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# Sustainable Water Storage and Distribution in The Mediterranean

# All In-Situ Data Required for Demo Site Characterisation Are Collected

**VERSION 1.0**

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# Table of Contents

# List of Tables

# Acronyms

| | |
|---|---|
| DMP | Data Management Plan |
| WP | Work Package |
| CO | Consortium |
| PU | Public |
| R | Report |
| O | Other |
| DEM | Demonstrator |
| PT | Platform |
| NbS | Nature-based solution |
| MED | Mediterranean |
| UFZ | Helmholtz Centre for Environmental Research |
| RSS | Remote Sensing Solutions GmbH |
| UPV | Universitat Politècnica de València |
| IDRICA | Idrica |
| SEMIDE | Euro-Mediterranean Information System on know-how in the Water sector |
| TdV | La Tour du Valat |
| TUC | Technical University of Crete |
| UNIPR | Università di Parma |
| UNISS | University of Sassari |
| UNINA | University of Naples Federico II |
| RSCN | Royal Society for the Conservation of Nature |
| LPM | Living Planet Morocco |
| AGRI | AgroInsider |
| ESIM | Higher School of Engineering of Medjez El Bab |
| BU | Boğaziçi University |
| BMP | Best Management Practices |

# 1. Introduction

## 1.1. Purpose

The OurMED project, funded by PRIMA under Section I, is dedicated to advancing sustainable water storage and distribution systems within the Mediterranean region. The overarching goal is to design and explore innovative solutions closely integrated into ecosystem management at the river basin scale. This ambitious objective is pursued through a collaborative approach that combines scientific expertise with local knowledge, fostering spaces for social learning among stakeholders, societal actors, and scientific researchers.

Data availability and needs within the OurMED project are essential components in achieving its sustainable water management goals. Primary data categories, including infrastructure distribution, site specifics, hydrological water flow trends, and soil characteristics, form the core of understanding for effective ecosystem management. Additionally, secondary data is crucial in providing supplementary information for a more nuanced comprehension of the challenges and opportunities associated with sustainable water storage and distribution.

The project's data requirements are systematically outlined in dedicated tables and interpreted in rigorous text analysis. This info serves as comprehensive tools, offering insights into the availability of data and its limitations across eight local and one regional demonstration sites. This detailed overview of data serves as the foundation for informed decision-making and strategic planning, ensuring demo site characterization and the successful integration of innovative and sustainable water management practices within the demo sites and the Mediterranean region.

# 2. Work Packages Data Availability

## 2.1. WP2 Demonstration sites, statuses, and needs (TUC)

Effective water management requires careful collection of local information and data. Data relevant to water management can be divided into primary and secondary categories. The primary categories such as infrastructure distribution, site information, hydrological water flow trends and soil characteristics, represent basic and essential elements directly related to water resources management. These primary categories are foundational for cultivating a comprehensive understanding of the ecosystem. Conversely, secondary categories provide supplementary information that enriches the holistic perspective of the ecosystem, contributing to a more nuanced comprehension of the complexities inherent in water resource management.

Overall a critical analysis of data availability for Work Package 2 relatively to demo sites needs follows:

1. Comprehensive Coverage:
    - Data is available for a diverse range of regions, including Bode, Jucar, Agia, Arborea, Mujib, Sebou, Medjerda, Konya, and the broader MED-Region. This comprehensive coverage allows for a holistic understanding of water systems in various geographical contexts.
2. Temporal Dimension:
    - Historical in-situ data and time series data on ecosystem states, groundwater levels, and streamflow provide a temporal dimension, allowing for the analysis of trends, patterns, and changes over time. This is crucial for understanding the dynamics of water resources.
3. Spatial Analysis:
    - Maps, including land use and land cover, wetlands, and hydrogeological maps, provide a spatial perspective. This spatial analysis is essential for identifying geographical patterns, spatial relationships, and potential correlations between different variables.
4. Monitoring Technologies:
    - The use of high-resolution monitoring sensor images, low-cost cameras, and Earth Observation products enhances the monitoring capabilities. These technologies offer detailed insights into the current state of water storage, distribution, and ecosystem conditions.
5. Citizen Science Engagement:
    - Limited citizen science data indicates some level of community involvement. This engagement can contribute valuable local knowledge and observations to complement scientific data, providing a more comprehensive understanding of the water systems.
6. Planned Data Updates:
    - The information about planned updates, such as the expected update in hydrogeological data for Konya in January 2024 and soil properties in March 2024, suggests a commitment to keeping the data current and relevant.
7. Data Gaps and Gathering Efforts:
    - Data gaps, such as limited streamflow data for ARBOREA, are acknowledged. The plan to gather missing data, as indicated by UFZ, reflects proactive efforts to fill in information gaps and ensure a more complete dataset.
8. Interdisciplinary Approach:

- The variety of data types, including geological, hydrogeological, ecological, and citizen science data, reflects an interdisciplinary approach. This is crucial for a comprehensive analysis that considers the complex interactions within water systems.

9. Potential for Integrated Analysis:
    - The availability of diverse data types, including sensor images, time series data, and Earth Observation products, suggests the potential for integrated analysis. Combining these datasets can provide a more holistic understanding of the factors influencing water resources.

