SafeCREW
Final Conference

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Belgium

Funded by
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INNOVATIVE TOOLS TO CONTROL ORGANIC MATTER AND DISINFECTION BYPRODUCTS IN DRINKING WATER

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26/03/2026

Funded by
the European Union

Objective and ambition

intoDBP will develop, test, scale-up, validate and benchmark innovative tools and strategies **to protect catchments and minimize human exposure to DBPs** under current and future climates, without compromising disinfection efficacy, and which could be applied at the global scale.

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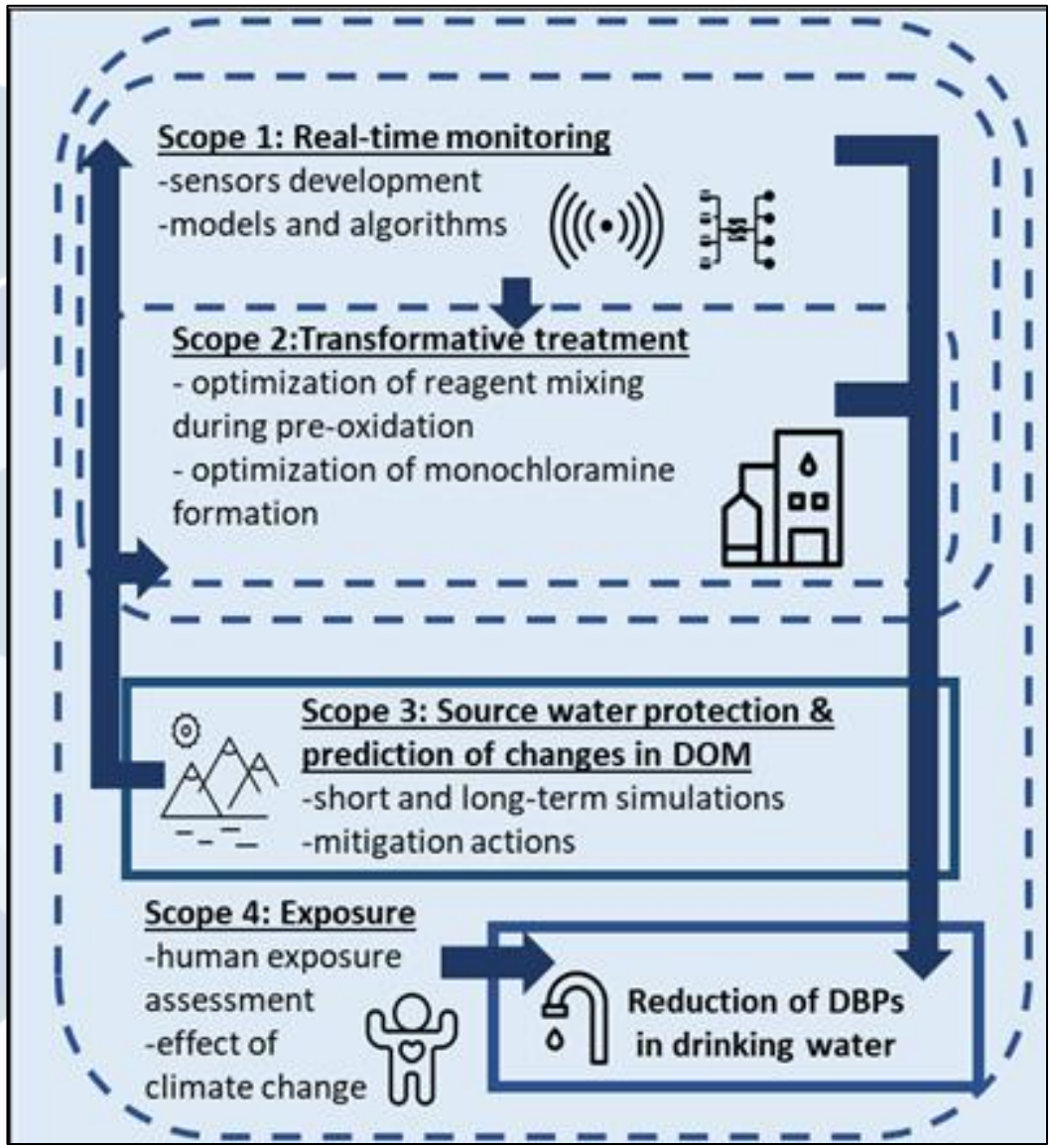
LIST OF PARTICIPANTS

Number	Role	Short name	Legal name	Country
1	COO	ICRA	FUNDACIO INSTITUT CATALA DE RECERCA DE L'AIGUA	ES
2	BEN	UCY	UNIVERSITY OF CYPRUS	CY
3	BEN	UNICT	UNIVERSITA DEGLI STUDI DI CATANIA	IT
4	BEN	DKIT	DUNDALK INSTITUTE OF TECHNOLOGY	IE
5	BEN	ISGLOBAL	FUNDACION PRIVADA INSTITUTO DE SALUD GLOBAL BARCELONA	ES
6	BEN	WE	WATER EUROPE	BE
7	BEN	HUJI	THE HEBREW UNIVERSITY OF JERUSALEM	IL
8	BEN	AQUASOL SRL	AQUASOL SRL	IT
9	BEN	SK EUROMARKET	S.K. EUROMARKET LTD	CY
10	BEN	CANAL DE ISABEL	CANAL DE ISABEL II GESTION S.A.	ES
11	BEN	WBL	Eparchiakos Organismos Aftodioikisis Lemesou	CY
12	BEN	ATL	ENTE DE ABASTECIMIENTO DE AGUA TER-LLOBREGAT	ES
13	BEN	S CAN GMBH	BADGER METER AUSTRIA GMBH	AT
13.1	AE	SCAN IBERIA	BADGER METER SPAIN S.L	ES
14	AP	VT	VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY	US
15	AP	Uni S. Australia	UNIVERSITY OF SOUTH AUSTRALIA	AU
16	BEN	DCU	DUBLIN CITY UNIVERSITY	IE
17	BEN	CSIC	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES
18	BEN	UFZ	HELMHOLTZ-ZENTRUM FUR UMWELTFORSCHUNG GMBH - UFZ	DE

