

Why do research and innovation on water?

Water plays a fundamental role in agricultural production. Water scarcity has a significant negative impact on the amount and quality of rainfed crops production and on irrigated crops, when irrigation is not possible or is reduced (around 7-8 % of farmland is irrigated annually in the EU on average). When water is scarce, productions are lower and the prices of food and feed rise, compromising food security and affordability. In situations of extreme drought, woody, perennial crops are at risk of being lost causing serious economic losses. Inefficient water management in agriculture exacerbates the problem (agriculture is responsible for 24% of water abstraction in the EU), causing less availability and quality of water. Excess of irrigation provokes also nutrient and pesticides losses and pollution of surface and groundwater. Climate change aggravates the problem of water scarcity, but has also a significant impact of the greater frequency of phenomena such as heavy rainfall and floods, with negative impact on the leaching of chemicals, erosion, and people's safety.

One of the specific objectives of the **Common Agricultural Policy** focuses on the sustainable development and efficient management of natural resources such as water. But water is essential for all of the CAP's social, environmental and economic objectives. Research and innovation on sustainable water management in agriculture aims to find the balance between maintaining and enhancing yields while reducing costs and environmental impacts. EU-supported R&I on smart farming, digitalisation, agro-ecology, nature-based solutions, breeding, reuse of treated wastewater, among others, contribute to enhancing water use efficiency and climate change mitigation and adaptation in agriculture.

Water under Horizon 2020 and Horizon Europe



CORDIS search keywords

water management, water stress resilience, waste water reuse, irrigation, fertigation, water use efficiency



Nb of projects

179 Horizon 2020
34 Horizon Europe



EU contribution

€ 420 million
€ 145 million

Selection of a few projects logos



TOMRES





Success stories dedicated to water management in agriculture

Water stress resilience

European farmers are challenged by the need to maintain or increase crop yields and quality with reduced or more variable rainfall. The Horizon 2020 projects **TOMRES**, **SoIACE**, **BRESOV** and **Shui** identified and tested novel solutions for improving crop efficiency for water use. TOMRES selected tomato rootstocks and scions tolerating combined stress, while retaining fruit quality and yield. Solace has developed solutions for improving crop efficiency through the design of novel crop genotypes and agroecosystem management innovations to improve water use efficiency. BRESOV provides climate-resilient cultivars addressed to organic vegetable production systems. Shui provides a platform for research on soil-water resources management under water scarce conditions, integrating long-term experiments across different environmental conditions and cropping systems in the EU and China. The Horizon Europe project **Root2Res** will develop and use tools to define and test innovative genotype ideotypes able to enhance the tolerance to abiotic stress; **BOOSTER** will develop innovative and sustainable strategies to improve drought tolerance in cereals.

Water use efficiency

Projects **FATIMA**, **FERTINNOWA**, **MASLOWATEN**, **MOSES**, **WATERAGRI** or **WATERPROTECT** develop innovative tools that help optimise water management and other external inputs. FATIMA has produced a wide range of tools, from webGIS platforms to calculators. FERTINNOWA is a thematic network of innovative technologies and practices for fertigation of horticultural crops. MASLOWATEN contributes to reducing the water consumption, using Automatism, ICT and Precision Agriculture-based solutions. MOSES' main objective is to put in place an information platform for water procurement and management agencies to facilitate planning of irrigation water resources. WATERAGRI aims to re-introduce and enhance sustainable solutions for water retention and nutrient recycling. WATERPROTECT contributes to effective uptake and realisation of management practices and mitigation measures to protect drinking water resources. The Horizon Europe project **PHITO** is a platform that offers free data-driven agronomic advice on soil, water and crops tailored for small and medium farmers by downscaling the complexity of digital farming.

Reuse

Wastewater is an alternative water supply that can help address water scarcity. This practice is so far deployed below its potential in the EU. The **Water Reuse Regulation** applies from 26 June 2023. The project **SuWaNu Europe** aims to promote the effective exchange of knowledge, experiences and skills between practitioners and relevant actors of water reuse in agriculture. The project summarises existing and upcoming knowledge and skills in eight EU regions. **OPTAIN** aims to identify efficient and easy-to-implement techniques for the retention and reuse of water and nutrients in small agricultural catchments across Boreal, Continental, and Pannonian regions, and to optimize the spatial allocation and combination of Natural/Small Water Retention Measures from 14 case studies. **MADFORWATER** developed a set of integrated technological and management solutions to enhance wastewater treatment, reuse for irrigation and water efficiency in agriculture in three Mediterranean African Countries. **Project Ô** develops water management and treatment technologies to increasing the opportunity to reuse water, creating new business opportunities to trade water and resources, and using less operating energy when treating water.

Horizon 2020 and Horizon Europe collaborative projects on water

Follow the **CORDIS** link for more information on the start-end date, EU contribution, coordinator and results.

List sorted by ascending project acronym.

