RURAL PACT

Mobile app for sustainable water management in rural Ireland

Connected

Resilient

SUMMARY

The TRACE project is modernising Ireland's rural water cooperatives (Group Water Schemes, GWS) through a mobile application that integrates Water-Energy-Climate (WEC) data. Launched in November 2024, the app helps communities manage water scarcity, contamination, and infrastructure issues by providing real-time monitoring and data collection.
The project aims to improve water resilience, digital literacy, and introduce AI systems for better decision-making. Over 400 rural communities benefit from tools for enhanced water management, cost savings, and improved decision-making.

CONTEXT

The TRACE project is implemented in rural Ireland, addressing the critical challenges faced by rural water cooperatives (Group Water Schemes, GWS). These cooperatives are community-owned and managed water systems that provide essential drinking water services to rural households and farms, often in areas where public water infrastructure is unavailable.

The GWS play a vital role in ensuring access to clean water for dispersed rural populations, yet they face mounting pressures that threaten their sustainability. Key challenges include water shortages, ageing infrastructure, and the reliance on manual data management which limits operational efficiency and adaptability. Rising energy costs further strain the financial sustainability of these schemes, while climate pressures, such as increasing water scarcity and contamination risks, exacerbate the stress on rural water resources.

OBJECTIVES

The TRACE project modernises Ireland's GWS through a Water-Energy-Climate (WEC) data-driven management system. Its key objectives are to:

- Develop and implement a mobile application **enabling real-time monitoring, predictive analytics, and renewable energy integration**;
- Enhance **water resilience** and **operational efficiency** by replacing manual processes with digital tools;
- Promote **environmental sustainability** by reducing energy costs and optimising resource use;
- Support **data-driven decision-making** to maximise water conservation and improve infrastructure management;
- Foster transparency and **community engagement** by increasing access to performance data.

Themes: Digital, infrastructure, energy, climate, nature and environment

Country: Ireland

Organisations:

- National Federation of Group Water Schemes (NFGWS), NGO
- Group Water Schemes (GWS), Local Action Group
- Uisce Eireann, public authority
- Environmental Protection Agency, public authority
- Geological Survey Ireland, public authority
- Local Authorities Water Programme, public authority
- An Foram Uisce, NGO
- ACOWAS-EU, international organisation
- Community Members and GWS Committees, citizens

Start & end date: 09/2023- 02/2025

Budget: EUR 250 000

Funding sources: National Challenge Fund, under the Irish National Recovery and Resilience Plan (NRRP) (funded by the EU's Recovery and Resilience Facility)

Website: https://www.sfi.ie/challenges/sustainable-communities-challenge/TRACE/

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ACTIVITIES, KEY ACTORS, AND TIMELINE

- In 2024, the project team, including researchers, data scientists, engineers, and renewable energy specialists from Trinity College Dublin, developed the **WEC-nexus data-driven management system, including the TRACE app**, which integrates real-time monitoring, predictive analytics, and energy optimisation features.
- In early 2025, **four pilot studies** are being conducted in selected Group Water Schemes (GWS), the first – Glaslough Tyholland GWS in County Monaghan and another three planned in Kilkenny, Laois, and Galway. These pilots will trial **the digital data collection app**, while Glaslough Tyholland will also serve as a site for advanced infrastructure assessments and evaluation of renewable energy integration to support Ireland's decarbonisation agenda.
- Building on these pilots, the project will **scale up** later in 2025, optimising and rolling out the TRACE app **to additional GWS communities** across Ireland.

RESULTS

- **Stakeholder engagement** – surveys, interviews, and workshops with Group Water Scheme (GWS) managers, the National Federation of Group Water Schemes (NFGWS), and national agenciessuch as the Environmental Protection Agency (EPA) and Geological Survey Ireland (GSI).– identified fragmented data systems, inefficient infrastructure, and high energy costs.
- **Framework development**: a conceptual Water-Energy-Climate (WEC) data management system was designed, integrating real-time monitoring and predictive analytic tools to guide sustainable water management.
- **Data mapping**: initial mapping identified gaps in data collection and management, shaping the development of a unified platform.
- **Pilot launch**: the TRACE app was deployed in selected GWS communities to test its capacity for improving water management and efficiency.

The immediate beneficiaries include approximately **400 GWS communities** across Ireland, which gain tools to enhance water efficiency, reduce operational costs, and support data-driven decision-making. In the long term, the project establishes a **scalable model for sustainable rural water management**, benefitting communities and policymakers in Ireland and across Europe.

SUCCESS FACTORS/LESSONS LEARNT

- **Close partnerships** with the National Federation of Group Water Schemes (NFGWS), local managers, and national agencies ensured the project tackled real challenges such as fragmented data systems, water shortages, and rising operational costs.
- The project has addressed issues of data fragmentation and limited digital literacy by developing **user-friendly tools tailored to the needs of GWS**.
- **Financial sustainability** is achieved through operational cost savings and improved energy efficiency, while **environmental sustainability** is ensured through reduced carbon emissions and optimised water use.
- The **project's adaptable framework is highly replicable**, addressing similar challenges in rural communities across Ireland and Europe.

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Funded by the European Union