SCOPE

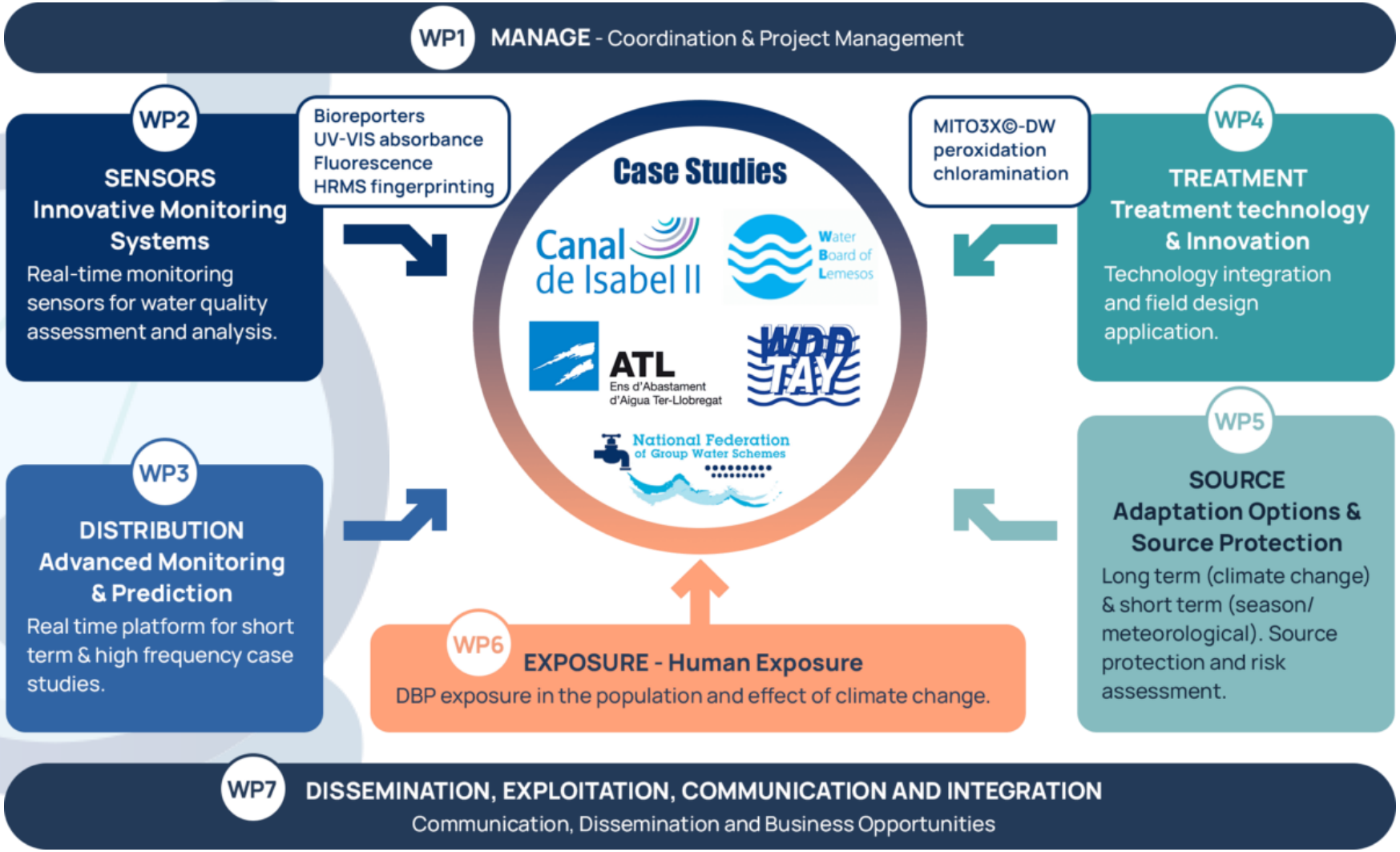


Key innovations:

