See report from the European Court of Auditors (ECA): https://www.eca.europa.eu/en/publications/SR21_20

⁶ See ECA report https://www.eca.europa.eu/lists/ecadocuments/sr21_12/sr_polluter_pays_principle_en.pdf (page 21)

⁷ See <https://www.ohchr.org/en/water-and-sanitation>

change in people's everyday lives, but also increases acceptance of potentially restrictive measures introduced as part of the strategy. Further, strengthening citizens' engagement and knowledge was seen as a key factor in ensuring the long-term success of water resilience measures.

Participants also noted that societal effects would depend on the visibility of water challenges. In territories where scarcity is already experienced in daily life, citizens may be more receptive to efficiency measures. In this respect, the impact of climate change can help for global awareness in the population. In contrast, regions with seemingly abundant water may require stronger awareness efforts, even if implementation would be comparably easy. However, the price of water needs to be considered; there are situations where water is scarce, yet cheap.

The effects of the strategy were also discussed in the light of affordability. Efficiency measures that require substantial investments, both from the supplier side and from the household side may lead directly or indirectly to higher costs for consumers. Experts stressed that this could disproportionately affect vulnerable households, especially in territories where income levels are lower or where water services already represent a significant share of household budgets. Already, households bear most of the water services costs⁸. The fact that the households 'sector' is considered on the same level as agriculture and industry (WFD, Art. 9) raises a social justice issue: households and individuals have an inherent right to access water as it is vital.

People's willingness to pay a slightly higher water bill may also depend on the perceived quality of service; this may be challenging in territories like southern Italy where there are regular water cuts and the price of water is much higher than in the north of the country.

Finally, participants expected the strategy to contribute to a more secure and reliable drinking water supply across Europe.

Environmental effects

The environmental discussion emphasised that increased efficiency alone does not automatically lead to improved environmental outcomes. Experts stressed that **water saved through efficiency measures is not automatically 'returned to nature'**; on the contrary, it may instead lead to increased consumption, reducing or eliminating environmental improvements. Participants in this context highlighted the importance of rebound effects, whereby technological improvements reduce the perceived scarcity (and also the cost) of water⁹, prompting higher use. Such behavioural and systemic responses were discussed as a critical risk that could undermine both the environmental impact and other effects of the strategy.

The participants highlighted the importance of the concept of **water footprint** as a useful measurement of water use and its environmental impacts. Although it is not yet as widely applied as the concept of carbon footprint, and it currently mainly considers quantitative aspects of water use, it could be extended to qualitative aspects such as water quality, origin of water (whether it comes from a sustainable source or not), and effects on ecosystems. The concept of 'virtual water' was highlighted, which helps to illustrate water contained in products and goods and usually overlooked (e.g. vegetables produced in water-scarce areas in Spain) and goes beyond the only metric of volume as in footprint.

⁸ See ECA report on the implementation of Art. 9 of the WFD:

https://www.eca.europa.eu/lists/ecadocuments/sr21_12/sr_polluter_pays_principle_en.pdf

⁹ See ECA report previously mentioned on water efficiency technologies not resulting in curbing demand

One of the experts highlighted that the Spanish government is implementing a certification for transparent water management that could be used to evaluate several dimensions of water use.

Experts also highlighted that the water cycle is highly complex and sensitive to climate-induced changes such as increased evapotranspiration or decreased due to loss of vegetal cover/vegetal homogenisation, altered precipitation patterns and reduced soil moisture levels. These changes may mean that a 10% efficiency improvement only compensates for ongoing climatic trends rather than yielding additional environmental benefits. Several participants supported the hierarchy established by the Commission's strategy, stressing that **reducing absolute demand, not merely improving efficiency, is essential to achieving meaningful ecological improvements.**

Governance effects

Effective and coherent governance regulation was seen as crucial for the successful implementation of the European Water Resilience Strategy. Currently, water management responsibilities are fragmented across **different levels of administration**, creating institutional complexity and, in some cases, inefficiencies. An expert made the point that, although money was made available, a lot of Member States did not use it all to invest in capacity-building or staff, which affected governance. In addition to this, administrative boundaries and functional relations usually do not align, complicating the management of the proposed measures. Participants therefore emphasised that either provision should be made for additional measures to mitigate this barrier, or most other effects will be limited due to insufficient effectiveness at **basin level**.

Experts also noted that effective implementation takes place at basin **level**, since water challenges differ significantly across Europe and depend strongly on local conditions. The implementation of the strategy will therefore likely rely strongly on the authorities at local and regional level and place an additional burden on them and depends on the partnership/relationship those LRAs have with authorities at other levels (such as member states).

Several participants highlighted that the political will to introduce or enforce measures aimed at increasing water efficiency is currently often lacking, partly because such measures may be unpopular (e.g. a ban on building private swimming pools in a municipality). However, the strategy could trigger political action if specific proposals were made.

Some participants also stressed the need for a long-term vision when it comes to water resilience, as well as the need to enforce existing legislation such as the Water Framework Directive, as the cornerstone of EU water legislation, and an **environmental impact assessment of European and national policies**, using the example of data centres, which abstract huge amounts of water.

The discussion further highlighted the role of **digitalisation and data collection** as a key enabler of efficient management. Participants identified significant data gaps that hinder effective monitoring and evidence-based policymaking, which could be improved through the implementation of the strategy if specific proposals were to be included. Improved digital tools and shared data platforms were seen as effective tools and, if implemented, were deemed likely to reduce both technical losses and unreported extractions of water.

Cross-cutting aspects

Across all four dimensions, experts highlighted the **interdependencies of effects**, with the realisation of one effect relying on another effect. For example, efficiency gains alone will not lead

to reduced pressure on water resources unless combined with awareness raising and behavioural change, as well as changes in regulatory frameworks besides the Water Resilience Strategy that ensure that any water saved contributes to long-term objectives rather than enabling higher consumption.

A second aspect relevant across dimensions is the **role of administrative capacity and institutional structures**. Local and regional authorities are central to implementation, yet many lack the resources, both in terms of capacity and staff, or legal mandate to implement measures at the functional scale required for effective implementation. Strengthened cooperation mechanisms through the strategy were identified as providing significant potential in this regard, but these lack emphasis in the current version.

Finally, the discussion repeatedly stressed the need for **coherent social and environmental safeguards** to avoid any unintended effects resulting from the implementation of measures. Efficiency improvements may generate unintended effects in multiple ways: rising prices can increase social vulnerability, while rebound effects can undermine environmental goals. Experts again saw relevant measures already hinted at in the strategy, but in vague language; they emphasised that for these unintended effects to be avoided greater awareness raising and much clearer language would be needed, especially in order to emphasise the importance of protecting water as a finite resource.

Chapters 4 to 7 below present the potential territorial impact assessment in the form of maps based on a combination of the expert judgements on exposure and the territorial sensitivity of a region.

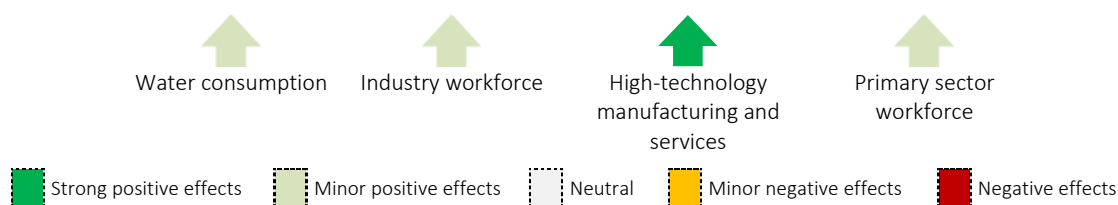
The expert judgement is a qualitative judgement on the type of impact the policy scenario has on territorial welfare (strong advantageous effect/moderate advantageous effect/no effect/moderate disadvantageous effect/strong disadvantageous effect).

Sensitivity is a quantitative indicator (at NUTS-3 level). For all regions considered, the indicator is standardised within the range of 0.75 to 1.25; these coefficients either increase (if greater than 1) or decrease (if lower than 1) the impact on a specific field.

A detailed description of the indicators is provided in the appendix.

4 Potential territorial impact considering economic aspects

Based on the discussions reported in section 3.3, four exposure fields were selected to reflect and measure the anticipated economic impacts of the Water Resilience Strategy. Three of the four exposure fields are expected to show a positive effect: water consumption, industry workforce and primary sector workforce. In the case of the ‘high-technology manufacturing, and services’ exposure field, the experts’ votes are less clear, which is why both positive and negative expected impacts are considered. These exposure fields reflect both structural dynamics and a sectoral assessment that is key to understanding regional impacts of the Water Resilience Strategy, thereby offering a multidimensional perspective on how improvements in regional water efficiency can present opportunities or challenges for different economic sectors.



4.1 Water consumption

Consideration of the ‘water consumption’ exposure field is essential in the context of the Water Resilience Strategy, as it directly reflects the intensity of water use in a region. High consumption levels increase the risk of water stress and can affect the stability of ecosystems, especially in regions already affected by droughts or seasonal water shortages. In particular, desertification is relevant for the Mediterranean basin¹⁰.

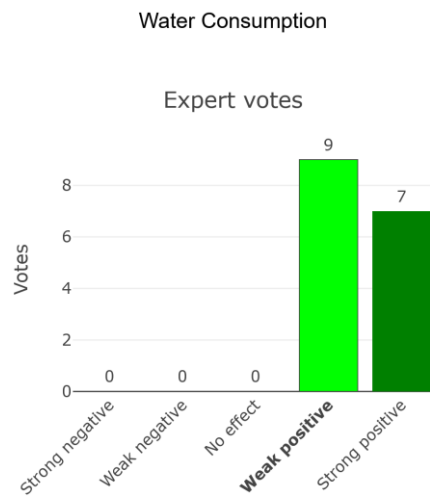
The indicator behind the exposure field measures freshwater consumption in litres per capita per day at NUTS-2 level¹¹ for the reference year 2020, based on data from JRC LUISA.

Experts were asked to judge the potential territorial impact of the scenario considered for the European Water Resilience Strategy with regard to this exposure field.

¹⁰ See ECA report https://www.eca.europa.eu/lists/ecadocuments/bp_desertification/bp_desertification_en.pdf

¹¹ The indicator covers 86% of the regions analysed.

Figure 4.1: Result of the expert judgement: Water consumption and the impact potential of the European Water Resilience Strategy



Source: Territorial impact assessment expert workshop, 22 October 2025

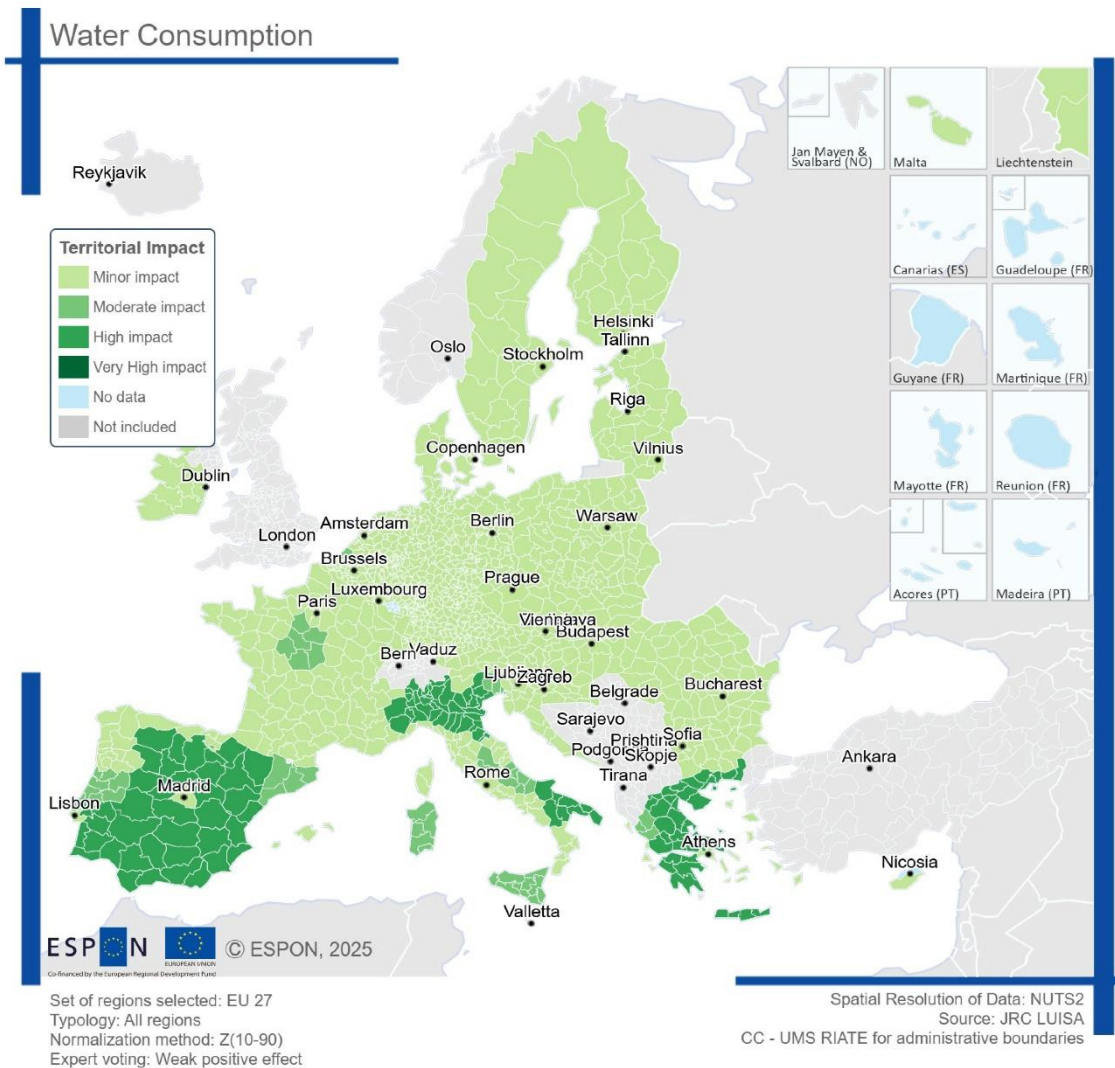
The majority voted for a *weak positive* effect.

