Topic 1.1.1-2026 (IA): Decentralised brackish water desalination for climate-resilient and resource-efficient Mediterranean agriculture

TABLE 6. CALL GENERAL CONDITIONS

	Thematic Area 1-Water management in the Nexus
Topic 1.1.1 (IA) –2026	**Decentralised Brackish Water Desalination for Climate-Resilient and Resource-Efficient Mediterranean Agriculture**
Contribution to SRIA	Operational Objective: 1/ WATER SAVING SOLUTIONS 2/LAND AND WATER SUSTAINABILITY Additional Cross-cutting Alignment: Soil Sustainability Socio-Economic Research and Stakeholders Involvement Digital Revolution
Contribution to EU Policies	Water Framework Directive New Circular Economy Action Plan European Water Resilience Strategy Long term Vision for Rural Areas A Vision for Agriculture and Food
SDGs	SDG 6: Clean Water and Sanitation SDG 7: Affordable and Clean Energy SDG 13: Climate Action
Admissibility conditions	The conditions are described in General Annex A for Section 1.
Eligibility conditions	The conditions are described in General Annex B for Section 1.
Financial and operational capacity and exclusion	The criteria are described in General Annex C for Section 1.
Award criteria	The criteria are described in General Annex D for Section 1.
Documents	The documents are described in General Annex E for Section 1.
Procedure	The procedure is described in General Annex F for Section 1.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G for Section 1.
Expected EU contribution per project	PRIMA estimates that a contribution of around **EUR 3.6 million** would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is **EUR 10.815 million**
Duration	PRIMA considers that proposals with a duration of **36 months** would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submitting and selecting proposals with different durations.

Type of Action	Innovation Action (IA)
Technology Readiness levels (TRL)	Activities are expected to achieve **TRL 7-8** by the end of the project. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project. Applicants are encouraged to use the TRL self-assessment tool to accurately determine the Technology Readiness Level (TRL) of their proposal.

Expected Outcomes.

Enhancing water-use efficiency and increasing the availability of irrigation water are critical to adapting Mediterranean agriculture to climate change and mitigating the pressures on overexploited aquifers. This is aligned with the objectives of the European Water Resilience Strategy, the European Green Deal, A Vision for Agriculture and Food and New Circular Economy Action Plan. The action will support water autonomy for smallholder and peri-urban farmers by valorising underutilised brackish water sources, while minimising energy consumption and environmental impact. Projects are expected to deliver measurable contributions to reducing freshwater withdrawals, improving water-use productivity in agriculture, and lowering the carbon and chemical footprint of irrigation through modular, nature-positive technologies.

Project results are expected to contribute to all of the following outcomes:

- Improved access to sustainable and cost-effective irrigation water for Mediterranean smallholders through decentralised, renewable-energy-powered brackish water desalination systems.
- Demonstration of scalable, low-energy desalination solutions adapted to rural and peri-urban farming contexts, including circular brine management strategies that prevent environmental harm.
- Progress toward a climate-neutral, climate-resilient, circular, and resource-efficient agricultural economy by enabling the recovery and reuse of by-products (e.g., nutrients, minerals) and reducing the environmental footprint of irrigation practices.
- Evidence-based recommendations to support policy dialogue and regulatory guidance on non-conventional water use and Integrated Water Resources Management (IWRM), in collaboration with competent authorities and relevant regional platforms.
- A clear market uptake pathway, including cost-performance benchmarks, validated business models for smallholder adoption, and engagement with local SMEs, technology providers, and financial actors to enable scalability and post-project continuity.

Scope: Water scarcity is a growing challenge in the Mediterranean, where agriculture accounts for 64–79% of freshwater withdrawals, particularly in southern and eastern regions (FAO 2016; Malek & Verburg 2018)[1]. Brackish water desalination offers a promising alternative to sustain agricultural production, especially for high-value crops and smallholder systems. However,

1 FAO (2016a). AQUASTAT Main Database. Food and Agriculture Organization of the United Nations (FAO), Rome. Malek, Ž., & Verburg, P. H. (2018). Adaptation of land management in the Mediterranean under scenarios of irrigation water use and availability. Mitigation and Adaptation Strategies for Global Change, 23(5), 821–837. https://doi.org/10.1007/s11027-017-9751-0

costs, energy intensity, brine disposal, and limited integration with renewable energy and digital optimisation tools hinder adoption (Jones et al., 2019; IRENA, 2022)[2].