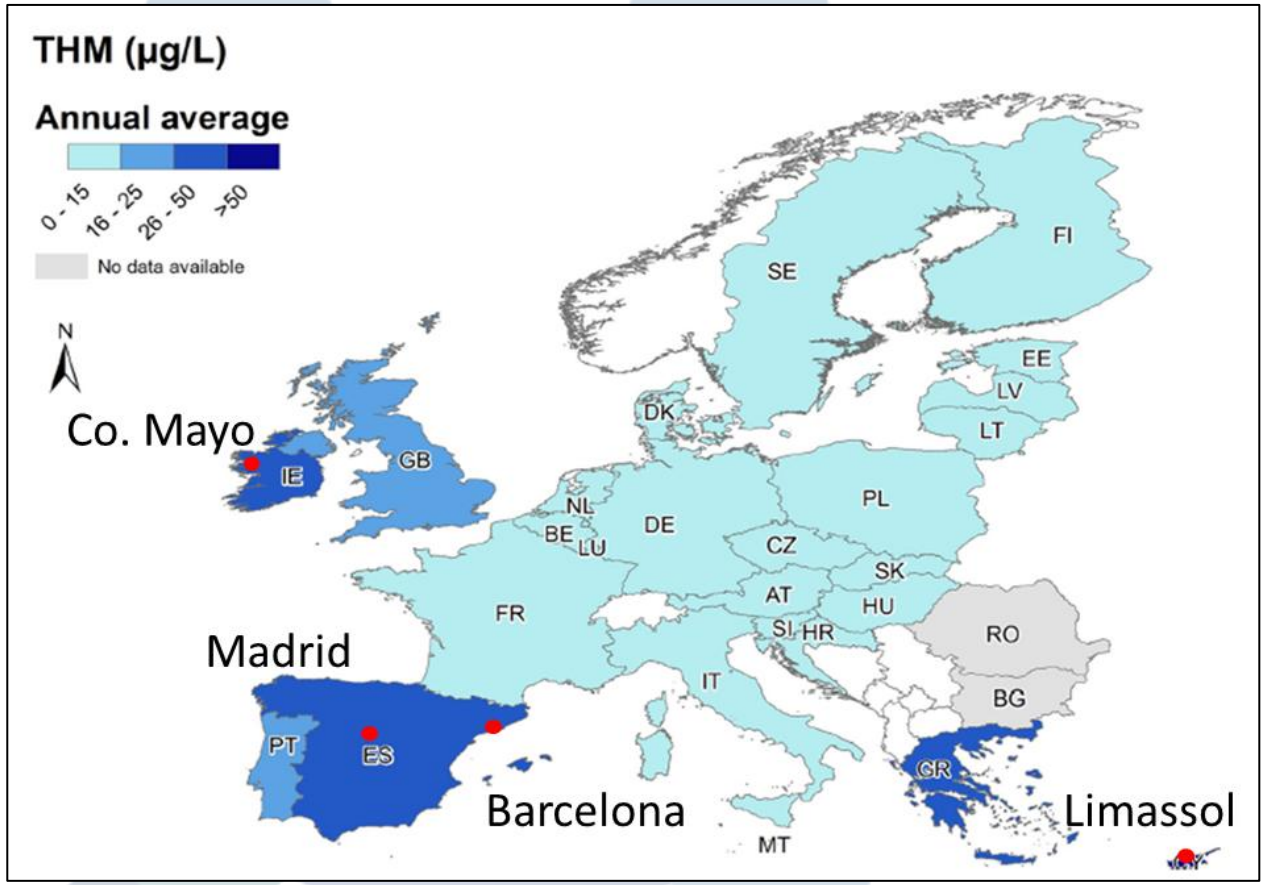
- On-line fluorescence sensors
- On-line bioreporters
- Disinfection and precursor removal technology
- Algorithms for DBP formation in DWTPs and networks
- Network models to optimize sensor deployment
- Models to forecast source water quality changes
- Human exposure models

PROJECT OVERVIEW

www.intodbp.eu



CASE STUDIES



Adapted from (Evlampidou, 2020)

❑ CS1-LIMASSOL (CYPRUS)

high variability of source water and quality and high formation of THMs.

❑ CS2- BARCELONA (SPAIN)

high THMs formation potential in distributed water and changing conditions in the source reservoirs. High concentration of bromide in drinking water sources.

❑ CS3- MADRID (SPAIN)

possible formation of N-DBPs (e.g., NDMA) from generation of chloramines

❑ CS4- Co. MAYO (IRELAND)

high formation of THMs from peatland dominated catchments. EU infringement for unsafe drinking water.