Regarding territorial sensitivity, it is assumed that regions with higher water consumption are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The below map displays the territorial impact in relation to water consumption across the EU-27, based on expert voting that expected a weak positive effect within the context of the European Water Resilience Strategy.

For this map and subsequent maps, regions are categorised into four levels of potential territorial impact: very high impact, high impact, moderate impact and minor impact, shown in varying shades of green. Regions without available data are shown in light blue, while areas not included in the assessment appear in grey.

Figure 4.2: Water consumption and the impact potential of the European Water Resilience Strategy – expert judgement: weak positive effect



Source: Territorial impact assessment expert workshop, 22 October 2025

Overall, a clear spatial pattern can be observed, with the highest expected impacts concentrated in southern Europe – particularly Spain, Portugal, Greece and parts of northern and southern Italy – suggesting higher water demand that is strongly influenced not only by climatic conditions but also based on the wider regions’ economic profiles, agricultural activity and tourism. The fact that geographical conditions play a role is also reflected in the fact that non-coastal regions expect twice as high impact (56%) as coastal areas (only 20%). Moderate impacts are also expected in some central parts of France and two coastal regions of the Netherlands.

In contrast, northern and central European regions display only minor expected impacts, reflecting an overall lower water consumption level per capita.

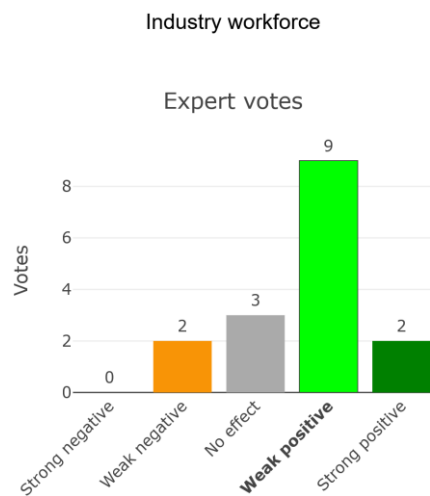
4.2 Industry workforce

The ‘industry workforce’ exposure field was selected as it provides information concerning one of the most relevant economic sectors. Many industries – such as food processing, chemical production, energy generation, textiles and semiconductor manufacturing – are highly

dependent on water. The size and composition of a region’s industrial workforce provide a hint concerning its industrial activity and thus of its water demand in that regard. Regions with a high proportion of industrial workers are particularly vulnerable to water scarcity, as water shortages can lead to production losses, job losses and economic harm. This exposure field is therefore particularly important in the context of the European Water Resilience Strategy, as a high concentration of industrial jobs in water-intensive sectors indicates increased regional vulnerability, but also offers opportunities to benefit from improved efficiency.

The indicator behind it measures the share of persons employed in industry as a portion of total employment, based on data from ARDECO for the reference year 2023¹².

Figure 4.3: Result of the expert judgement: Industry workforce and the impact potential of the European Water Resilience Strategy



Source: Territorial impact assessment expert workshop, 22 October 2025

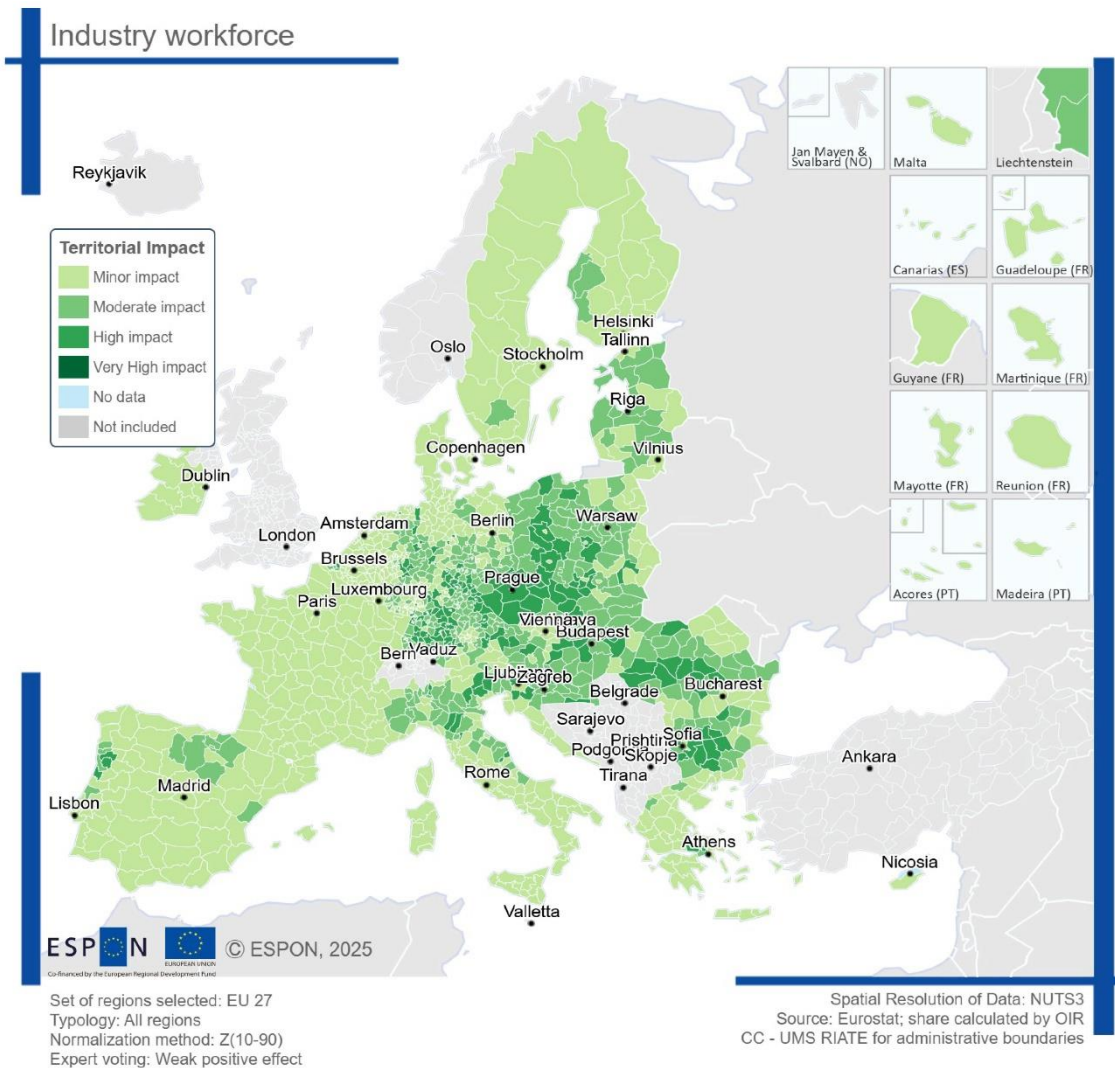
The majority voted for a *weak positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher share of industry workforce are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The below map displays the territorial impact linked to the ‘industry workforce’ exposure field across the EU-27, based on expert voting that expected a weak positive effect within the context of the European Water Resilience Strategy.

¹² The indicator covers about 82% of the regions analysed at NUTS-3 level.

Figure 4.4: Industry workforce and the impact potential of the European Water Resilience Strategy – expert judgement: weak positive effect

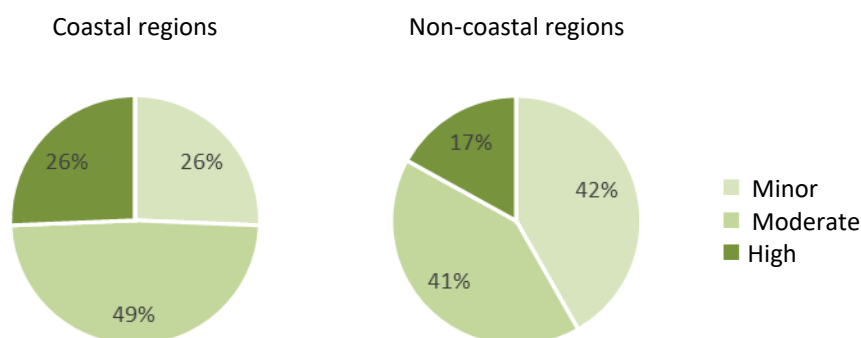


Source: Territorial impact assessment expert workshop, 22 October 2025

The impact of the European Water Resilience Strategy is likely to be particularly significant in central and eastern European countries, indicating a high concentration of industrial employment in these regions. High impacts are expected across almost the whole of Czechia, while the pattern in other southern and central regions is more fragmented. Several regions in southern Germany and northern Italy and parts of Poland, Hungary, Slovakia, Croatia, Slovenia, Romania and Bulgaria are also expected to experience widespread moderate or even high impacts. However, there are also regions in between that are expected to experience only a minor impact.

As Figure 4.5 illustrates, coastal regions show higher expected impacts (26%, compared to 17% in non-coastal areas), which reflects the higher share of industrial workforce in these regions and the higher sensitivity to the Water Resilience Strategy.

Figure 4.5: Expected impact based on industry workforce by type of geographic region



Source: ÖIR GmbH, own calculation based on Eurostat 2023

In contrast, only minor impacts are expected for western, northern and parts of southern Europe – including France, the Netherlands, Scandinavia, Ireland, Greece and the southern regions of Italy – reflecting lower shares of industrial employment.

However, despite the larger share of eastern European regions with high impact potentials, no distinct pattern can be identified with regard to the cohesion typologies of the regions: the expected impacts are largely uniform, with around 20% of regions anticipating strong impacts and around 40% anticipating moderate or weak impacts.

4.3 High-technology manufacturing and services

The ‘high-technology manufacturing and services’ exposure field is important in the context of the European Water Resilience Strategy because high-technology industries, such as data centres, AI-driven services, microelectronics and advanced manufacturing tend to be highly water-intensive, thereby placing additional pressure on regional water resources.

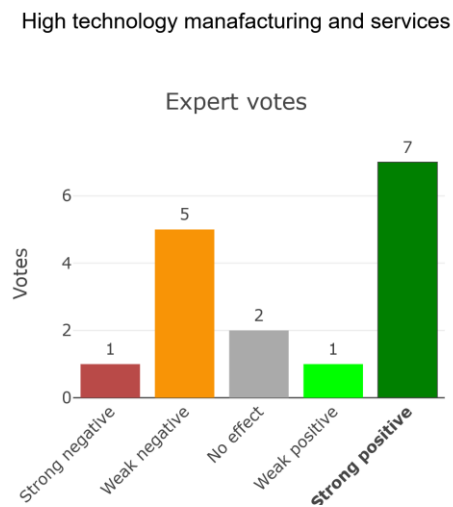
As is also reflected in the resulting voting below, expert discussions around potential impacts highlighted opposing aspects. Several experts expected clear positive effects in this regard, as these industries are among the most water intensive, but have also shown clear improvements in recent years. Furthermore, increasing water scarcity would increase their operating costs considerably and increased efficiency could therefore be seen as beneficial. On the other hand, several experts assumed that considerable cost increases would put a strain on such industries, thereby leading to a negative effect.

Furthermore, experts highlighted the two very different industries covered by this exposure field: innovation-driven industries, which are likely to benefit, and industries that simply have high water demand (e.g. for cooling), which are likely to see negative effects.

The indicator behind this exposure field measures the share of employment in high-technology manufacturing and knowledge-intensive high-technology services within a region¹³. It is based on 2019 data reported, sourced from Eurostat.

¹³ The indicator covers about 93% of the regions analysed at NUTS-2 level.