This topic aims to improve the cost-effectiveness, environmental sustainability, and agricultural applicability of brackish water desalination systems, through solutions co-designed with farmers and adapted to local agro-ecological and socio-economic conditions. The use of digital monitoring and optimisation tools (e.g., IoT, Digital Twins, AI) is encouraged where this improves performance or reduces operating costs.

All solutions should comply with the Do No Significant Harm (DNSH) principle under the EU Taxonomy Regulation, as amended by the Delegated Act of 4 July 2025. and ensure no harm to freshwater or marine ecosystems, biodiversity, or circular resource use, applying the "water efficiency first" principle of the European Water Resilience Strategy. Compliance with the DNSH principle will be verified by PRIMA during the project implementation, specifically at reporting time.

Solutions should be co-designed with relevant stakeholders — including farmers, water user associations, community organisations, and public authorities — to ensure they address practical needs and socio-cultural contexts.

Projects are expected to address at least three of the following activities:

- Develop and pilot decentralised; environmentally sustainable low-cost brackish water desalination systems specifically tailored for agricultural reuse.
- Test and validate renewable-energy-powered desalination units in different agro-ecological contexts, ensuring energy efficiency and seasonal adaptability
- Assess lifecycle impacts (environmental, economic, and social), including carbon footprint, soil health, cost–benefit analysis, and WEFE Nexus indicators.
- Produce guidelines and toolkits for the design, implementation, and scaling of sustainable desalination solutions for agricultural use, adaptable to various local contexts.

While emphasis may be placed on demonstration, projects must establish a clear foundation for replication and scaling across Mediterranean contexts. Proposals are expected to demonstrate economic and financial viability, including cost-effectiveness, affordability for smallholder and peri-urban farmers, and scalable business and financing models, with engagement of relevant market actors where appropriate.

In line with the Innovation Action award criteria, proposals will be assessed on the credibility of their market uptake and impact pathways, including the meaningful involvement of SMEs. Projects should also include an environmental impact assessment, with particular attention to brine management and ecosystem protection. In light of the specific aims and expected impacts of this topic, PRIMA encourages applicants to additionally include KPIs related to energy use, operational costs, brine management, and farm-level adoption, as these indicators can

2 IRENA (2022). Renewable Energy for Desalination: Technology Brief. International Renewable Energy Agency (IRENA), Abu Dhabi. ISBN: 978-92-9260-417-5.

significantly strengthen monitoring and support the effective implementation of decentralised desalination solutions.

Proposals should adopt a Multi-Actor Approach (MAA)[3], ensuring that all key actors—end users, practitioners, SMEs, technology providers, researchers, and competent authorities—are meaningfully involved throughout the entire project lifecycle. This includes the definition of needs, co-design of solutions, testing and validation in real contexts, interpretation of results, and formulation of recommendations. Living Labs[4] are encouraged as a framework for participatory co-design and iterative adaptation.

Projects should ensure strong contributions from agronomy, water and resource management, socio-economics, and relevant Social Sciences and Humanities (SSH). To promote anticipatory and responsible innovation, consortia are encouraged to apply the Societal Readiness Thinking Tool (Bernstein et al., Science & Engineering Ethics, 2022) to systematically consider societal needs, ethical dimensions, and adoption pathways throughout the project lifecycle. Projects should define and monitor relevant social and behavioural outcomes, including those linked to *PRIMA KPI 6* (e.g., cooperative governance arrangements, social innovations, behavioural changes in irrigation and farming practices). SSH contributions must be clearly reflected in the work plan, stakeholder engagement, and impact pathways.

3 The definition and specific requirements of the multi-actor approach as applied in PRIMA can be found in the Introduction of the Horizon Europe Work Programme (2025) - Cluster 6 (pages 14-16)

4 PRIMA adopts the ENOLL Living Labs definition recognising them as dynamic, open innovation ecosystems where research and innovation are developed, tested, and validated in real-life settings rather than isolated laboratory environments. Through a systematic co-creation approach, Living Labs place citizens, end-users, and local stakeholders at the centre of the innovation process, ensuring that new solutions are not only technically sound and creative, but also relevant, context-appropriate, and grounded in real-world needs.