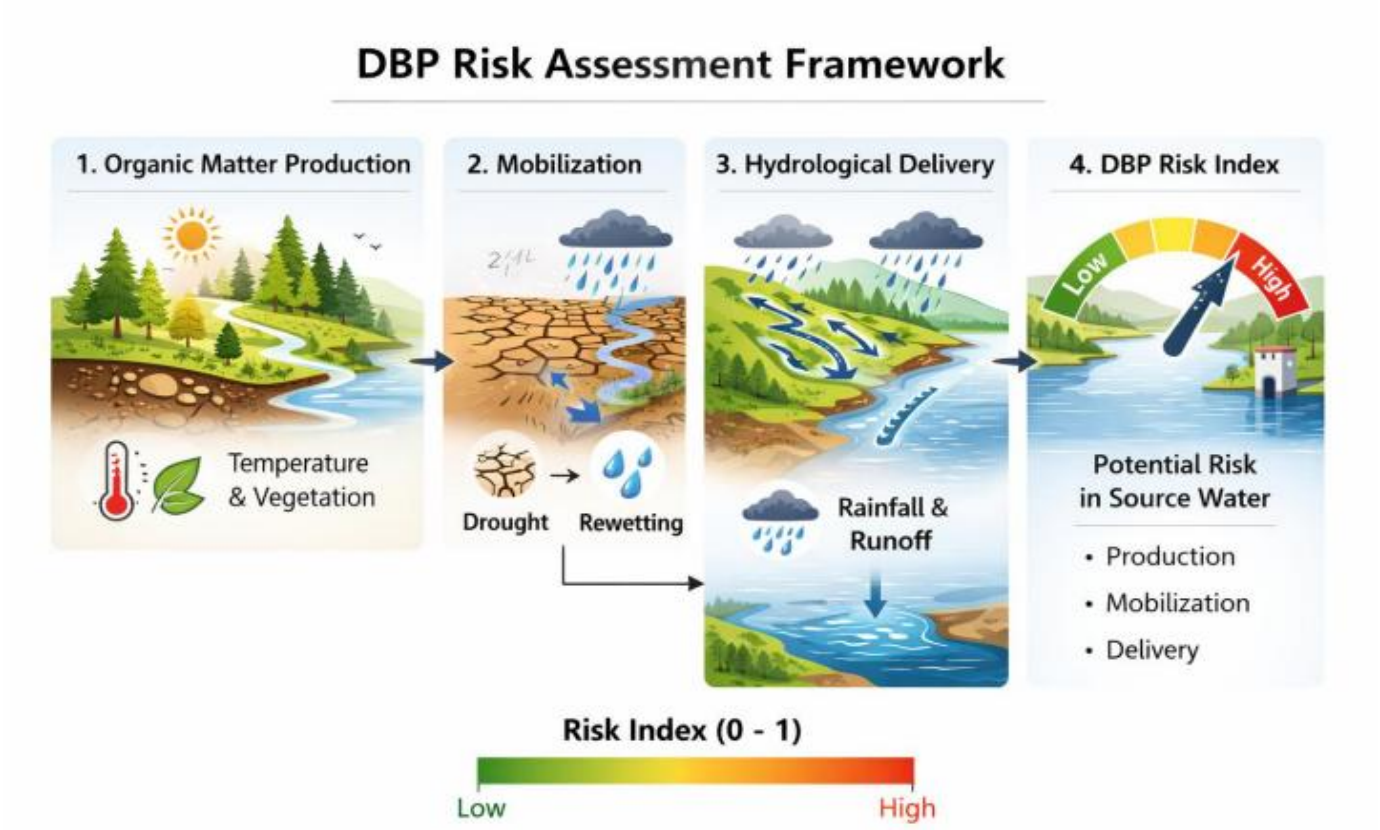
MAIN OUTCOMES

❑ 1. Climate and source forecasting workflow

A forecasting workflow has been built to link climate, hydrology and source water quality, helping anticipate precursor loads and support prevention-oriented source protection

https://doi.org/10.5194/egusphere-2025-4049

A risk assessment methodology for climate-driven source-water DOM risks and mitigation across European sites



- An index-based methodology will assess how climate and land-use change affect DOM-related risks in source waters.
- It combines climate, land-use and water-quality projections to estimate future DBP formation risks.
- It can support monitoring priorities, investigations and source protection within adaptive management strategies.

MAIN OUTCOMES

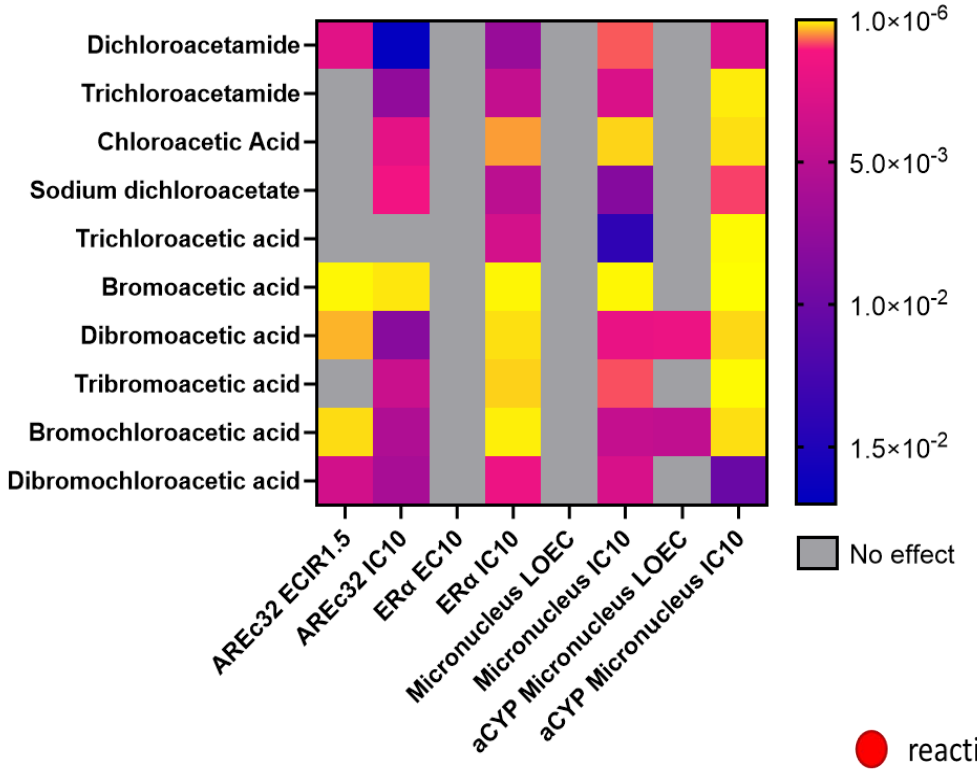
❑ 2. Integrated monitoring toolbox for DBP assessment

A source-to-tap monitoring toolbox is now in place, combining sampling methods, DBPFP algorithms, fluorescence screening, HRMS fingerprinting and bioassay components

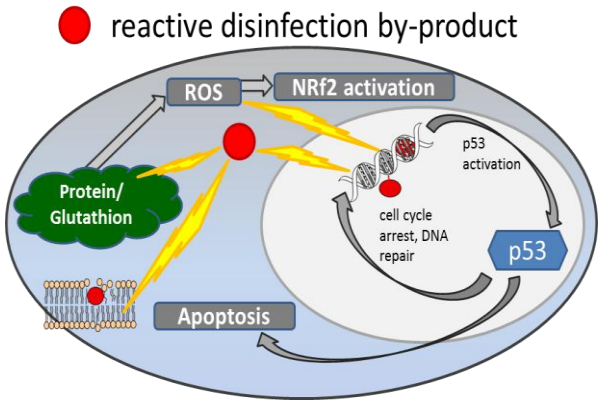
Development of in-vitro bioassays for off-line in-vitro toxicity measurements

Results of Single chemicals:

- Half of the chemicals activated ARE at concentrations below IC10 (cytotoxicity)
- All chemicals were cytotoxic in at least one assay
- No chemical was active in ERα Micronucleus assay
- aCYP induced genotoxic effects for two chemicals
- aCYP let to overall increased cytotoxicity



Oxidative stress is the dominant and most sensitive biological response to DBPs, which strongly supports using AREc32 in intoDBP.



