CALL TEXT AND SUPPORTING INFORMATION

Call: Section 1 – Water Management in the Nexus 2024

Topic 1.1.1-2024 (IA) Sustainability of Mediterranean irrigated agriculture through the implementation of the WEFE Nexus approach

Version 1.0
19 January 2024

The PRIMA programme is supported and funded under Horizon 2020, the European Union's Horizon 2020 research and innovation

Topic 1.1.1-2024 (IA) Sustainability of Mediterranean irrigated agriculture through the implementation of the WEFE Nexus approach.

	Thematic Area Water management in the Nexus
Alignment with SRIA	Priority 1.2 Water sustainability in the Mediterranean Region should be ensured through improved technical tools coupled with socio-economic tools and governance, organisational and/or business models to define water-use limits in certain key areas under present and future global change scenarios. Priority 1.4 Use of alternative water resources Priority 2.2 Developing sustainable and productive agro-ecosystems OPERATIONAL OBJECTIVES - 2/LAND AND WATER SUSTAINABILITY - 4/ SMART AND SUSTAINABLE FARMING
Alignment with EU policies	European Green Deal EU energy policies Water Framework Directive (WFD)

Challenge

Irrigated agriculture is a critical source of food and income in the Mediterranean region. However, with around 30% of the cropland being irrigated, agriculture is the largest consumer of freshwater[1]. As a result, the sector faces multiple challenges including water scarcity, energy insecurity and environmental degradation, which can threaten the sustainability of the entire value chain.

Due to high population density and semi-arid climatic conditions, the Mediterranean features among the most water-scarce regions, posing serious constraints on irrigation. Because of competition with domestic and industrial uses, but also of a mix of policies that have encouraged excessive expansion of irrigated areas, irrigation allotments had often to be capped or reduced in several countries. Considering the expected increase in population, urbanization, and economic growth, together with

[1] FAO (2016) Area equipped for irrigation and percentage of cultivated land. Retrieved from http://www.fao.org/nr/water/aquastat/tables/ WorldData-Irrigation_eng.pdf. Accessed 6 Dec 2017; Plan Bleu (2008) The Blue Plan's sustainable development outlook for the Mediterranean. Retrieved from http://planbleu.org/sites/default/files/publications/upm_en_0.pdf. Accessed 6 Dec 2017

changes in rainfall patterns and increasing temperatures associated with climate change, irrigation will further bear the brunt of future water shortages.

In recent years, government subsidized pressurized irrigation systems have replaced traditional low efficiency surface irrigation schemes in many countries in an attempt to minimize water losses and improve efficiency. However, the implications on energy use and carbon emissions have until now been largely overlooked. The process of extracting, transporting, and distributing water requires significant amounts of energy, which is often derived from non-renewable sources such as coal and oil. It is also worth considering that fuel subsidies to support irrigated agriculture can lead to over-extraction of water. Then, this overuse of energy contributes both to the depletion of scarce water and fossil fuels and to greenhouse gas emissions and climate change.

Moreover, while innovative irrigation technologies are more water efficient and allowing higher yields and incomes, several constraints and negative impacts have also been observed. Higher efficiencies at the plot level have not translated into water savings at the basin level and have even compounded water depletion by intensification and expansion of cultivation ('rebound effect')[2]. The expansion of intensive irrigated agriculture has also been accompanied with an increase in the use of pesticides and fertilizers, and the pollution of soil and water resources/ecosystems, which calls for the deployment of nature-based and microbiome-based solutions or agroecology for pollution mitigation. The adaption by small farmers is conditional upon several factors such as their know-how and access to markets or financial resources (e.g., subsidies). As barriers to entry are minimized through fuel or other subsidies, small farmers are led to adopt more capital-intensive farming systems and to link to more profitable but also more risky markets. Economic, social, and environmental sustainability aspects appear to be linked.

Opportunities for a comprehensive assessment of irrigation systems lie in integrated approaches such as the Water-Energy-Food-Ecosystems (WEFE) Nexus, which highlights and enhances the understanding of linkages between these four components. The challenge will be to explore the potential of WEFE Nexus approaches to transform the design and implementation of irrigated agriculture towards greater sustainability.

