

**Digital Transformation**  
**for advancing Water-Energy-Food-Ecosystems Nexus**  
**in the Mediterranean Source to Sea continuum**

**Launching Workshop**  
**of a regional consultation process**  
4-5 June 2024, Lisbon, Portugal

**Venue:** [Holiday Inn Lisbon](#), Av. Antonio Jose De Almeida 28-A, Lisbon

**Registrations:** <https://forms.office.com/e/dN93w8pZeM?origin=IprLink>.

**CONCEPT NOTE**  
**DRAFT**

**1. BACKGROUND**

Digital transformation in the context of Water-Energy-Food-Ecosystems (WEFE) Nexus refers to the strategic adoption and integration of conventional and innovative digital technologies across the interconnected systems of water management, energy production and consumption, food supply chains and environmental capital, in the spatial components of the Source-to-Sea (S2S) continuum. It involves, among others, leveraging advanced digital tools, data analytics, innovative technologies and related governance and managerial approaches to optimise the efficiency, sustainability, and resilience of integrated WEFE systems.

Digital transformation is not just a technological upgrade. It is a strategic imperative for creating more sustainable, resilient, and interconnected responses to sectorial challenges in a holistic WEFE Nexus approach applied in the spatial components of the Mediterranean Source-to-Sea continuum. Embracing integrated digital solutions is essential for overcoming current challenges and preparing for the evolving socio-economic demands of the future, particularly as these are shaped by climate change impacts.

Key components of digital transformation include, but are not limited to, data integration, real time monitoring, analytics and decision support, smart infrastructure, inter-connected platforms, automatization and optimisation, innovative tech ecosystems, etc. Digitalization in a WEFE Nexus in a S2S approach can contribute to integrated and data-driven management for informed decision-making, optimising resource allocation, increasing efficiency in operations, promoting innovation, etc., thus enhancing climate resilience.

Currently, a draft 'WEFE Nexus Strategy in the Mediterranean Source to Sea continuum' is under elaboration. The Strategy aims to assist countries and stakeholders in improving the integration of policy and management frameworks and instruments across WEFE sectors and spatial components throughout the Mediterranean. The development of the draft Strategy is a joint initiative of UfM, UNEP-MAP and the EU, technically supported by GWP-Med, EU WES Project and the PRIMA Foundation. Two consultative Regional Roundtables on the Strategy contents have so far taken place, in [Rabat, June 2023](#) as well as in the margins of the [5th Med Water Forum \(Tunis, February 2024\)](#), with key contributions by PRIMA. The draft Strategy, which include references to digital transformation, is aimed to be presented at the next UfM Ministerial on Water (possibly to take place on the second half of 2025) as well as at the 24<sup>th</sup> Contracting Partners Meeting of the Barcelona Convention

(December 2025, Egypt). Furthermore, the next UfM Ministerial Meeting on Water is suggested having three focus themes: WEFE Nexus; Financing & Investments; Digitalization.

The PRIMA ACQUAOUNT and TALANOA-WATER projects and the H2020 TRANSCEND project are at the forefront of digitalization research and innovation for Water and its interlinkages with other sectors, including in a WEFE Nexus approach, creating impact on several demo sites across the Mediterranean via the development of actionable data, models and technologies, and their adoption through policy co-creation and co-implementation of novel digitalization tools. Examples of relevant digitalization efforts for advancing integrated approaches in these projects include the incorporation of remote sensing water and land use data into Decision Support Tools; co-creation processes and spaces (including serious games) towards the design of transformational adaptation strategies that mainstream digitalization methods and tools into the Mediterranean and EU policy; implementation of real-time monitoring systems; integrating modelling platforms with IoT technologies to optimize irrigation and water management systems at farm and river basin scale; etc. These innovations are aimed to transcend the demo sites in which they are being implemented, and to be widely replicated across the Mediterranean. Among others, the recent [Side Event on 'Transformative Water Resources Management: Smart and resilient solutions for climate challenge across the Mediterranean'](#), co-organised by the three PRIMA and H2020 projects (5 February 2024, Tunis, in the margins of the 5<sup>th</sup> Mediterranean Water Forum), elaborated on related issues.

Based on exploratory discussions with and reflecting UfM's preliminary interest, a regional multi-stakeholder consultation that would link the 'Digitalisation' and 'WEFE Nexus' thematic areas of the aimed UfM Ministerial Meeting, would be of added value. This should also reflect UNEP-MAP and EU contents on the agenda, while more partners may contribute.

To this end, the PRIMA ACQUAOUNT, TALANOA-WATER and H2020 TRANSCEND projects, in service of and with the support of UfM and other institutional partners, would be initiating and technically facilitating a science-driven regional consultation on the digitalization agenda for WEFE Nexus in the S2S continuum, involving major regional players, including decision makers and other relevant stakeholders.