[mol/L]

MAIN OUTCOMES

❑ 3. Optical sensing tools for real-time DBP risk tracking

Optical tools now allow real-time assessment of DBP precursor dynamics, with UV-VIS and fluorescence methods already developed and tested in case-study conditions

Development of a fluorescence-based tool and adaptation for real-time measurement

Task 2.2	Development of a fluorescence-based tool and adaptation for real-time measurement [Lead: UNICT] [M1-M18]
 *Degree of achievement*	• UNICT developed a fluorescence-based tool for real-time DBP measurement, using selected excitation/emission pairs. • Two prototype sensors were created, interfacing with Programmable Logic Controller (PLCs) via analogue and digital outputs. • Sensors were calibrated and validated with strong correlations to laboratory data (R^2 values of 0.94 for I3 and 0.98 for I5). • The tool effectively predicted DBP concentrations, detailed in Deliverable D2.3, submitted to the EU Funding & Tenders Portal.

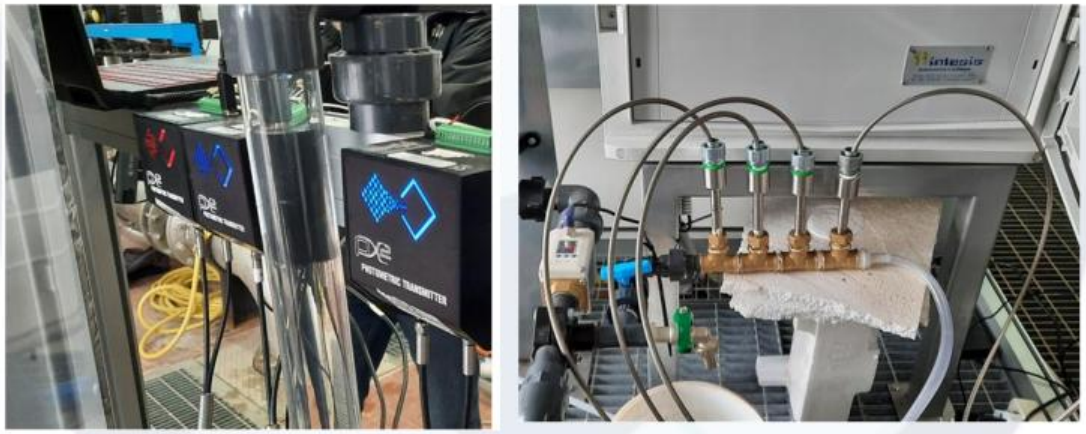


Figure 2. Left: Picture of the PT. Right: probe of the customized fluorescence tool

Figure 3. Detail of an online connection of the fluorescence probe

Comparison of UV and fluorescence signals to HRMS fingerprinting

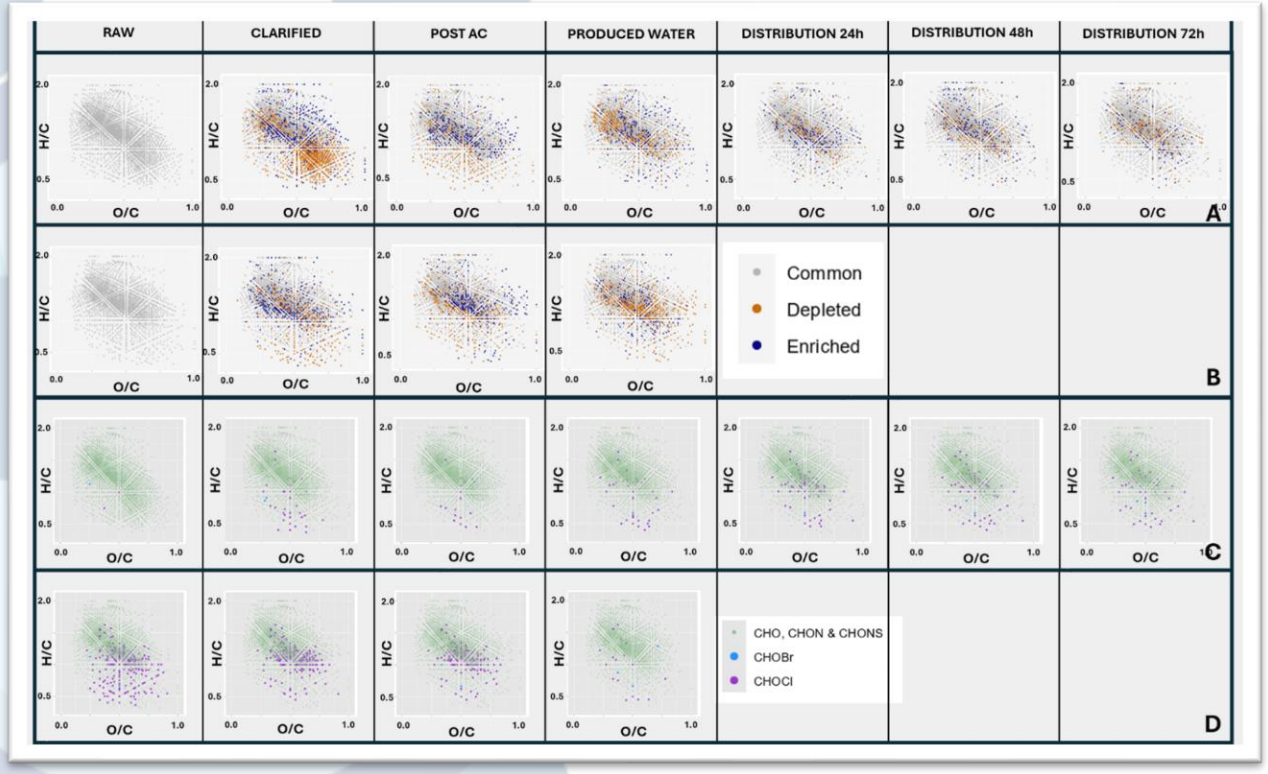


Figure 1. Mean relative changes in the molecular features detected across all samplings along the DWTP (A) and FP samples (B), highlighting depletion and enrichment trends based on features showing at least a tenfold change in abundance compared to the previous treatment stage (A and B). Van Krevelen diagrams showing the distribution of molecular features at each DWTP (C) and FP (D) sampling points, distinguishing halogenated from non-halogenated compounds.