[2] Perry, C., Steduto, P., & Karajeh, F. (2017). Does improved irrigation technology save water? A review of the evidence. FAO, Cairo. Grafton, R. Q., Williams, J., Perry, C. J., Molle, F., Ringler, C., Steduto, P. & Allen, R. G. (2018). The paradox of irrigation efficiency. Science, 361(6404), 748-750

Scope

This call is designed to promote the creation of innovative solutions rooted in the Nexus approach, with a cross-sectoral perspective that enhances the sustainability of irrigated regions within the Mediterranean area. Moreover, projects should focus on mitigating current challenges that obstruct the effective implementation of the WEFE Nexus approach when adopting novel irrigation technologies. These challenges may include gaps in data availability, systemic disconnect between institutions, and uneven power distributions across sectors. Through a multi-actor approach, the proposals should be demonstrated at large sites[3] in irrigated areas that are experiencing recurrent or permanent water scarcity conditions and anticipate solutions for current and future challenges. Proposals will support strategies for advancing the WEFE Nexus approach in practice, linking food systems with farming, ecosystem services and healthy diets.

Proposals should assemble innovative technologies and or strategies developed at sectoral level and test them in a combined way at the demonstration sites to improve the efficiency and sustainability of water, energy, and food use in irrigated agriculture, taking also into consideration water and groundwater quality (i.e., the ecosystem component of the nexus). Specific areas worthy of consideration include wastewater reuse systems, optimizing combinations of technological innovations in irrigated agriculture with alternate water resources and their energy requirements, ICT (e.g., smart agriculture) for smallholders, nature-based solutions or sustainable practices, such as agro-ecological, as well as modelling and decision-making tools and institutional/policy frameworks. The reuse of wastewater and the use of alternate water resources might need the development and the review of policy frameworks in certain countries. Proposals should address stakeholders driven needs with their participation towards improvement of WEFE sustainable practices.

Proposals should provide a detailed analysis of the expected impact of these solutions through appropriate indicators. The impact assessment should consider various aspects, such as improved crop yields, reduced water use, energy savings, and enhanced ecosystem service benefits, including water quality. In addition, the impact assessment should consider the potential benefits of these innovative solutions on soil health, including soil structure, fertility, and overall sustainability. It is also important to

[3] "Large sites" typically refers to demonstration sites that are larger in scale and extend beyond research facilities. These sites are often chosen to showcase and validate the effectiveness, feasibility, and practicality of certain practices or technologies in real-world conditions. Large demonstration sites provide an opportunity to observe and assess the performance, impacts, and scalability of interventions or innovations at a larger scale. They aim to replicate the conditions and challenges faced by stakeholders in a particular sector or industry. These sites may involve multiple stakeholders, including farmers, industry representatives, policymakers, and researchers, who collaborate to implement and evaluate the demonstrated practices or technologies.

assess the potential trade-offs and synergies associated with the implementation of these innovative solutions.

Particular attention should be devoted to assessing the enabling or necessary conditions for upscaling solutions and benefits thereof. Whenever possible, proposals should assess the environmental impacts of the entire value chain of irrigated agriculture using appropriate methods (e.g., Life Cycle Assessment, ecological footprint analysis or similar) to demonstrate reductions in the environmental footprint and improvements in the sustainability of irrigated agriculture. An understanding of the trade-offs and synergies between farming systems optimization and efficient and sustainable use of water and energy for food production in irrigated agriculture would be needed to inform policy and investment decisions to enhance productivity, viability, and sustainability, and address broader socio-economic development objectives.

Proposals should consider the development of business models and/or policy mixes that support the adoption and scaling up of innovative solutions. They could include recommendations for improved and targeted incentives and policies at regional and national level to reduce financial risks for early adopters of practices developed in the project. Proposals should systematically consider and integrate the gender dimension in all aspects of the project, including research, stakeholder engagement, policy development, and technology adoption. This includes assessing the specific challenges and opportunities faced by women and men in irrigated agriculture, ensuring equitable participation of both genders in decision-making processes, and addressing gender-specific needs and concerns. The project should promote gender equality and empowerment within the context of sustainable irrigated agriculture in the Mediterranean region.

Proposals should implement a 'multi-actor approach', ensuring adequate participation of the main stakeholders (i.e., research institutions and agricultural extension services, communities of irrigators, environmental policymakers, water management agencies, farmers, and agricultural producers) involved in irrigated agriculture, and making explicit their respective roles and the distribution of costs and benefits. Proposals should include a dedicated task, appropriate resources, and a plan on how to capitalize on past achievements and collaborate with past and current PRIMA funded projects or other HE funded projects including EU Missions[4].