Figure 4.6: Result of the expert judgement: High-technology manufacturing and services and the impact potential of the European Water Resilience Strategy



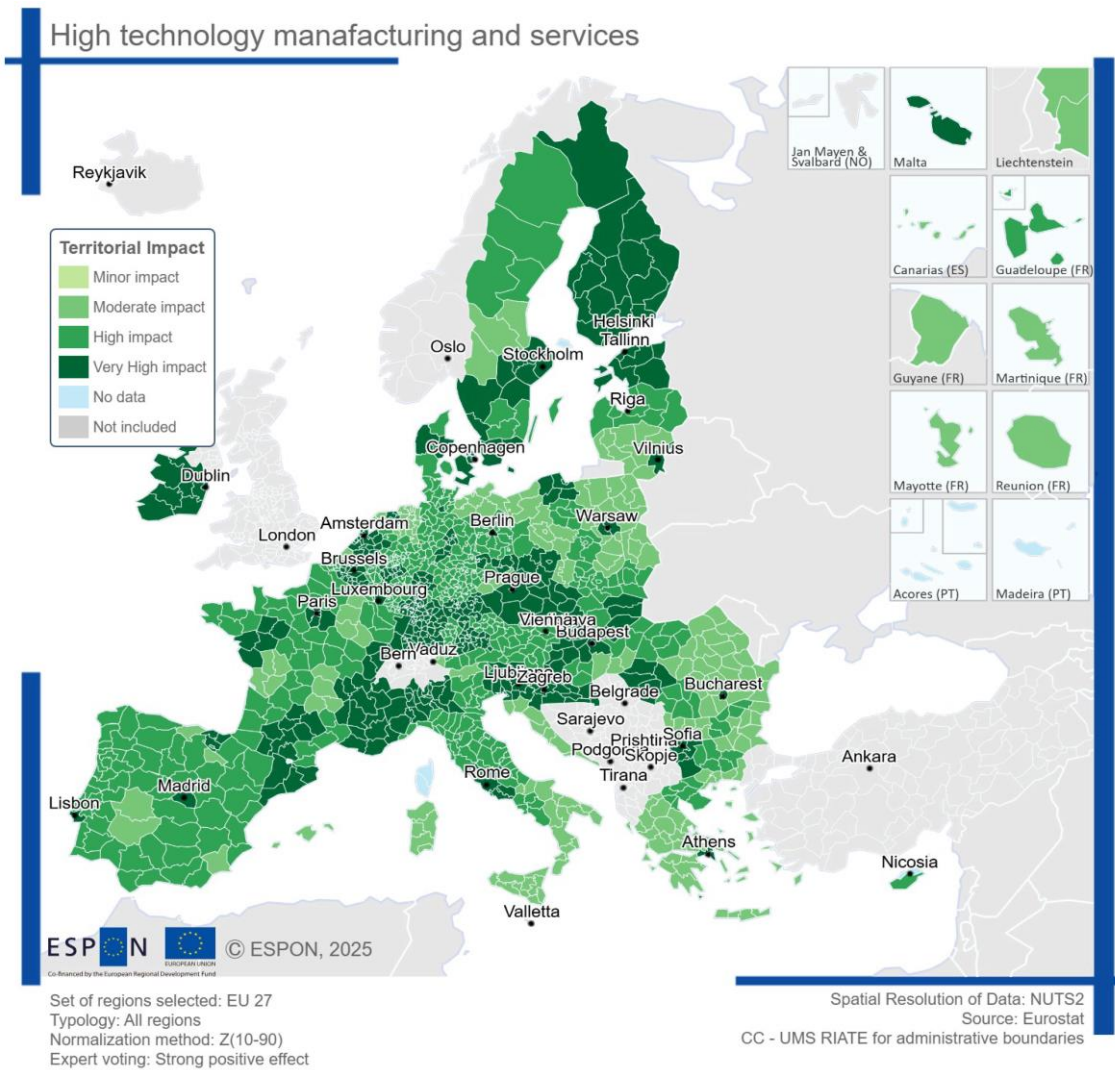
Source: Territorial impact assessment expert workshop, 22 October 2025

Although the majority of experts voted for a strong positive effect, with a total of 7 votes, the votes for a weak negative effect are also relatively high, at 5 votes. Therefore, both scenarios are successively considered in this report.

Regarding territorial sensitivity, it is assumed that regions with a higher share of high-technology manufacturing and services are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact linked to the 'high-technology manufacturing and services' exposure field across the EU-27, based on expert voting that expected a strong positive effect within the context of the European Water Resilience Strategy.

Figure 4.7: High-technology manufacturing and services and the impact potential of the European Water Resilience Strategy – expert judgement: strong positive effect

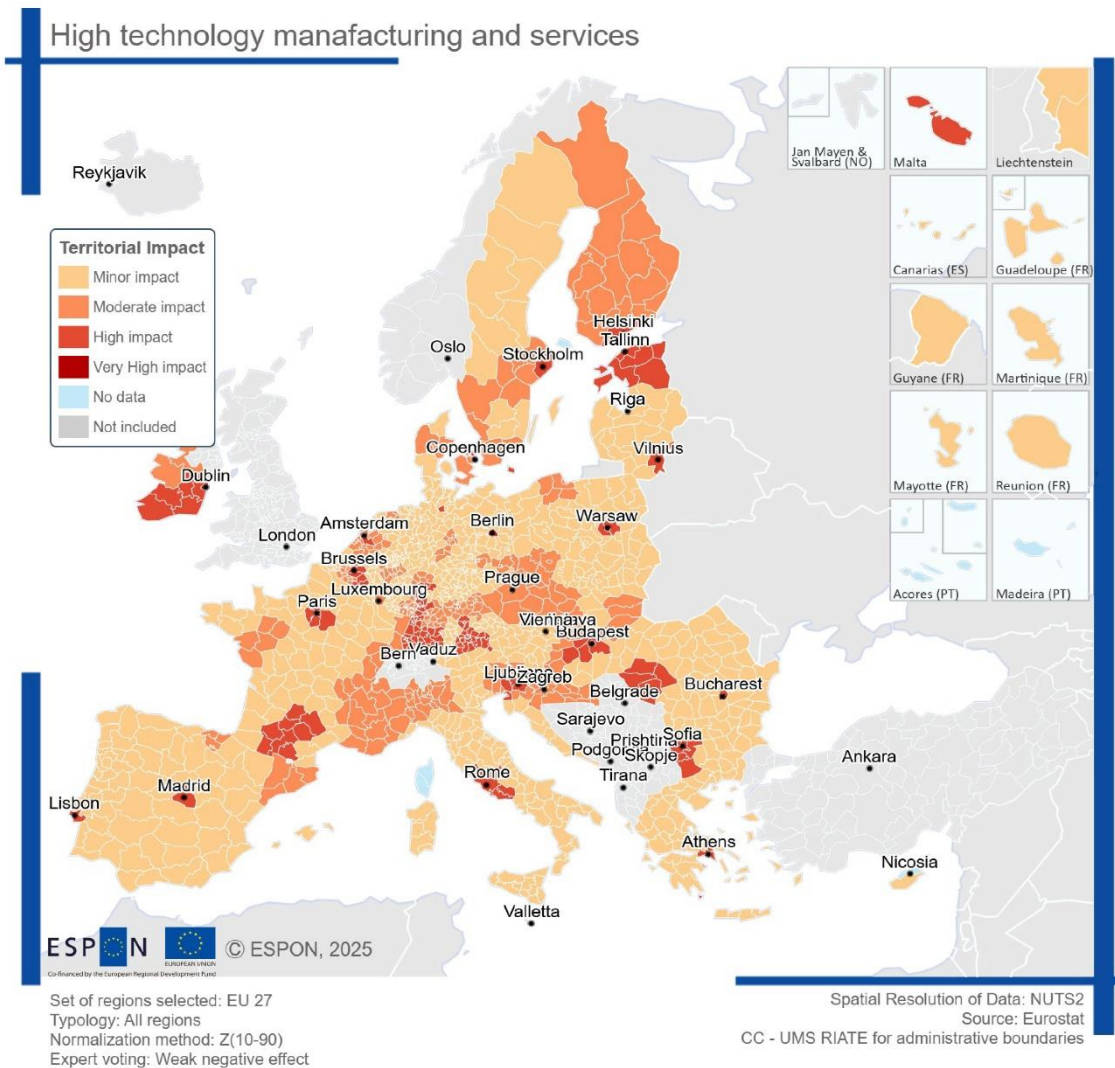


Source: Territorial impact assessment expert workshop, 22 October 2025

The map shows a clearly fragmented and heterogeneous picture across the EU-27. A very high impact is expected in Finland, Ireland and the Czechia, indicating a high share of high-technology manufacturing and services, as well as in some regions in southern Sweden, southern France and southern Germany. Meanwhile, regions around capital cities such as Madrid, Paris, Warsaw, Vilnius and Sofia in particular show a high positive expected impact.

The second map below displays the territorial impact in the same exposure field based on expert voting that expected a weak negative effect within the context of the European Water Resilience Strategy.

Figure 4.8: High-technology manufacturing and services and the impact potential of the European Water Resilience Strategy – expert judgement: weak negative effect



Overall, the spatial pattern of the expected negative impacts is also fragmented. High negative impacts are expected notably in and around capital regions (e.g., Lisbon, Madrid, Paris, Vilnius and Warsaw), where concentrations of high-technology manufacturing, data centres and knowledge-intensive services lead to comparatively high water demand. Finland and Ireland as a whole are expected to experience moderate negative impacts. Similar patterns can be observed in larger areas around Prague, in the region surrounding Zagreb and in several border regions in southern France and northern Italy.

Due to this scattered nature, few differences between cohesion- and non-cohesion regions are visible and regional differentiation is mostly linked to individual regional aspects and not to larger scale patterns.

4.4 Primary sector workforce

The ‘primary sector workforce’ exposure field measures the proportion of employment in agriculture, forestry and fisheries, livestock farming and aquaculture, i.e. in sectors that are directly dependent on sufficient water resources for irrigation. The indicator behind the

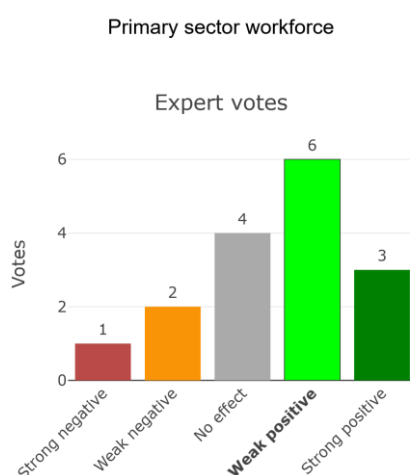
exposure field measures the share of the labour force employed in the primary sector as a portion of total employment¹⁴, based on data from ARDECO for the reference year 2023.

Changes in water availability – for example, due to droughts, groundwater pollution or human-induced overuse – have a direct impact on productivity and income and can also undermine food security by reducing agricultural yields, limiting livestock production and disrupting supply chains. At the same time, agriculture itself is one of the largest consumers of water in many regions. This can lead to overuse of both surface and groundwater resources, especially in areas with intensive irrigation. In addition, agricultural activities can affect water quality through the use of fertilisers and pesticides. Ultimately, these issues in turn affect agricultural activities which depend on the availability of (clean) water.

This exposure field is particularly important in the context of the European Water Resilience Strategy, as a high proportion of employment in the primary sector indicates a strong economic dependence on water-intensive activities. Such regions are therefore particularly sensitive to water stress, droughts and climate fluctuations.

As is visible in the vote distribution, while a clear tendency emerged, experts were split on the assessment of an overall impact in line with the discussions mentioned above. While a majority considered that agricultural activities would ultimately benefit from the implementation, a minority still identified an overall negative impact.