- ✓ Selective DOM removal
- ✓ Formation of new features
- ✓ Differences between real samples and FP samples

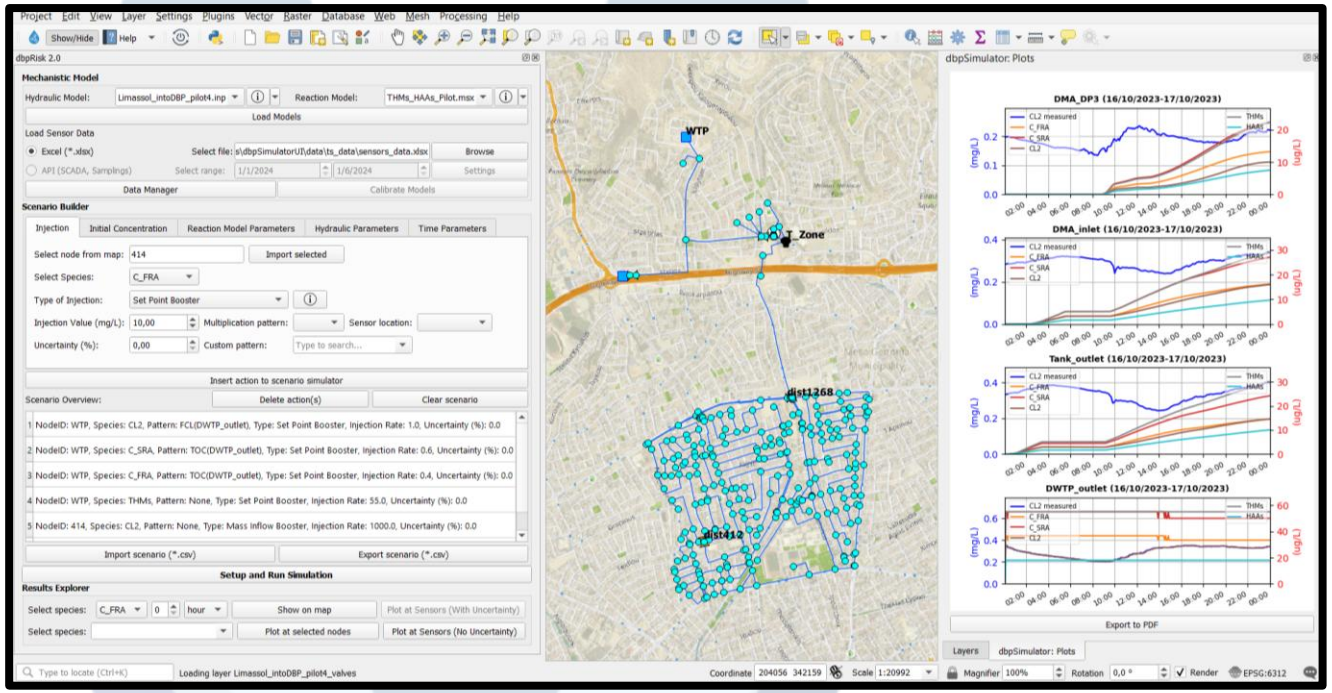
https://doi.org/10.1021/acsestwater.5c01470

MAIN OUTCOMES

❑ 4. Digital platform for DBP prediction in water networks

The project delivered a digital DBP prediction platform (dbpRisk 2.0) that combines hydraulic modelling, water-quality data and scenario analysis for network decision support