## 2. PURPOSE

The aim of the **regional consultation process** is to promote digital transformation for advancing Water-Energy-Food-Ecosystems (WEFE) Nexus in the Mediterranean within the spatial components of its Source-to-Sea (S2S) continuum, particularly under evolving climate change impacts.

The objectives of the regional consultation process are to:

- identify the strengths, weaknesses, opportunities, and threats (SWOT);
- highlight related advancements made;
- provide recommendations for promoting related digital transformation contributing to the draft Strategy on WEFE Nexus in the S2S continuum as well as providing input to key regional political fora like the UfM Ministerial on Water, CoP of the Barcelona Convention, etc.

At the same time, the outcomes from this regional consultation process and the political fora that will be addressed by its results, will help the PRIMA ACQUAOUNT, TALANOA-WATER and H2020 TRANSCEND projects to adapt their research agenda to ensure they produce transformational, actionable science that builds resilience to water scarcity and other natural resources management challenges under climate change impacts.

### 3. PROCESS

Utilising combined resources of the synergising PRIMA and H2020 Projects, and capitalising on UfM's as well as other institutional and technical partners' scheduled events and capacities, *the regional consultation process would unfold in the form of a Living Lab*. This could provide related technical background and recommendations to the UfM Ministerial Meeting and other upcoming political fora scheduled to take place in 2024-2025, and could sustain its function beyond these assisting the implementation of the Strategy on WEFE Nexus in the S2S continuum on related topics as well as contributing to sustaining PRIMA, H2020 and other projects' results. Synergies are also made with the [PRIMA WEFE4Med Project](#) and the enlarging WEFE Nexus Community of Practice in the Mediterranean.

The regional process will start with a **Launching Workshop** organised back-to-back with the 14th Meeting of the UfM Regional Platform on Water (former 'Water Expert Group-WEG'), in Lisbon, Portugal. More specifically, the Launching Workshop will take place on 4 June (full day) with target audiences of the synergising PRIMA and H2020 project as well as other partners to discuss related shared topics, while on 5 June (half day) participants from governments and regional organisations attending the UfM Meeting would join the Workshop for the kick-off of the process. The UfM Regional Platform on Water Meeting will take place on 5 June (half day) and 6 June (full day) 2024.

A series of regional consultation events will follow up, in the form of a Living Lab, the Launching Workshop towards shaping technical background and policy recommendations aimed for submission as inputs for consideration to the Mediterranean policy events that would be organised towards the end of 2025. Based on the process's outcomes as well as on interest to continue and on mobilisation of necessary capacities, the Living Lab may expand its works e.g. supporting the implementation and/or monitoring process of the Strategy on related aspects.

### 4. CONTENTS

The regional consultation process is suggested to be articulated around a set of key aspects of digital transformation for advancing the WEFE Nexus in the S2S continuum in the Mediterranean. These may be identified through a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, and could evolve by formulating policy recommendations based on sound technical background and understanding of the socio-economic and developmental realities in the countries of the region.

Among topics holding substantial potential for advancing the Nexus agenda are three identified by the contributing PRIMA and H2020 projects. Additional, or adjusted, topics as well cross-cutting subjects would be considered to further reflect priorities while the regional consultation process advances.

#### **Topic 1: Advancement in digital technologies and integration**

- **Leading project:** ACQUAOUNT
- **Motivation:** Technological advancements in sensors, communication networks (Lora, 5G, StarLink), interconnectivity of devices, remote sensing, Big-Data and AI are revolutionizing the way we monitor our environment and the way we make decisions. The potential of these technologies in the water sector remains largely untapped. Moreover, the integration of digital technologies with modelling tools, such as hydrological models, crop water needs, but also crop production modelling, can improve the water and nexus management. However, their deployment intermingles with the way "water" authorities interact at several geographic scales. These technologies also require integration with local traditional knowledge, nature-based solutions and existing irrigation systems, in order to develop optimized systems and

to improve the acceptance and usefulness of digital technologies. *In this sense, which digital solutions are most promising to tackle present and future water and other natural resources management related issues, and how a related digital transformation process would advance in the Mediterranean countries?*

**Topic 2: Digital transformation under uncertainty.**

- **Leading project:** TRANSCEND
- **Motivation:** Consistently, decision makers and policy approaches to water resources management are “surprised and overwhelmed” by climatic and socioeconomic changes (UNDRR, 2021). Planning for the future involves managing a growing number of uncertainties, which are nonetheless often ignored in standard decision making models and practices. This risks providing unrealistically precise information that can lead to maladaptation. *How can we incorporate uncertainty into decision making and ensure resilient adaptation to change?*