Figure 4.9: Result of the expert judgement: Primary sector workforce and the impact potential of the European Water Resilience Strategy



Source: Territorial impact assessment expert workshop, 22 October 2025

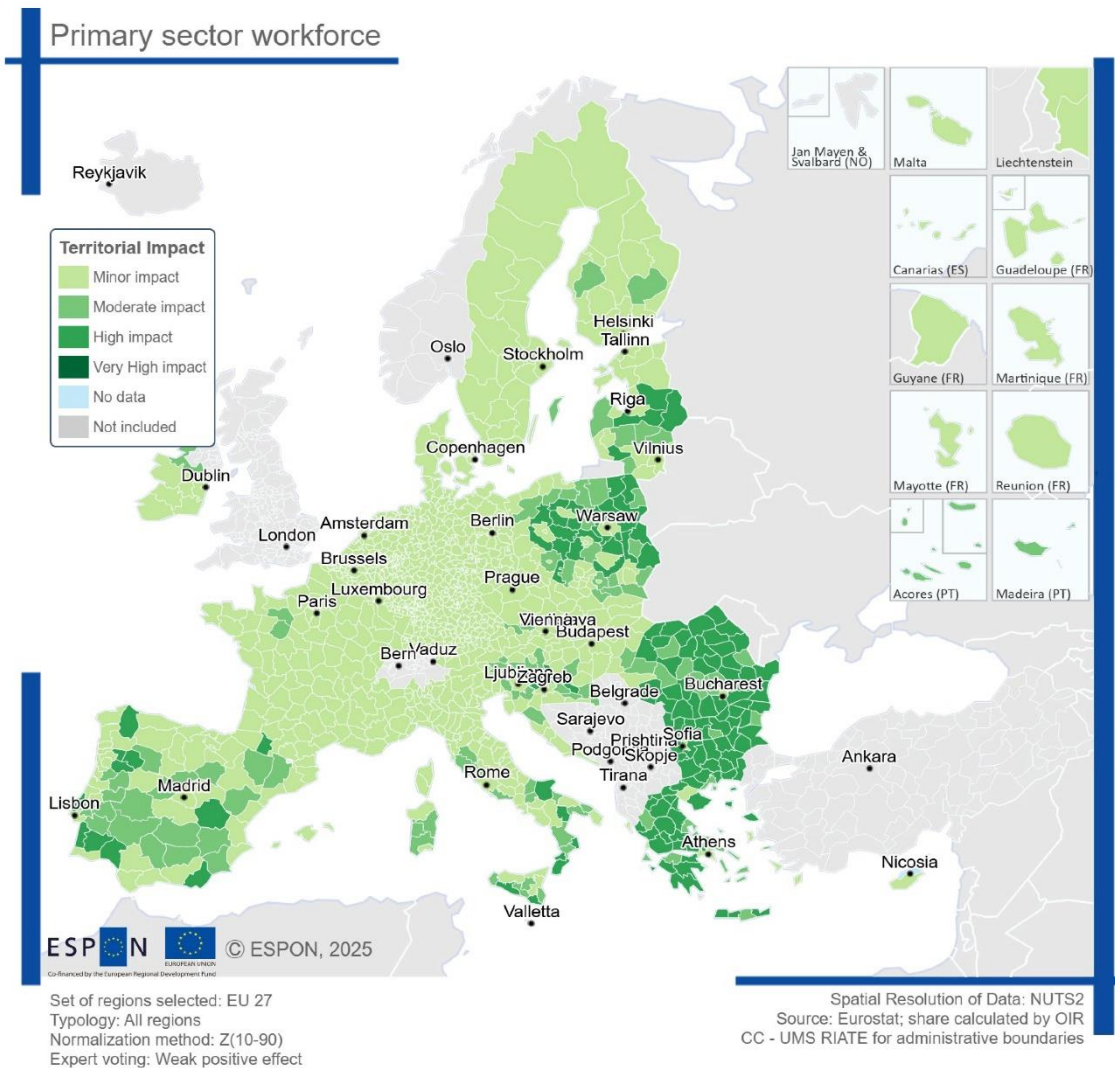
The majority voted for a *weak positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher share of workforce in the primary sector are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact linked to the 'primary sector workforce' exposure field across the EU-27, based on expert voting that expected a weak positive effect within the context of the European Water Resilience Strategy.

¹⁴ The indicator covers about 82% of the regions analysed at NUTS-2 level.

Figure 4.10: Primary sector workforce and the impact potential of the European Water Resilience Strategy – expert judgement: weak positive effect



Source: Territorial impact assessment expert workshop, 22 October 2025

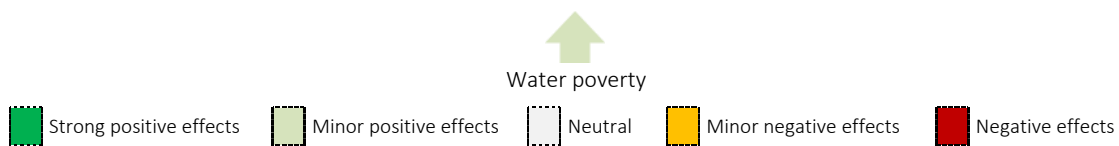
Overall, a clear east-west gradient can be observed. Regions in eastern Europe – especially Romania, Bulgaria, Greece, parts of Poland and the Baltic countries – show moderate to high impacts, indicating a relatively high share of employment in the primary sector. Austria, Slovakia and Hungary, on the other hand, expect only minor impacts in this context of the European Water Resilience Strategy.

In contrast, western and northern Europe, including France, Germany, the Benelux region, Ireland and Scandinavia, show minor expected impacts, reflecting a considerably lower share of employment in agriculture. Southern European regions show a more mixed pattern: while parts of Spain, Portugal and southern Italy expect moderate to high impacts, the expected impacts are relatively minor in other Mediterranean regions such as southern France and Croatia.

In terms of geographical typologies, the distribution is almost even and no clear correlation can be identified: around 50% of coastal and non-coastal regions expect moderate impacts, while around 25% anticipate high impacts and a further 25% expect minor impacts.

5 Potential territorial impact considering societal aspects

Building on section 3.3, one exposure field was selected to reflect and measure the anticipated societal impacts of the Water Resilience Strategy. The selected exposure field of water poverty is expected to show a positive effect. It reflects the correlation between socio-economic conditions and water availability in order to highlight regions that are particularly vulnerable in this regard and that face specific challenges.



5.1 Water poverty

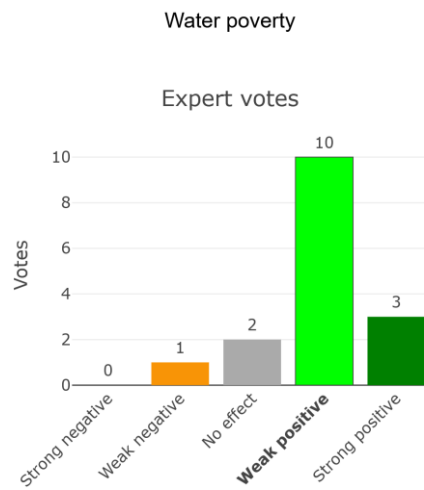
The 'water poverty' exposure field is based on a composite indicator that combines two dimensions: drought risk and the proportion of people at risk of poverty or social exclusion. More specifically, it integrates the proportion of areas affected by annual soil moisture deficits owing to insufficient rainfall with the proportion of the population at risk of poverty or social exclusion. It is calculated at NUTS-3 level¹⁵ for the reference periods 2000-2023 and 2024, based on data from the European Environment Agency (EEA) and Eurostat.

The exposure field reflects the combination of regions' ecological and social vulnerability to water-related stress. Regions which face both water scarcity and high levels of poverty are likely to be considerably more vulnerable when it comes to a reduction in water availability and, ultimately, rising prices, as those who have fewer resources to respond or adapt to water stress will be more severely affected.

Experts considered that implementing the strategy would lead to an improvement in drinking water supply security and potentially also to reduced or curbed prices. However, the increase in efficiency alone was not considered to have a strong effect in this regard, but rather only in combination with other measures. A clear majority vote for a weak negative effect therefore emerged.

¹⁵ The indicator covers about 78% of the regions analysed.

Figure 5.1: Result of the expert judgement: Water poverty and the impact potential of the European Water Resilience Strategy



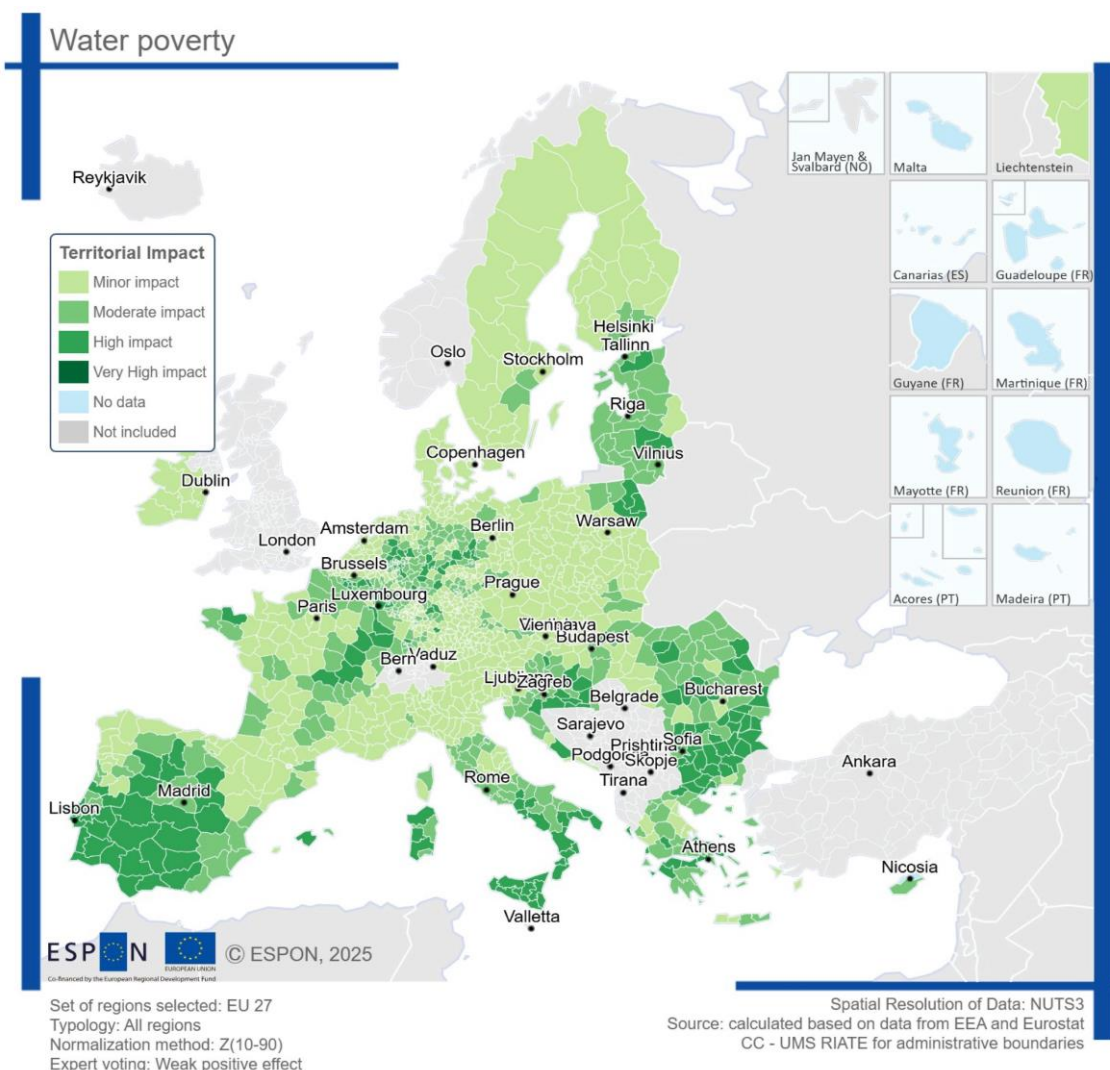
Source: Territorial impact assessment expert workshop, 22 October 2025

The majority voted for a *weak positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher vulnerability to water poverty are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact linked to the 'water poverty' exposure field across the EU-27, based on expert voting that expected a weak positive effect within the context of the European Water Resilience Strategy.

Figure 5.2: Water poverty and the impact potential of the European Water Resilience Strategy – expert judgement: weak positive effect

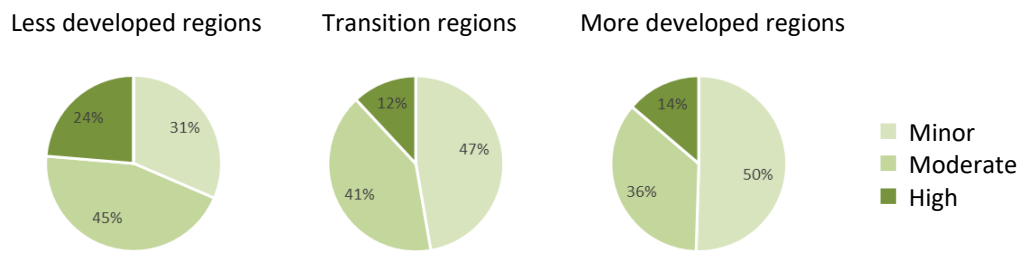


Source: Territorial impact assessment expert workshop, 22 October 2025

The spatial pattern of the ‘water poverty’ exposure field appears relatively fragmented across Europe. Moderate to high impacts are expected in several regions of eastern and southern Europe, particularly in southern Spain and Bulgaria, as well as in parts of the Baltic region, the Benelux countries, Germany and France. In contrast, only minor impacts are expected for the Scandinavian countries, Poland, Czechia, Austria, Slovakia and northern Italy, owing to these countries’ overall lower vulnerability to water poverty.

As expected with this spatial pattern, Figure 5.3 shows that 24% of the less developed regions anticipate a high impact, which is twice the share observed in transition regions (12%) and in the more developed regions (14%).