dbpRisk 2.0: Software tool for simulating DBP formation in WDN



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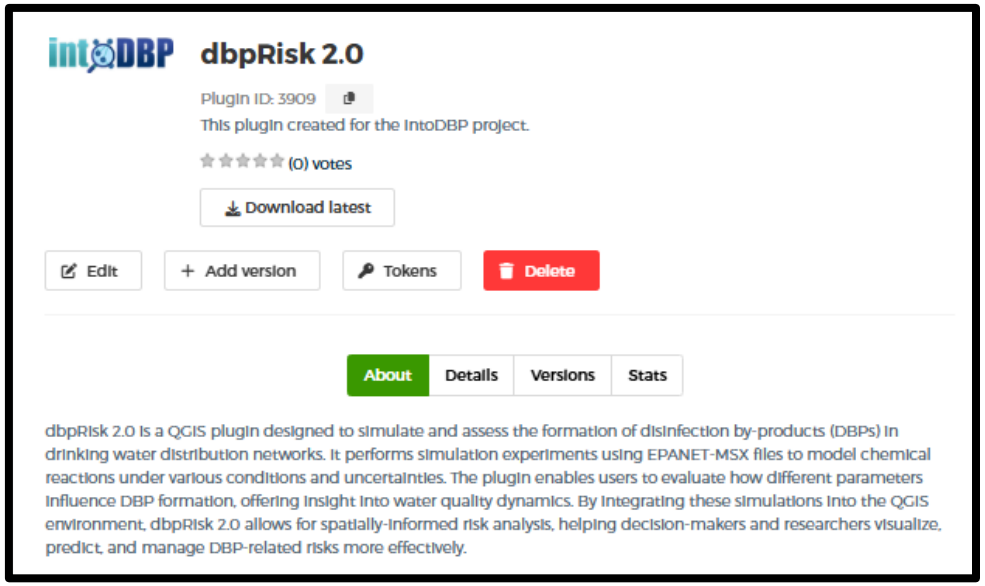
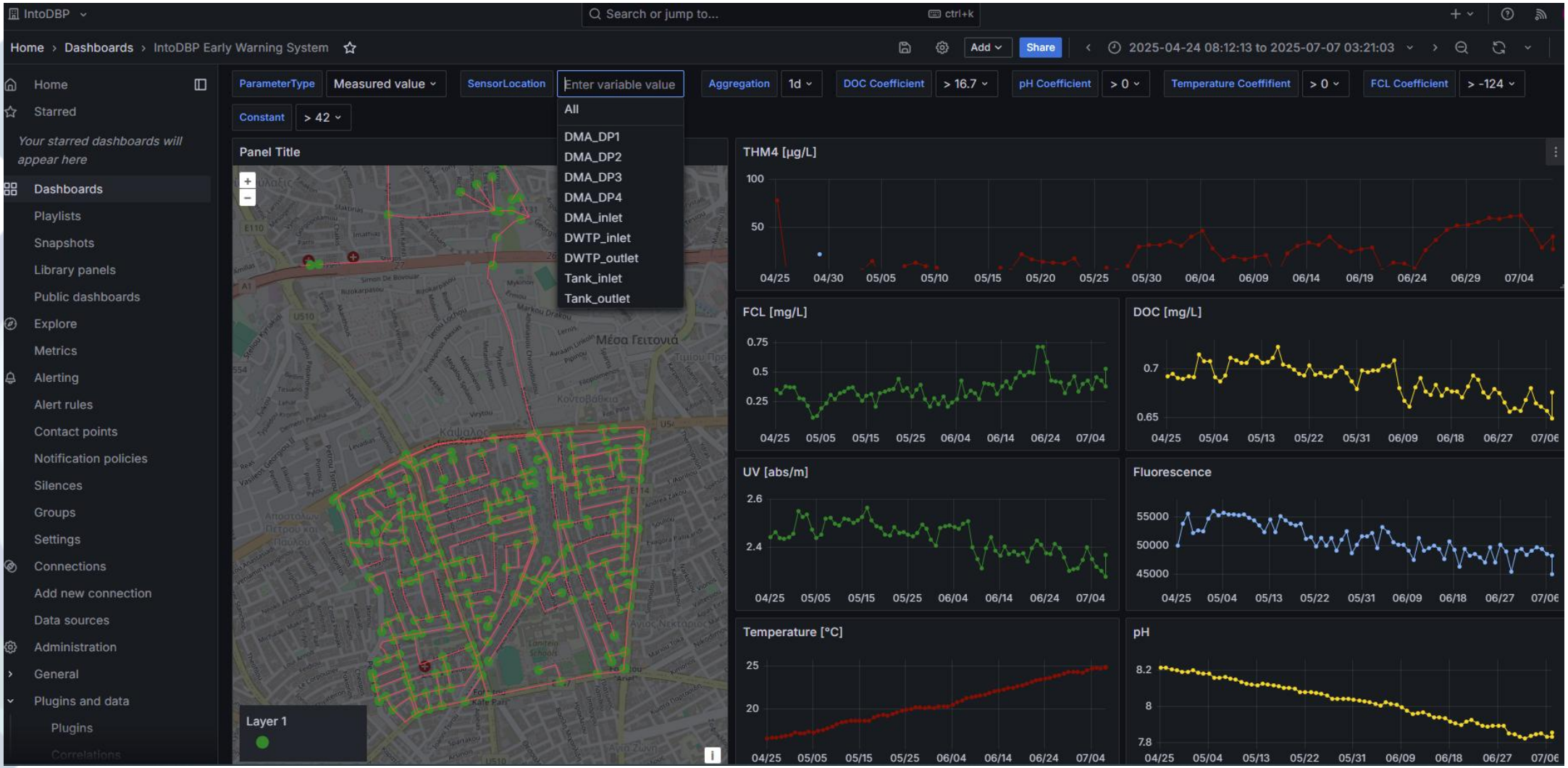


DOI: 10.1007/978-3-319-31664-2_7

Example of Early Warning User Interface



MAIN OUTCOMES

❑ 5. MITO3X pilots advancing treatment validation

The MITO3X drinking water pilots have moved into implementation and early validation, with first evidence of improved DBP control under monochloramine and pre-oxidation/AOP conditions

Construction and operation of two MITO3X® with integrated sensors at the CSs (left Madrid, Spain and Limassol, Cyprus pilot plant)