[4] Apart from PRIMA projects, there are also projects from HE-Cluster 6 calls or the Mission on Adaptation to Climate Change calls that could be of interest for this topic (e.g. HORIZON-MISS-2022-CLIMA-01-05; HORIZON-MISS-2023-CLIMA-OCEAN-SOIL-01-01; HORIZON-CL6-2023-ZEROPOLLUTION-01-1: Knowledge and innovative solutions in agriculture for water availability and quality; HORIZON-CL6-2024-CLIMATE-01-1: Improving irrigation practices and technologies in agriculture)

The successful consortia are strongly encouraged to participate in the **Mediterranean WEFE Nexus Community of Practice** established as an outcome of the WEFE Science Advances Conference to stimulate cross-organization collaboration and knowledge sharing in the Mediterranean region. The objective is to enlarge the portfolio of WEFE Nexus projects and case studies in PRIMA. The project proponents should use lessons learned from the Nexus projects funded by PRIMA by developing a close partnership during the implementation of respective projects. Projects selected within this call shall produce a joint policy brief that aligns with the call's scope and objectives with the aim to translate the main lessons learnt, knowledge and evidence generated through project work into key messages for policy makers. Other forms of collaboration, including data sharing, communication and dissemination, joint deliverables, events, etc., between funded projects are strongly encouraged.

Expected Impacts

Implementing the proposed objectives of WEFE Nexus approaches in irrigated agriculture has the potential to bring about significant positive impacts in terms of sustainable use of resources, improved agricultural productivity, increased resilience, policy reforms, and inclusive and equitable development.

Some expected impacts of implementing these objectives are:

- More efficient and sustainable use of resources and contribution to achieving the objectives of sustainable development.
- Increased resilience of irrigated agriculture to different stressors, including water scarcity, salinity, energy constraints, and climate change.
- More effective policies and governance structures that support sustainable agricultural development.
- Improved awareness and uptake by end-users (citizens, farmers) through integration of methods and tools.

Key Performance Indicators

- **Water Usage Reduction KPI**

Baseline: Total water consumption for the entire project area at the start of the project.

Target: Achieve a minimum 10% reduction in total water consumption compared to the baseline.

- **Stakeholder Engagement KPI**

Baseline: Number of stakeholders engaged at the start of the project.

Target: Engage a minimum of 50 additional stakeholders during the project duration.

- **Marketing and Promotion Effectiveness KPI**

Baseline: Lack of an effective marketing model or promotion strategy.

Target: Develop and implement at least one effective marketing model or promotion strategy, targeting either farmers or consumers, to increase awareness and adoption of the WEFE Nexus approach. Evaluate the success of the strategy based on defined metrics, such as increased awareness, adoption rates, or stakeholder feedback.

Contribution to EU Policies, HE Mission and partnerships

The proposals should indicate linkages to relevant EU policies and objectives in the context of the European Green Deal, Water Framework Directive (WFD) and relevant Horizon Europe calls, EU Missions and European Partnerships.

Contribution to SDGs

In the context of irrigated agriculture, the following Sustainable Development Goals (SDGs) are particularly relevant SDG2, SDG6, SDG7, SDG12, SDG13 and SDG15.

Table 1. Supporting information for Section 1 call for Proposals, Topic 1.1.1

Type of action	Innovation Action (IA)
The total indicative amount allocated to this call	EUR 9.2 million
Funding level	According to Horizon 2020 Rules. 70% (except for non-profit legal entities, where a rate of 100% applies).
Technology Readiness levels (TRL)	TRL 6-8 Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.
Budget and duration of grants	PRIMA considers that proposals requesting a contribution from the EU in the range of EUR 4.6 million and with a duration of 36 months would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submitting and selecting proposals requesting other amounts or duration.

Eligibility conditions for participation	Please refer to section 5.1.1 for the List of countries eligible for funding. Due to the specific challenge of this topic, in addition to the minimum number of participants set out in the standard eligibility conditions (section 5.1.3), consortia must include at least an additional legal entity established in a Mediterranean Partner Country (MPC)[5] as defined in section 5.1.1.
Submission and evaluation procedure	The call will be organised according to a two-stage submission process. A first-stage proposal (maximum ten pages) must be submitted within the first-stage submission deadline. Successful applicants in the first step will be invited to the second step to submit a full proposal (maximum 50 pages). A timeline for submitting and evaluating applications can be found in Table 6.
	The award criteria, scoring, thresholds and weightings for IAs listed in part 5.1.7 will be used.
Grant agreement	PRIMA MGA (multi-beneficiary), based on Horizon 2020 MGA.
Consortium agreement	Participants in projects resulting from this call for Proposals, according to Art 24 of the H2020 RfP must conclude a consortium agreement before the PRIMA grant agreement's signature.

[5] Mediterranean Partner Countries, as defined in section 5.1.1, include the following Third Countries associated to Horizon 2020 (AC): Israel, Tunisia, and Turkey. And the following Third Countries not associated with Horizon 2020 (TC), having concluded international agreements for scientific and technological cooperation setting out the terms and conditions of their participation in PRIMA: Algeria, Egypt, Jordan, Lebanon and Morocco.