Figure 5.3: Expected impact based on water poverty by cohesion region

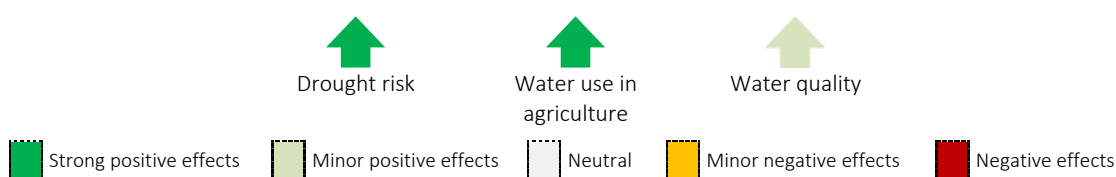


Source: ÖIR GmbH, own calculation based on Eurostat 2023 data

In terms of geographical typologies, the distribution is almost even and no clear correlation can be identified: around 20% of coastal and non-coastal regions expect high impacts, while around 40% anticipate moderate impacts and a further 40% expect minor impacts. However, there is a clear north-south divide, with almost all coastal regions experiencing high impacts being located in southern Europe.

6 Potential territorial impact considering environmental aspects

Building on section 3.3, three exposure fields were selected to capture the expected environmental effects of the strategy at the regional level. Each of these is expected to show a positive impact: flood risk and water quality are expected to display a weak positive effect, while drought risk and water use in agriculture are expected to show a strong positive impact. A fourth exposure field on flood risk was ultimately rejected in the voting. A fifth exposure field proposed was ‘agricultural water pollution’; however, no feasible indicator fitting the methodological approach could be included.



6.1 Drought risk

The ‘drought risk’ exposure field is an important measure in the context of the European Water Resilience Strategy, as it directly reflects the influence of drought conditions on water availability.

The indicator behind the exposure field measures the actual aridity index, which is determined by calculating the monthly mean values of the ratio between actual evapotranspiration and precipitation over a 30-year period. A higher value indicates decreased soil water availability, while lower values show increased soil water availability. The indicator is assessed at NUTS-2 level for the reference period 2011-2040¹⁶, based on data from the European Environment Agency (EEA).

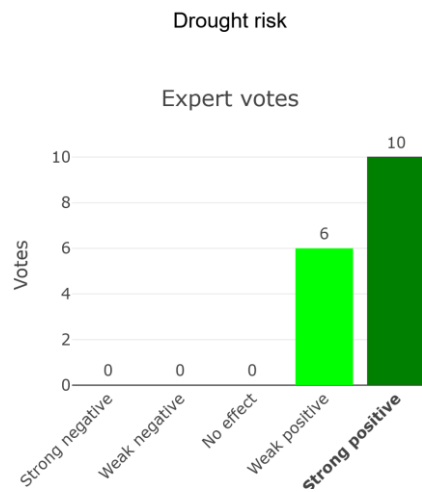
Reduced water availability can have far-reaching consequences for agriculture and food security, as well as for the stability of the ecosystem, society and the economy. Droughts may lead to declining crop yields, ecosystem degradation and biodiversity loss, while also causing socio-economic challenges such as rising water prices, production losses and increasing inequalities in water distribution. Furthermore, climate change is expected to increase both the frequency and intensity of droughts across many European regions.

Experts identified a clear positive effect of implementing the strategy, under the assumption that increased efficiency would reduce abstraction. However, they clearly highlighted that this would only be the case if sufficient measures to avoid any rebound effects were implemented.

Furthermore, the exposure field highlights that further research focus is required during the implementation process. Regions with high values should receive special analytical consideration, as their natural water losses and climatic characteristics can significantly affect the effectiveness of water efficiency measures.

¹⁶ The indicator covers about 99% of the regions analysed.

Figure 6.1: Result of the expert judgement: Drought risk and the impact potential of the European Water Resilience Strategy



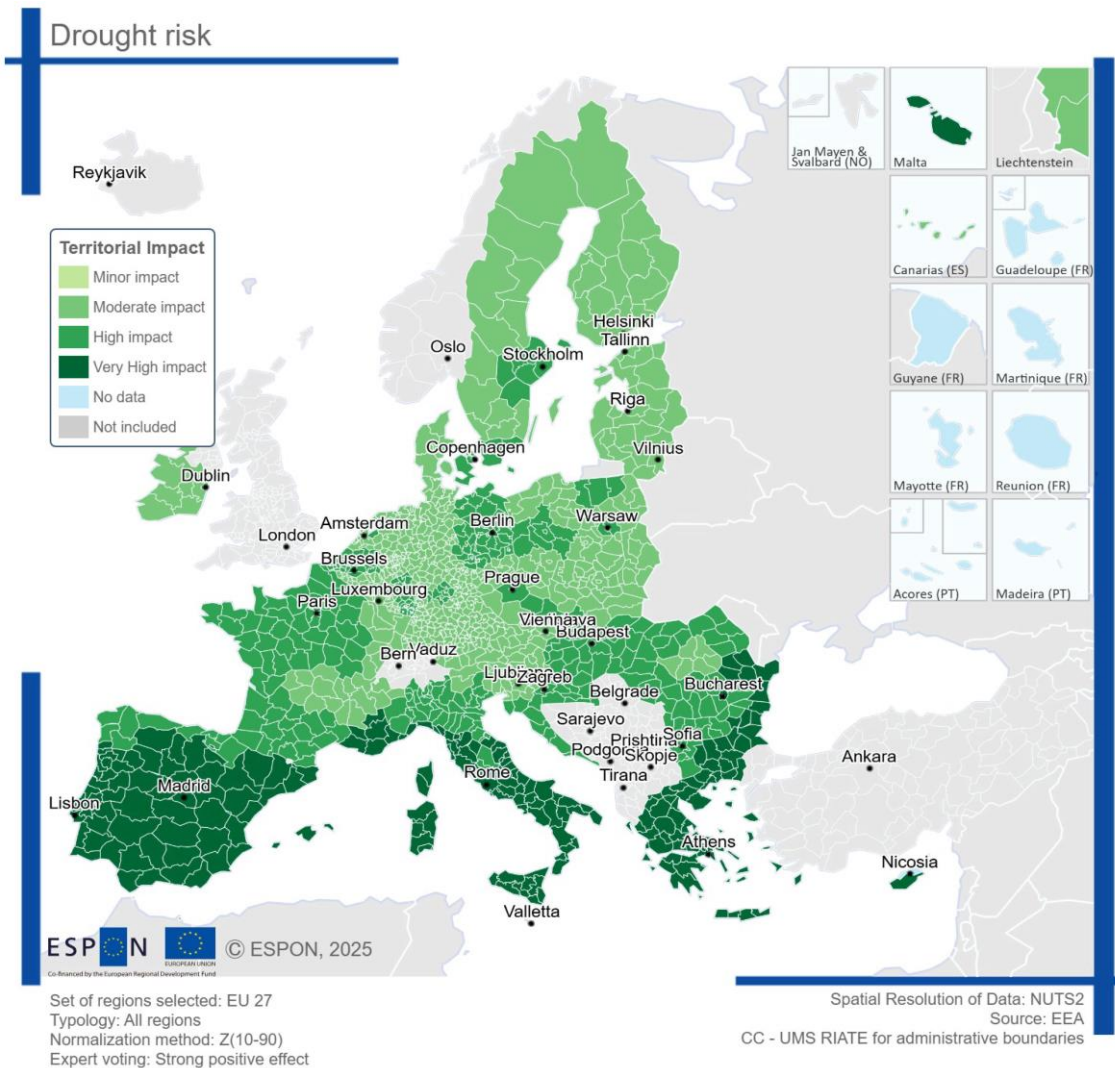
Source: Territorial impact assessment expert workshop, 22 October 2025

The majority voted for a *strong positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher drought risk are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact of the 'drought risk' exposure field across the EU-27, based on expert voting that expected a strong positive effect within the context of the European Water Resilience Strategy.

Figure 6.2: Drought risk and the impact potential of the European Water Resilience Strategy – expert judgement: strong positive effect



Source: Territorial impact assessment expert workshop, 22 October 2025

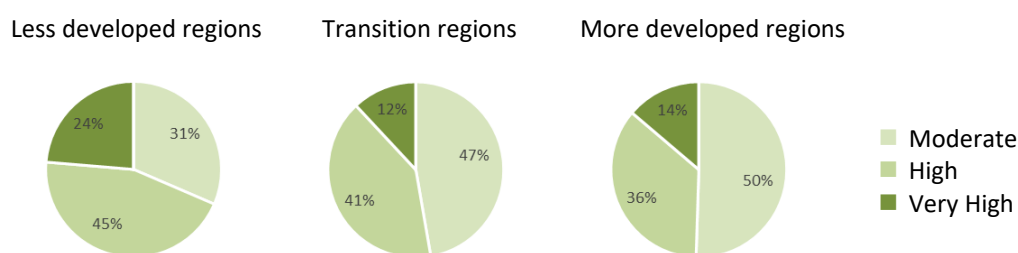
A clear north-south gradient can be observed, with very high impacts expected in southern Europe, particularly in Spain, Portugal, Greece and Italy, but also in the southern regions of France and along the coastal areas of Bulgaria and Romania. High impacts are also expected for large parts of France, Croatia and Hungary, indicating at least an elevated drought risk in these regions.

However, some areas in northern Germany, northern Poland, Denmark and Sweden also display relatively high expected impacts, which seems more unexpected. Overall, this special pattern highlights that drought risk is an increasingly widespread challenge for European countries owing to climate change, affecting not only the Mediterranean area but also a growing number of other regions.

As

Figure 6.3 shows, there is also a cohesion pattern, as there is a higher proportion of less developed regions that expect a high or very high impact as a result of the Water Resilience Strategy (69%), while this proportion of high or very high impact decreases to 53% in transition regions and 50% in more developed regions.

Figure 6.3: Expected impact based on water poverty by cohesion region



Source: ÖIR GmbH, own calculation based on Eurostat 2023 data

A high or very high impact is expected in 52% of non-coastal regions as well as in a substantial share of coastal regions (48%). Although one might assume that coastal areas are often less affected by drought risks – and would therefore display a higher proportion of regions expecting only minor impacts – the distributions are in fact very similar for both types of geographical region: approximately 15% expect only a moderate impact.

6.2 Water use in agriculture

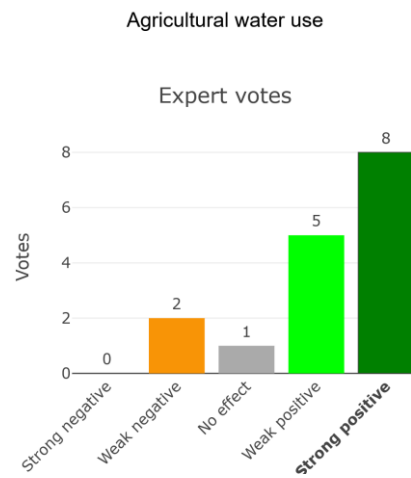
The ‘water use in agriculture’ is a composite indicator that combines data on water abstraction and the portion of agricultural land¹⁷. The reference periods for this indicator are 2018 and 2023, and the data sources are Eurostat and the EEA for the CORINE Land Cover Data.

This exposure field complements the primary sector workforce, covering one of the most relevant sectors requiring access to water and at the same time contributing considerably to water abstraction. The indicator behind it captures the relationship between overall water use and the extent of agricultural land in a region, providing insight into regions where water demand for agricultural purposes places significant pressure on available resources.

Experts saw a clear positive effect in relation to this exposure field, as agriculture would benefit from increased efficiency through cost savings as well as through increased access to clean water for irrigation purposes. Experts considered effects in this regard to be higher than for primary sector employment only.

¹⁷ The indicator covers about 64% of the regions analysed at NUTS-3 level.