**Topic 3: Informing decision-making in the digital transformation era.**

- **Leading project:** TALANOA-WATER
- **Motivation:** A critical follow-up aspect to uncertainty modelling is how to communicate uncertainty to stakeholders, so as to keep problems tractable and enable the design effective of policies. Models play a critical role in policy making, enabling scientists and decision-makers to identify key sources of uncertainty and quantify their impact on modelling outcomes; but shaping and interpreting these modelling outputs and translating them into effective policy making cannot be done by mechanistic modelling outputs alone—it requires heuristics. Stakeholders can derive heuristics of value for the solution of complex problems through inductive reasoning, i.e., ad-hoc interpretations based on their experience that are applied to speculate upon the consequences of a specific socioeconomic or environmental context. *How to combine these heuristics with models towards informing decision making remains a nontrivial challenge, particularly in the digitalization era where increasing amounts of data are made available to decision makers, who may not be able to process all of them?*

The serious games approach holds the potential to bring about transformative effects in strategic decision support tools, allowing for more efficient management when contrasted with solely technical simulation or optimization methods. These traditional approaches encounter challenges in addressing the intricate nature of complex systems, including their social, environmental, and technical aspects. *How can we foster stakeholder engagement in knowledge creation and policy design and implementation? How can we transfer scientific knowledge to the different stakeholders in a way that allows them to apply it in practice?*

**5. Draft AGENDA of the Launching Workshop**

Some speakers and panellists to be confirmed.

**Day 1: Tuesday, 4 June 2024**

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| 9.00-9.20 | <p><b>Welcome and scope of the Launching Workshop</b></p> <ul style="list-style-type: none"> <li>- Marta Debolini, Euro-Mediterranean Centre on Climate Change (CMCC) &amp; Mediterranean Experts on Climate and environmental Change (MedECC)</li> <li>- Omar Amawi, Deputy Director, PRIMA Secretariat</li> <li>- Almotaz Abadi, Deputy Secretary General, Union for the Mediterranean</li> </ul> |
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| <p><b>Setting the stage: Digital Transformation for advancing Water-Energy-Food-Ecosystems Nexus in the Mediterranean Source to Sea continuum</b><br/> <i>Facilitator: Marta Debolini, CMCC &amp; MedECC</i></p> |   |
| 9.20-9.40  | <p><b>Key findings of the UfM Study on Digital Transformation of the Water System in the Mediterranean</b><br/> - Hassan Aboelnga, UfM Expert</p>   |
| 09.40-10.00  | <p><b>Transformational adaptation via digitalization: cutting-edge results from the PRIMA ACQUAOUNT, TRANSCEND and TALANOA-WATER projects</b><br/> - Dionisio Perez Blanco, University of Salamanca<br/> - Simone Mereu, Euro-Mediterranean Centre on Climate Change</p>  |
| 10.00-10.30  | <b>Q/A and discussion</b>   |
| 10.30-11.00  | <b>Coffee Break</b>   |
| <p><b>Serious game: Digital Transformation for advancing Water-Energy-Food-Ecosystems Nexus in the Mediterranean Source to Sea continuum</b></p>   |   |
| 11.00-13.30  | <p><b>Serious game – instructions &amp; conducting</b><br/> - Francesco Sapino, University of Salamanca<br/> - Javier Sierra, University of Salamanca</p> <p><i>Participants attending in-person participants will be divided into diverse groups. Through facilitated debate, they will grapple with real-world water management challenges in the context of digital agriculture in a WEF E Nexus approach. Their decisions will have a simulated future outcome, allowing them to experience the potential consequences of their choices.</i></p>  |
| 13.30-14.30  | <b>Lunch Break</b> (participants make own arrangements)   |
| 14.30-14.45  | <p><b>Serious game – debriefing</b><br/> - Francesco Sapino, University of Salamanca</p>  |
| 14.45-15.45  | <p><b>Digital Transformation for WEF E Nexus in the Mediterranean S2S continuum: Reflections from the field</b><br/> - Heba Al-Hariry, Land and Water Officer, Regional Water Scarcity Initiative, FAO Regional Office for the Near East and North Africa<br/> - Khaled Abu Zeid, Center for Environment &amp; Development for Arab Region and Europe (CEDARE)<br/> - Gianluca Cocco and Giuliano Patteri, Sardinia Region and Regional Authority for Water Management<br/> - Marc Garcia, Water Commissioner of the Jucar River Basin Organisation, Spain &amp; President of the Mediterranean Network of Basin Organisations (MENBO) (15 mi<br/> <i>Facilitator: Vangelis Constantianos, Regional Coordinator, Global Water Partnership – Mediterranean (GWP-Med)</i></p> |