Website	Project	CORDIS
BELIS	Breeding European Legumes for Increased Sustainability	101081878
BOOSTER	Boosting drought tolerance in key cereals in the era of climate change	101081770
BRESOV	Breeding for Resilient, Efficient and Sustainable Organic Vegetable production	774244
CIRAWA	Agro-ecological strategies for resilient farming in West Africa	101084398
Diverfarming	Crop diversification and low-input farming across Europe: from practitioners engagement and ecosystems services to increased revenues and chain organisation	728003
FAirWAY	Farm systems that produce good Water quality for drinking water supplies	727984
FATIMA	FArming Tools for external nutrient Inputs and water MAnagement	633945
FERTINNOWA	Transfer of INNOvative techniques for sustainable WAtEr use in FERTigated crops	689687
HE-FARM	Healthy environmental-friendly and resilient farm to fork	101084097
HYDROUSA	Demonstration of water loops with innovative regenerative business models for the Mediterranean region	776643
MADFORWATER	DevelopMent AnD application of integrated technological and management solutions FOR wasteWATER treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries	688320
MASLOWATEN	MArket uptake of an innovative irrigation Solution based on LOW WAtEr-ENergy consumption	640771
MOSES	Managing crOp water Saving with Enterprise Services	642258
OPTAIN	OPTimal strategies to retAIN and re-use water and nutrients in small agricultural catchments across different soil-climatic regions in Europe	862756
PHITO	Platform for helping small and medium farmers to incorporate digital Technology for Improved Opportunities	101084332
PrAEctiCe	Potentials of Agroecological practices in east africa with a focus on Circular water-energy-nutrient systems	101084248
Project Ô	Project Ô: demonstration of planning and technology tools for a circular, integrated and symbiotic use of water	776816
Root2Res	Root2Resilience: Root phenotyping and genetic improvement for rotational crops resilient to environmental change	101060124
Shui	Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems	773903
SolACE	Solutions for improving Agroecosystem and Crop Efficiency for water and nutrient use	727247
SuWaNu Europe	Network for effective knowledge transfer on safe and economic wastewater reuse in agriculture in Europe	818088
TOMRES	A novel and integrated approach to increase multiple and combined stress tolerance in plants using tomato as a model	727929
TUdi	Transforming Unsustainable management of soils in key agricultural systems in EU and China. Developing an integrated platform of alternatives to reverse soil degradation.	101000224
WATERAGRI	Water retention and nutrient recycling in soils and streams for improved agricultural production	858375
WATERPROTECT	Innovative tools enabling drinking WATER PROTECTIon in rural and urban environments	727450
WIDER UPTAKE	Achieving wider uptake of water-smart solutions	869283



Relevant sources of information supporting water

Other instruments like the 'EU CAP Network', partnerships (such as the Partnership for Research and Innovation in the Mediterranean Area-PRIMA, Water Security for the planet-Water4All), and EU missions, in particular the Missions 'A Soil Deal for Europe' and 'Restore our Ocean and Waters', also help enabling sustainable water management.

Water under EIP-AGRI activities – Focus Groups and Operational Groups

- Circular Horticulture
- Nature-Based Solutions for water management under climate change
- Protecting agricultural soils from contamination
- Soil salinisation
- Water & agriculture: adaptive strategies at farm level
- New irrigation systems from oval pipes with low flow emitters for better management and use of water
- Resilient and sustainable use of resources towards efficient water and land management
- Surface irrigation optimization in traditional crops of stable meadows and rice for groundwater protection
- Precision agriculture for processing vegetables to improve the management of water, fertilizer and pesticides

Water under the EU Missions

Relevant topics under the R&I missions

- HORIZON-MISS-2023-CLIMA-01-01: Testing and demonstrating transformative solutions increasing climate resilience of the agriculture and/or forestry sector
- HORIZON-MISS-2023-SOIL-01-05: Soil-friendly practices in horticulture, including alternative growing media
- HORIZON-MISS-2023-CLIMA-OCEAN-SOIL-01-01: Mission Climate adaptation, Mission Ocean & waters and Mission Soil Deal for Europe – Joint demonstration of an integrated approach to increasing landscape water retention capacity at regional scale
- HORIZON-MISS-2023-OCEAN-SOIL-01-01: Joint demonstration of approaches and solutions to address nutrient pollution in the landscape–river–sea system in the Mediterranean sea basin

In the pipeline and future funding opportunities

Updated list of relevant topics from cluster 6 work programme 2023–2024

- HORIZON-CL6-2023-CircBio-01-3: Harnessing the innovation potential and market uptake of successful circular economy water related projects
- HORIZON-CL6-2023-ZEROPOLLUTION-01-1: Knowledge and innovative solutions in agriculture for water availability and quality
- HORIZON-CL6-2024-CircBio-02-4-two-stage: New circular solutions and decentralised approaches for water and wastewater management
- HORIZON-CL6-2024-CLIMATE-01-1: Improving irrigation practices and technologies in agriculture
- HORIZON-CL6-2023-CLIMATE-01-2: Improve the reliability and effectiveness of alternative water resources supply systems and technologies

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