Figure 6.4: Result of the expert judgement: Water use in agriculture and the impact potential of the European Water Resilience Strategy



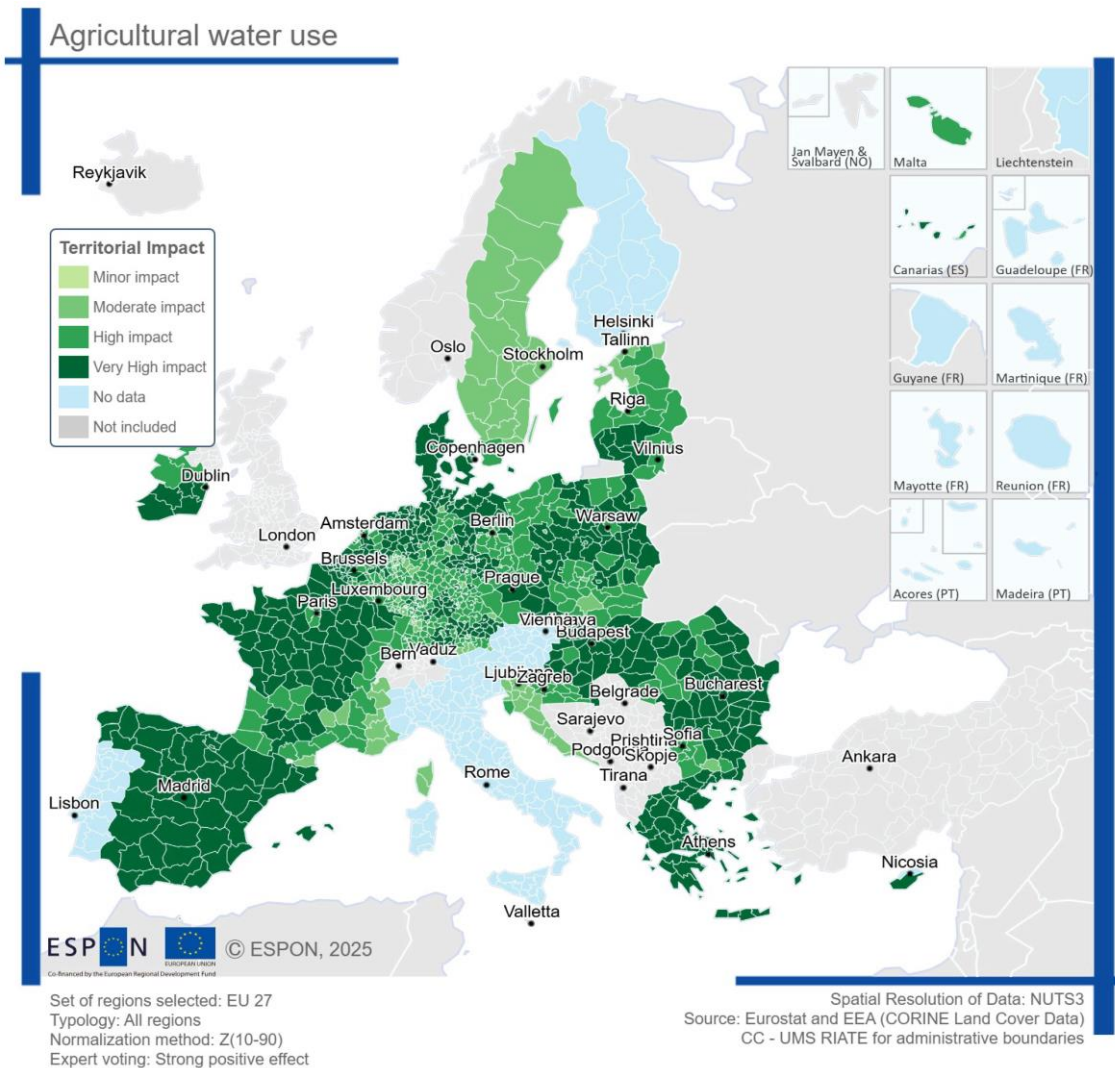
Source: Territorial impact assessment expert workshop, 22 October 2025

The majority voted for a *strong positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher share of agricultural water use are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact of the 'water use in agriculture' exposure field across the EU-27, based on expert voting that expected a strong positive effect within the context of the European Water Resilience Strategy.

Figure 6.5: Water use in agriculture and the impact potential of the European Water Resilience Strategy – expert judgement: strong positive effect

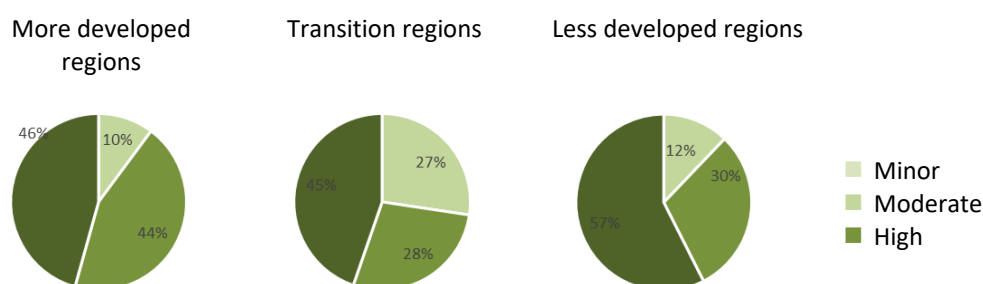


Source: Territorial impact assessment expert workshop, 22 October 2025

While there are considerable data gaps to be considered, overall, a large proportion of European regions are expected to experience a very high impact, particularly in Spain, Greece and Denmark, but also across many regions of France, the Benelux countries, Germany, Romania, Bulgaria, Hungary, Czechia, Poland and Ireland. This spatial pattern reflects an overall high share of water use and agricultural activities. Two exceptions are Sweden and Croatia, where generally only a moderate impact is expected.

As shown in Figure 6.6, more developed regions and less developed regions both show a higher share of regions with a high or very high expected impact, with over 50% of less developed regions showing potential for a very high impact. While such a distribution would be expected in the case of less developed regions, the exposure field also shows considerable relevance in the case of more developed regions.

Figure 6.6: Expected impact based on water poverty by cohesion region



Source: ÖIR GmbH, own calculation based on Eurostat 2023 data

In terms of geographical typologies, the distribution is almost even and no clear correlation can be identified: around 50% of coastal and non-coastal regions expect minor impacts, while around 35% anticipate high impacts and a further 15% expect moderate impacts.

However, data is missing for several countries, including Portugal, Italy, Austria and Finland, which limits a complete assessment of the spatial pattern across Europe.

6.3 Satisfaction with water quality

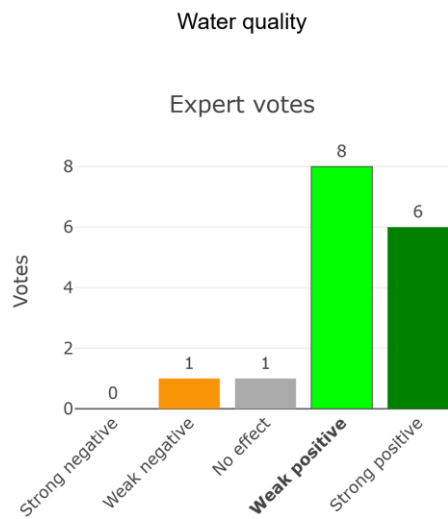
The 'satisfaction with water quality' exposure field is an important measure within the European Water Resilience Strategy because it provides valuable insight into public perception and awareness of water quality. High satisfaction levels indicate that citizens experience reliable access to clean and safe water resources, while low satisfaction may point to challenges relating to pollution, infrastructure or governance.

The indicator behind this exposure field shows the share of people expressing satisfaction with water quality in their region¹⁸, measured at the NUTS-2 level, and for some countries at the NUTS-1 level. The reference period is 2022 and the data source is Gallup World Poll.

Experts identify a clear positive effect on the exposure field; however, they indicated that it would only be a spin-off of the assessed measures. Increasing efficiency alone would not lead to improvements in water quality as this would require additional comprehensive measures to achieve full effectiveness.

¹⁸ The indicator covers about 77% of the regions analysed at NUTS-2 level. However, for the following countries data is only available at NUTS-1 level: AT, BE, DE, EL, ES, FR, IT, NL, PL, SE.

Figure 6.7: Result of the expert judgement: Water quality and the impact potential of the European Water Resilience Strategy



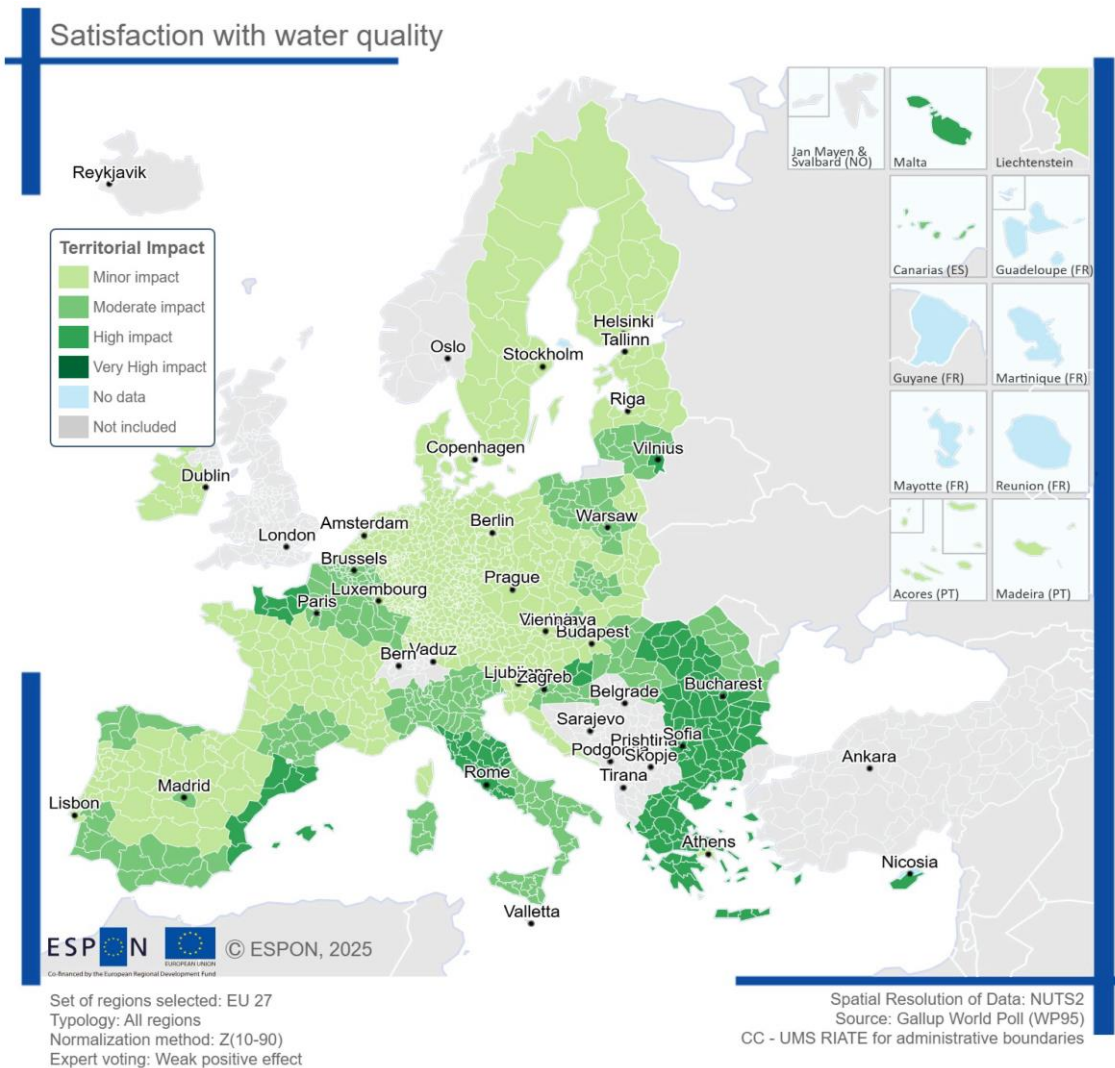
Source: Territorial impact assessment expert workshop, 22 October 2025

The majority voted for a *weak positive* effect.

Regarding territorial sensitivity, it is assumed that regions with a higher level of water satisfaction are expected to have a lower impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact of the 'satisfaction with water quality' exposure field across the EU-27, based on expert voting that expected a weak positive effect within the context of the European Water Resilience Strategy.

Figure 6.8: Water quality and the impact potential of the European Water Resilience Strategy – expert judgement: weak positive effect



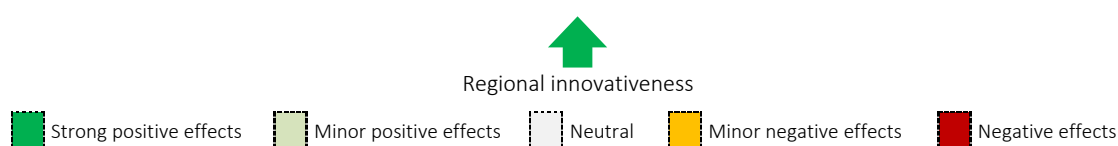
Source: Territorial impact assessment expert workshop, 22 October 2025

The spatial pattern of the ‘satisfaction with water quality’ exposure field shows no clear trend and appears rather fragmented across Europe. High impacts are expected in the eastern coastal regions of Spain, as well as in Greece, Bulgaria, large parts of Romania and in some northern coastal areas of France. Italy also shows moderate to high impacts, implying lower satisfaction with water quality. In the Baltic region, Estonia and Latvia record minor expected impacts, while Lithuania shows moderate impacts. In central European countries such as Czechia, Poland, Slovakia, Hungary and Croatia, the spatial pattern is more mixed, including at the regional level, demonstrating that water quality is not a national but rather a regional issue.