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| 15.45-16.15 | <b>Coffee Break</b>  |
| 16.15-17.15 | <b>Discussion – Taking stock towards a SWOT on Digital Transformation for WEF E Nexus in the Mediterranean S2S continuum</b><br><i>Facilitator: Jaroslav Mysiak, Director of the Research Division 'Risk assessment and adaptation strategies', CMCC</i> |
| 17.15       | <b>Brief conclusions of the day</b><br>- Marta Debolini, CMCC & MedECC   |

**Day 2: Wednesday, 5 June 2024**

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| 9.00-9.20      | <b>Welcome and scope of the Launching Workshop</b><br>- Marta Debolini, Euro-Mediterranean Centre on Climate Change (CMCC) & Mediterranean Experts on Climate and environmental Change (MedECC)<br>- Omar Amawi, Deputy Director, PRIMA Secretariat<br>- Almotaz Abadi, Deputy Secretary General, Union for the Mediterranean  |
| 9.20-10.00     | <b>Towards shaping the future: reflections on actionable digitalization solutions for resilient adaptation to climate change (reporting from previous day)</b><br>- Dionisio Perez Blanco, University of Salamanca<br>- Simone Mereu, Euro-Mediterranean Centre on Climate Change<br>- Q&A   |
| 10.00-11.00    | <b>Policy Panel Discussion –Taking stock towards a SWOT on Digital Transformation for WEF E Nexus in the Mediterranean S2S continuum</b><br>- Arduen Karagozi, Director, Directory of Strategic Management Water, Resources Management Agency (AMBU), Albania<br>- Enas Ahmed, Director General of Regional Organisations, Ministry of Water Resources & Irrigation, Egypt<br>- Mohamed Al Dwari, Secretary General Assistant for Strategic Planning, Ministry of Water & Irrigation, Jordan<br>- Mona Fakhri, Water Director, Ministry of Energy & Water, Lebanon<br>- Manuel Sapiano, CEO, Energy & Water Agency, Malta<br>- Siham Laraichi, Directorate for Research & Planning, Ministry of Equipment & Water, Morocco<br>- Panelist tbd, Spain<br>- Heba Al-Hariry, Land and Water Officer, Regional Water Scarcity Initiative, FAO Regional Office for the Near East and North Africa<br><i>Facilitator: Vangelis Constantianos, Regional Coordinator, GWP-Med</i> |
| 11.00-11.20    | <b>Coffee Break</b>  |
| 11.20<br>12.00 | <b>Discussion – Taking stock towards a SWOT on Digital Transformation for WEF E Nexus in the Mediterranean S2S continuum</b>   |

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|             | <i>Facilitator: Frederic de Dinechin, Senior Policy Advisor, Water Environment &amp; Blue Economy Division, Union for the Mediterranean</i>   |
| 12.00-12.20 | <b>Reflections and suggestions</b><br>- Donatella Spani, Euro-Mediterranean Centre on Climate Change<br>- Michael Scoullou, EU Water and Environment Support (WES) in the ENI Southern Neighbourhood region Project |
| 12.20-12.30 | <b>Conclusions and outlook – what’s next?</b><br>- Omar Amawi, Deputy Director, PRIMA Secretariat<br>- Almotaz Abadi, Deputy Secretary General, Union for the Mediterranean<br>- Marta Debolini, CMCC & MedECC      |

## 6. CO-ORGANIZERS

The regional consultation, including the Launching Workshop, is co-organised by the PRIMA and EU Projects ACQUAOUNT, TALANOA WATER and TRANSCEND in partnership with the Union for the Mediterranean.

**ACQUAOUNT** project improves water resource allocation, IWRM, and sustainable irrigation using innovative tools like IoT monitoring, interoperability, and smart visualisation. It includes pilot demonstrations in Italy, Jordan, Lebanon, and Tunisia, addressing climate-induced water scarcity.

**TALANOA- WATER** project addresses the global water crisis through robust, transformative adaptation strategies for climate-induced water scarcity. It emphasises economic efficiency, environmental sustainability, and consists of three pillars: Talanoa Water Dialogue, socio-hydrology science, and Water laboratories. This innovative approach targets a critical global challenge.

**TRANSCEND** project catalyses the adoption of Transformational Adaptation Policies (TAPs) to combat water scarcity. It involves 50+ researchers from 15 institutions globally, focusing on efficient water management policies with seven pilot case studies on three continents. Over four years, it fosters knowledge and tools for sustainable growth under uncertainty and climate change.