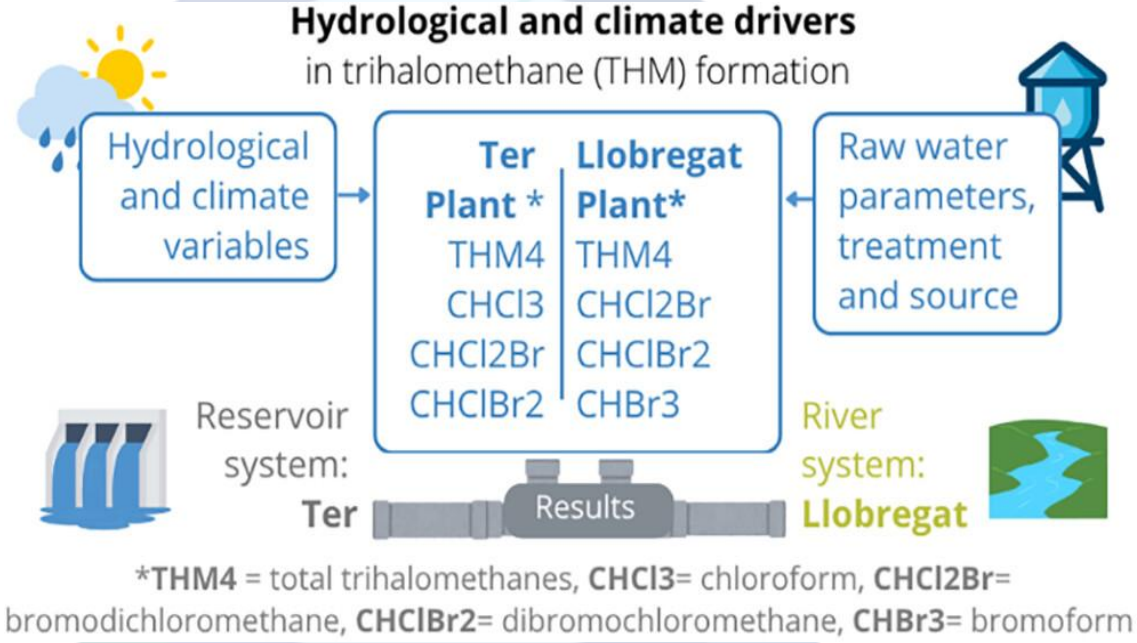
MAIN OUTCOMES

❑ 6. Exposure and policy outputs informing recommendations

The project has already generated strong exposure and policy evidence, including population surveys, behaviour analysis and policy briefs to support decision-making

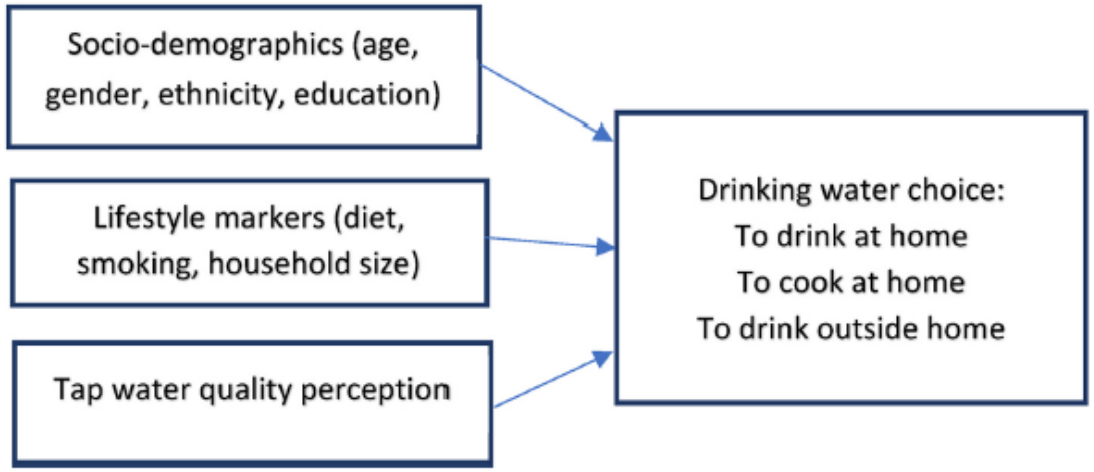
Exposure, policy and outreach outputs

Impact of Climate and Hydrological Variability on Drinking Water Production and Trihalomethane Levels: A Case Study in Barcelona, Spain (2010–2024)



https://pubs.acs.org/doi/10.1021/acsestwater.5c01024

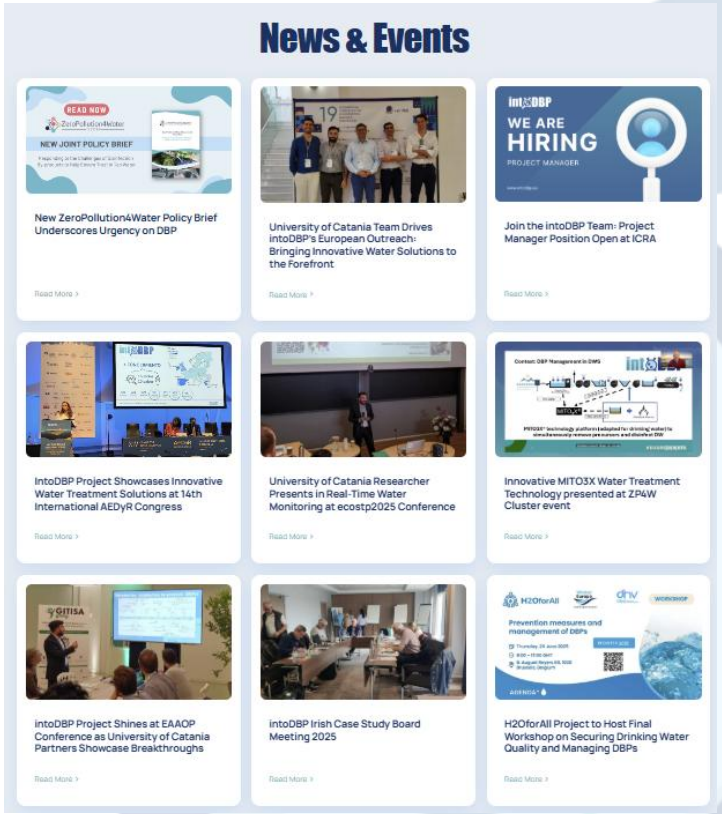
Understanding the drivers of water consumption patterns in Europe: A cross-sectional study of household water choices in Barcelona, Cyprus, and Ireland



https://doi.org/10.1016/j.indic.2025.101099

Exposure, policy and outreach outputs

www.intodbp.eu intoDBP_eu intoDBP_eu



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ZeroPollution4Water Cluster: the overview and the inventory of 32 case studies in drinking and groundwater

ZeroPollution4Water CLUSTER

ZeroPollution4Water Cluster Joint Policy Brief

Responding to the Challenges of Disinfection By-products to Help Ensure Trust in Tap Water

ZeroPollution4Water CLUSTER

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THANK YOU

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