Lower expected impacts, and therefore higher satisfaction with water quality, are mainly to be found in some central and most northern countries, such as Germany, Austria, Ireland, Sweden, Finland and the Benelux countries, as well as in central parts of France, Spain and Portugal. This pattern is also reflected in a higher proportion of high expected impacts in less developed regions (15%) than in more developed regions, where only 6% expect high impacts. However, the proportion of regions expecting low impacts is relatively similar across all three region types, at around 60%.

7 Potential territorial impact considering governance aspects

Based on the discussions reported in section 3.3, one exposure field was selected to reflect on the governance aspects of the Water Resilience Strategy. The selected exposure field of regional innovativeness reflects regions with a higher density of innovative companies and greater overall innovation capacities, which exert greater pressure on their water resources through increased water consumption. As such companies are very often key to regional development, governance measures are very often implemented in a way that supports their establishment and ensures sustainable water use.



7.1 Regional innovativeness

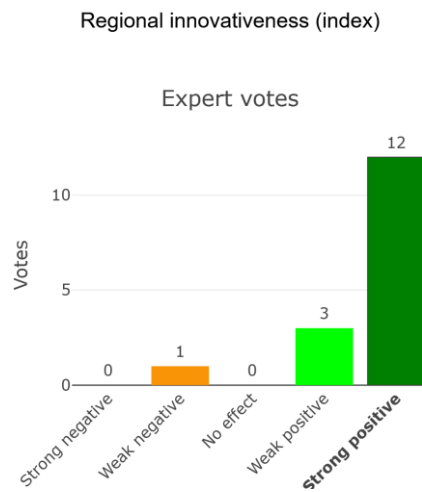
The 'regional innovativeness' exposure field is an important measure within the framework of the European Water Resilience Strategy because regions with a high level of innovation often host technology- and industry-intensive activities that are significant consumers of water.

The indicator behind this exposure field represents the Regional Innovation Index, which is calculated as the unweighted average of normalised scores of various indicators in relevant fields such as innovation activities, human resources and investments¹⁹. The reference period is 2023 and the data source is the Regional Innovation Scoreboard.

Innovative regions tend to concentrate sectors such as high-technology manufacturing, electronics, pharmaceuticals and research facilities, all of which require substantial water input for production, cooling or processing. A high level of regional innovativeness can therefore also indicate increased pressure on local water resources. At the same time, these regions may also play a key role in developing and implementing technological and managerial solutions that enhance water efficiency and resilience. As in the case of the 'high-technology manufacturing' exposure field, experts considered that, generally speaking, innovative companies are likely to benefit, while some high-tech but less innovative companies are likely to face difficulties. In line with the focus of the exposure, a clear positive effect is expected, considerably stronger than in the case of the 'high-technology manufacturing' exposure field.

¹⁹ The indicator covers about 92% of the regions analysed at NUTS-2 level.

Figure 7.1: Result of the expert judgement: Regional innovativeness and the impact potential of the European Water Resilience Strategy



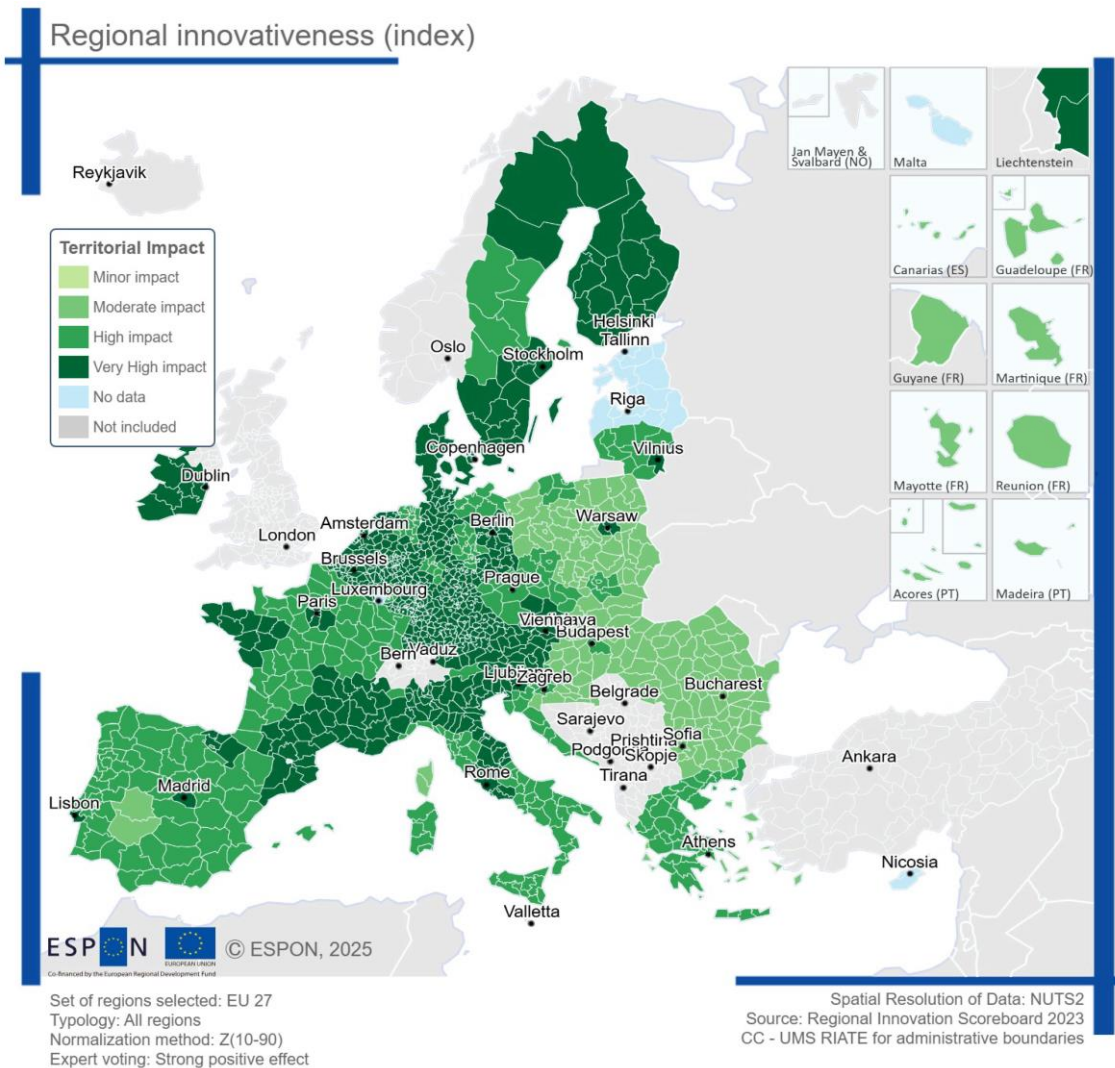
Source: Territorial impact assessment expert workshop, 22 October 2025

The majority voted for a *strong positive* effect.

Regarding territorial sensitivity, it is assumed that regions with higher regional innovativeness are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.

The map below displays the territorial impact of the 'regional innovativeness' exposure field across the EU-27, based on expert voting that expected a strong positive effect linked to the European Water Resilience Strategy.

Figure 7.2: Regional innovativeness and the impact potential of the European Water Resilience Strategy – expert judgement: strong positive effect



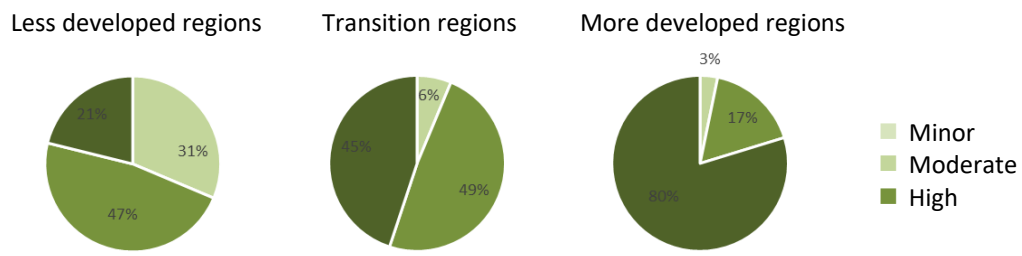
Source: Territorial impact assessment expert workshop, 22 October 2025

The spatial pattern reveals a slight west-east divide. Very high impacts – indicating regions with strong innovation performance and therefore higher sensitivity – are observed in northern and western Europe, particularly in Sweden, Finland, Denmark, Germany, the Netherlands, Belgium, France, Austria and Ireland, as well as in northern Italy and parts of Spain.

In contrast, eastern and south-eastern Europe, including Romania, Bulgaria, Poland, Czechia, Hungary and Slovakia, shows moderate impacts for the majority of the respective countries, usually or often with the exception of the capital region, which shows high or very high impact potential.

This pattern is clearly reflected in the assessment based on cohesion typologies: 80% of more developed regions will see a very high impact (80%). Conversely, only 43% of transition regions and only 21% of less developed regions will see a very high impact.

Figure 7.3: Expected impact based on regional innovativeness by cohesion region



Source: ÖIR GmbH, own calculation based on Eurostat 2023 data

8 Conclusions and recommendations

8.1 Conclusions deriving from the territorial impact assessment

The territorial impact assessment of the European Water Resilience Strategy confirms that the strategy has substantial but uneven territorial implications, determined by regional climatic and bio-geo-hydrological conditions, infrastructure maturity, economic structures and, more notably, the 'starting point' of each region.

The expert discussions showed that **a uniform target – such as the suggested +10% water efficiency improvement – does not reflect territorial realities** without being further broken down. As can be shown from the analysis, regions start from fundamentally different baselines with regard to water stress, infrastructure condition, economic structure, progress made to date and governance capacity. For some highly water-stressed regions, a 10% target is insufficient, while for others it is unattainable without significant investment that may not have a reasonable cost/benefit ratio. However, 'regional level' does not necessarily mean NUTS-3 level, but can mean basin-level, as hydrological necessities can require coordinated approaches and therefore coordinated targets for functionally connected territories. It should be reminded that the WFD is the main legal instrument; it is considered fit for purpose, it addresses the basin level and is coherent with hydro sciences methodologies.

In line with regionally differentiated backgrounds, many regions facing multi-risk pressure such as droughts and rising temperatures are also those with the most outdated infrastructure and currently experiencing the highest water losses. This creates a double vulnerability: systems are less able to cope with shocks and at the same time are more costly to maintain. Improving leakage control and reduction can therefore produce 'double savings'; increasing water revenue and thus income for water provision, and at the same time reducing the need for new supply infrastructure. Subsequently, ecological and social spin-off effects from reduced water abstraction and reduced water costs are possible.

The territorial patterns furthermore indicate that, for multiple indicators, **southern, coastal and eastern regions tend to face overlapping challenges and higher impact vulnerabilities**: droughts and soil moisture deficits; higher dependence on agriculture and, consequently, abstraction; higher share of population vulnerable to water poverty, etc. At the same time such regions often suffer from limited levels of funding and governance capacity and are comparably less likely to benefit from innovation-related aspects as they are less well established in innovation ecosystems.

Such regions also face further challenges when implementing measures to address water-related challenges. Experts agreed that many measures such as digitalisation, physical leakage reduction and water reuse systems do provide considerable benefits in the long term, yet they require substantial initial investment, which not all LRAs have the fiscal capacity to deliver. With a strong concentration of vulnerabilities in southern and eastern European regions, investment needs likely exceed available local budgets in multiple cases. The TIA furthermore highlights the risk of rebound effects, whereby efficiency gains may not translate into lower consumption without behavioural change and pricing policies.

Finally, the assessments revealed some clear high-level territorial patterns and identified regions which are likely to benefit more and those likely to benefit less; however, it also stressed that **limited conclusions can be drawn based on NUTS-3 level data**. The workshop emphasised the existing datasets, including those under the Water Framework Directive (WFD), municipal datasets and the wealth of information in the hands of municipal and private companies relating

to the use of smart meters. Without making use of these datasets, targeted actions will remain difficult to implement.

8.2 Recommendations

Based on the considerations above, a series of recommendations was derived from the expert discussion. While the policy scenario assessed in relation to the strategy will likely lead to overall positive impacts, realising these in practice will require the differences between European regions in terms of hydrology, climate exposure, existing infrastructure, economic structures and governance capacities to be taken into account in the implementation phase. Building on the workshop discussions and the patterns observed in the maps, the following key needs for action have been identified:

Set, monitor and enforce territorially differentiated targets

A first central recommendation concerns the differentiation of water efficiency targets. Without questioning the 10% efficiency target on the grounds that it may not take into account future climate change effects (see section 3.3), different targets could be set for different territories, together with local and regional authorities to ensure feasibility, fairness and alignment with regional conditions. The strategy already highlights that some initiatives for targets at regional level or basin level have been taken; however, these do not go far enough to ensure a territorially differentiated approach. In order to avoid setting unrealistic targets which overstrain local and regional capacities, or excessively low targets which leave potential gains unrealised, a common approach to target setting at regional or basin level is necessary. The relevance of such a coordinated approach should be highlighted in the strategy. Not doing so presents a particular risk for LRA in charge of implementing measures aimed at meeting these targets. Furthermore, the regional economic aspects cannot be overlooked, as, due to their industrial structures, some regions would not be able to implement some targets without risking economic rebound effects.

In line with the differentiated approach to target setting, it is equally important that the setting of targets is accompanied by clear and enforceable monitoring mechanisms. Even if such enforcements cannot be implemented through the strategy alone, they are necessary to avoid the risk that voluntary commitments remain unrealised. In that context, experts pointed to the existing body of sophisticated EU water legislation that is not fully enforced and implemented, namely the WFD.

Address double vulnerabilities and double benefit

The analysis highlighted that many regions facing the highest climate-related hazards in relation to water availability are the same regions that by comparison struggle the most with outdated, leak-prone water systems. Investing in the renewal and modernisation of ageing water infrastructure in this regard offers a double benefit from an economic perspective: improved efficiency increases the share of water revenue available and at the same time reduces the need for expensive new supply infrastructure. Given that these regions often face challenges linked to administrative capacity and access to funding in the first place, without additional financial support they risk falling further behind. **iEU and national programmes should therefore prioritise strategic funding for territories where this multi-risk exposure and infrastructure deficits overlap**, and address limited administrative capacity through targeted technical assistance. This will ensure long-term economic improvements. One expert suggested that the Water Resilience Strategy establish different zonings, along the lines of the legislation on pesticides, grouping together areas with similar features.

Improve the governance of water systems

Another key recommendation addresses the governance of water systems.

First, local authorities, especially those in isolated urban areas and on small islands, may have difficulties organising and buying new facilities and managing water supply systems. They need to join forces to reach scale effects and a regional entity often helps in making progress.

Second, measures should be designed and implemented based on functional rather than administrative logic. The shortcomings of analyses based on NUTS-3 level data reveal clearly that river basins that cross municipal, regional and even national borders provide a challenge for monitoring and implementation. To implement the Water Resilience Strategy effectively, genuine cooperation across these functional territories is essential with the formal and active involvement of local and regional authorities in all phases of planning and implementation. This includes basin-wide target setting and planning, intermunicipal coordination in implementation and, in some cases, cross-border governance structures. While the European Commission already emphasises 'room for improvement' in this regard, it should be clearly emphasised that this poses a considerable barrier for effective implementation.

Another governance aspect has to do with knowledge of water issues, such as technical knowledge (e.g. especially for countries such as Sweden where water is managed by user communities), and knowledge of risk assessment linked to water re-use. Experts referred to the [JRC's European Water Academy](#) (EWA) and the possible sharing of good practices by regions historically used to dealing with floods. It was also highlighted that the EWA should not only focus on water reuse and sanitation but the already mentioned capacity and staff gaps in national authorities to be able to address hydroecology, aquatic biology, hydromorphology, climatology, ecological modelling, monitoring methodologies, chemical pollution and nature-based solutions for restoration and adaptation.

A further governance consideration concerns the need to treat all major freshwater resources - rivers, lakes and groundwater - together. Experts underlined that effective basin-level governance requires addressing these resources as interdependent components of the same hydrological system. Failure to do so may lead to fragmented planning, uneven prioritisation and reduced effectiveness of the Water Resilience Strategy across different territorial contexts.

Improve access to funding and the consistency of EU policies

While the strategy already outlines approaches to funding mechanisms, a critical review of the challenges in relation to funding water resilience reveals several shortcomings in the proposed sources, particularly from a territorial perspective.

Cohesion policy funds offer a good opportunity for the European Commission and Member States to prepare territorially-based strategies and mobilise funding for this issue. However, experts considered that:

- › There is an uncertainty on the sustainability of EU funding beyond a given programming period, while long-term projects have a long implementation period;
- › While the concept of functional areas and territorial tools exist in the Cohesion Policy 2021-2027, in practice, cohesion policy funds can remain implemented following a strict administrative logic, not aligned with the need for investment that follows a functional territorial understanding e.g. at basin level.

If linked to long-term national level target setting, national funding may help overcome the issue of lack of certainty between EU programme cycles; however, it can also create issues. Functional considerations, especially in a cross-border setting, are difficult to capture through purely

national funding schemes and require coordination between the participating countries or states (in the case of federalised systems) .

One expert suggested including more grant schemes among the activities eligible for EU funding.

Improved tools for country-level cooperation to jointly fund projects based on functional considerations and mechanisms to facilitate multi-period projects through cohesion policy would considerably increase the impact potential of measures.

Some experts took a negative view of the Commission's proposals for the 2028-2034 multi-annual financial framework. They regretted the fact that several funds that were useful for implementing the Water Framework Directive or the Water Resilience Strategy and nature restoration at large are discontinued and shifted under other budget lines and may compete with other interests and priorities (e.g. LIFE programme, cohesion policy funding for all regions). They also indicated that the 35% overall target for the environment and climate is too vague, and that the lack of earmarking for bio-diversity restoration and protection also impacts water resilience.

Experts underlined the importance of an integrated approach to implement the Water Resilience Strategy, notably via a strong cohesion policy including the involvement of Local and Regional Authorities in the design of territorial investment strategies for water management, including at basin level and across administrative boundaries. Several experts also stressed that such an integrated and place-based approach can only be effective if supported by coherent, multiannual and multi-fund financing arrangements that are accessible to local and regional authorities.

The EU should integrate water management across all policy areas through a systemic, place-based approach, with consistent legislation. In particular, it should avoid environmentally harmful subsidies, and promote nature-based solutions as the most cost-efficient tool to improve water resilience.

Consider the social implications of measures

As mentioned in section 3.3, it is important to raise public awareness of why water efficiency measures are necessary. One expert considered that incentives such as the free installation of meters and making the first daily 30 litres of water free could facilitate the acceptance of new rules or restrictions.

The assessment points to the need to ensure social fairness and affordability when implementing efficiency-first measures. Regions with high levels of 'water poverty' – which are unevenly distributed across Europe – risk facing disproportionate burdens if efficiency measures are associated with higher consumption prices or new consumption restrictions.

While dynamic or progressive water pricing can be an important tool to curb excessive use, such instruments must be designed to protect vulnerable households and ensure that the Human Right to Water and Sanitation is respected. Besides hard measures, clear communication on the actual cost of water supply and treatment, combined with targeted public awareness campaigns, are tools to reduce excessive household use without implementing measures which would carry social disadvantages.

Consider rebound effects

A specific challenge highlighted during the workshop concerns the risk of rebound effects, whereby efficiency gains can unintentionally result in higher overall water consumption. This

happens when users perceive water as more abundant or accessible, or if it becomes considerably cheaper, and consequently usage increases. The territorial analysis shows that such risks are particularly relevant in regions where water scarcity is seasonal or unevenly distributed, and where behavioural responses can significantly influence demand patterns. Furthermore, the analysis shows that regions with high water scarcity are also frequently among those with the highest water usage per capita (both overall as well as when only residential drinking water consumption per capita), as these regions also tend to have much lower water prices.

To mitigate rebound effects, the implementation of the Water Resilience Strategy should be accompanied by a combination of behavioural, regulatory and economic measures. Efficiency gains should not be treated as 'additional available water' for consumption but rather as recovered environmental flows that support the environmental aspects urgently needed to restore the water cycle. Local and regional authorities play a key role in communicating clearly that technological improvements do not eliminate scarcity and that efficiency must go hand in hand with responsible consumption habits.

As long as the above-mentioned social considerations are respected, dynamic or progressive pricing models can contribute to mitigating the rebound effect both on private consumers and on the business sector. Furthermore, where feasible (and possible to monitor), LRAs should link efficiency gains to explicit environmental targets and focus primarily on reducing demand, in order to ensure concrete contributions.

Integrate existing data and collect new data

The workshop and data analyses also highlighted significant data gaps and digital capacity needs. Many LRAs lack access to consistent, high-quality datasets on water consumption, illegal abstraction, leakage rates, groundwater levels and climate-related pressures. At the same time, substantial information already exists through WFD data, municipal datasets and digital tools such as smart meters. These datasets are not yet systematically integrated in many cases and cannot be aggregated from the local level to higher levels. Better coordination, interoperability and transparency of data would greatly enhance planning possibilities and monitoring. While smart-metering and sensor technologies can offer substantial benefits, their deployment must consider both the environmental footprint of digital equipment and the financial capacity of providers.

In addition, some experts recommended changing the way water quality is measured. At present, measurements are typically taken 12 times per year and it is not known what happens in between. Monitoring should happen more frequently and should be carried out at the receiving side, including in urban areas.

Other recommendations

Experts made additional recommendations, such as:

- introducing a code of conduct for the agricultural sector, for example, advising farmers to stop irrigating in cases of flood risk; and
- emphasising the importance of being resilient to extreme climate events: the occurrence of one extreme event where there has been insufficient preparation can wipe out the benefits of a whole year's efficiency gains.

Overall, the TIA demonstrates that the European Water Resilience Strategy has strong potential to generate positive territorial outcomes, but only if its implementation is tailored to local and

regional conditions, supported by adequate strategic funding, embedded in functional water governance structures and accompanied by robust data and monitoring systems. In this context, LRAs will continue to play a crucial role, both as managers of water systems and as integrators of cross-sectoral adaptation strategies.

Appendix: Description of the indicators used and regional sensitivity

Following the interactive discussion among experts, the following indicators were selected and introduced into the ESPON TIA Quick Check model:

Water consumption

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with higher water consumption are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Freshwater consumption in litres per day and capita
Source	JRC LUISA
Reference year	2020 (projection)
Original Indicator Spatial Reference	NUTS2 (2010), for EL: NUTS2 (2006)

Industry workforce

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher share of industry workforce are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Share of persons employed in industry (NACE Rev 2. Section C-D) on total employment (SBS data comprises the NACE Rev 2. sections B-J and L-N and division S95)
Source	Share calculated based on data from ARDECO
Reference year	2023
Original Indicator Spatial Reference	NUTS3 (2021)

High-technology manufacturing and services

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher share of high-technology manufacturing and services are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Share of employment in high-technology manufacturing and knowledge-intensive high-technology services
Source	Eurostat
Reference year	2019

Original Indicator Spatial Reference	NUTS2 (2021)
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Primary sector workforce

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher share of workforce in the primary sector are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Share of persons employed in agriculture, forestry and fishing on total employment
Source	Share calculated based on data from ARDECO
Reference year	2023
Original Indicator Spatial Reference	NUTS3 (2021)

Water poverty

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher vulnerability to water poverty are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Sum of the normalised indicators 1) share of areas affected by annual soil moisture deficit caused by insufficient precipitation and 2) normalised share of people at risk of poverty or social exclusion. Normalisations were performed on a scale from 0 to 100.
Source	Calculated based on data from EEA and Eurostat
Reference year	2000-2023 and 2024
Original Indicator Spatial Reference	NUTS3 (2021) and NUTS2 (2021)

Drought risk

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher drought risk are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	This indicator represents the Aridity Actual index. It is determined by calculating the monthly mean values of the ratio between actual evapotranspiration and precipitation over a 30-year period. A higher value indicates decreased soil water availability, while a lower value shows increased soil water availability.
Source	EEA
Reference year	avg. 2011-2040

Original Indicator Spatial Reference	NUTS2 (2021)
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Water use in agriculture

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with a higher share of agricultural water use are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Sum of the normalised indicators 1) annual freshwater abstraction by public water supply per capita and 2) normalised share of agricultural areas. Normalisations were performed on a scale from 0 to 100.
Source	Eurostat and EEA (CORINE Land Cover Data)
Reference year	2023 and 2018
Original Indicator Spatial Reference	NUTS0 and NUTS3 (2021)

Satisfaction with water quality

Definition of sensitivity	A higher value of the indicator indicates a lower sensitivity, assuming that regions with a higher level of water satisfaction are expected to have a lower impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Share of people expressing satisfaction with the water quality in their region
Source	Gallup World Poll (WP95)
Reference year	2022
Original Indicator Spatial Reference	NUTS1 (2021): AT, BE, DE, EL, ES, FR, IT, NL, PL, SE; NUTS2 for other countries

Regional innovativeness

Definition of sensitivity	A higher value of the indicator indicates a higher sensitivity, assuming that regions with higher regional innovativeness are expected to have a higher impact potential linked to the proposed scenario for the European Water Resilience Strategy.
Description	Regional Innovation Index is the unweighted average of normalised scores of various indicators in relevant fields such as innovation activities, human recourses, investments.
Source	Regional Innovation Scoreboard 2023
Reference year	2023
Original Indicator Spatial Reference	NUTS2 (2021)



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Rue Belliard/Belliardstraat 101 1040 Bruxelles/Brussel BELGIQUE/BELGIË
 Tel. +32 22822211 e-mail: visuals@cor.europa.eu www.cor.europa.eu
 /european.committee.of.the.regions  /european-committee-of-the-regions
 @EU_regions_cities  @EU_CoR

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