In conclusion, the data availability for WP2 appears robust, with a good balance of temporal, spatial, and technological dimensions. The acknowledgment of data gaps and planned updates demonstrates a commitment to continuous improvement and a thorough understanding of the complexities of water systems in the targeted regions.

Table 1 below provides a comprehensive overview of the data required for the demonstration sites as described above. It serves to provide an insight into the availability of data and its limitations for each individual case, thus contributing to a deeper understanding of the topic at hand.

*Table 1 Data availability for all demo sites (WP2).*

| WP2 Demonstration sites, statuses & needs (TUC) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Current situation of water storage and distribution (Exiting and planned water strafe and distribution system) | x | x | x | x | x | x | x | x | x |
| Historical in situ data (rainwater, water levels, Spatial Precipitation Index, Temperature, etc.) | x | x | x | x | x | x | x | x | x |
| Demonstration sites descriptions (description, geological maps, cross-sections, Shapefiles, etc.) | x | x | x | x | x | x | x | x | x |
| Maps (land use and land cover maps, wetland maps) | x | x | x | x | x | x | x | x | x |
| Time series data on ecosystem states (Demands, water quality, NDVI, etc.) | x | x | x | - | - | x | - | only NDVI | x |
| Hydrological data and maps (description of the main hydraulic infrastructures, extension of irrigated area, etc.) | x | x | x | x | - | x | x | Jan 2024 | N/A |
| High-resolution monitoring sensor images | x | x | - | - | - | - | 2024 | - | N/A |
| Images from low cost cameras | x | x | - | x | - | x | - | - | N/A |
| Earth observation products (i.e. evapotranspiration, Water Index, Land Sur. Temperature, Fr. Veg Cover, etc.) | - | x | x | - | - | x | - | x | N/A |
| Citizens science data | - | x | - | - | x | limited | x | limited | x |
| Groundwater level time series | x | x | x | x | x | x | x | x | (UFZ: 1965-present in some Med countries) |
| Streamflow data series | x | x | x | - | x | x | x | x | literature (UFZ) |
| Soil properties | x | x | x | x | x | x | x | Mar 2024 | x |

## 2.2. WP3 Water and ecosystems governance and socio-economic assessment (BU)

The main focus of Work Package 3 (WP3) is the description of water use patterns through socio-economic analysis. Water use efficiency in both agricultural and industrial domains depends on hydrological conditions, which determine the overall quality and supply. Collecting data on land use and crop choices over time provides valuable insights into agricultural practices and their impact on the environment.

The comprehensive approach to water resources management involves assessing the regulatory, habitat, provisioning and information functions of the ecosystem through prior assessments of ecosystem services or nature's contributions to people. Identifying and resolving conflicts among stakeholders is critical to promoting cooperative and sustainable water management practices. This approach, which includes

stakeholder engagement, data-driven insights and ecological assessments, creates a fundamental framework for effective and informed water resources management.

The information provided for Work Package 3 (WP3) on Water and Ecosystems Governance and Socio-economic Assessment highlights key aspects related to historical data availability, management regulations, water network efficiency, stakeholder engagement, water allocations, land use, ecosystem service assessments, and conflicts among stakeholders.

1. Data Availability and Coverage:
    - Historical data on groundwater level and quality are well-documented across the demo areas, providing a foundational understanding. However, there is a notable gap in uniform availability of streamflow and instream water quality data, which may impact a comprehensive analysis.
2. Regulatory Insight:
    - The knowledge on management regulations for all demo areas reflects a commitment to understanding the legal and regulatory frameworks governing water and ecosystems. This insight is essential for effective governance.
3. Efficiency in Water Network:
    - The emphasis on water network efficiency, particularly within the agri-food system through irrigation consortiums, indicates a focus on sustainable water use practices. This aligns with broader goals of resource optimization.
4. Stakeholder Engagement:
    - The planned stakeholder mapping and engagement processes through participatory platforms, including living lab meetings, demonstrate a proactive approach to incorporating diverse perspectives. This approach enhances the inclusivity and effectiveness of water governance strategies.

5. Water Allocations and Management:
    - Documentation of water allocations from upstream (Forests/Parks authorities) to downstream (Farmers authorities) and water rationing from ENAS provides valuable insights into the intricate water management processes. Understanding these allocations is critical for sustainable water use.
6. Land Use and Crop Choices:
    - Availability of data regarding land use and crop choices, especially in time series, is essential for evaluating the impact of agricultural practices on water resources. This information is crucial for making informed decisions regarding land management.
7. Ecosystem Services Assessment:
    - A previous assessment of ecosystem services, including regulating, habitat, provisioning, and information functions, acknowledges the broader ecological impacts of water and land management decisions. This holistic approach considers the ecosystem's role in sustainable water governance.
8. Stakeholder Conflicts:
    - Identified conflicts among stakeholders/users, such as upstream/downstream water uses and conflicts between dairy farmers, fishermen, and regulatory bodies, highlight potential challenges in achieving consensus. Addressing these conflicts is essential for effective water governance.

In conclusion, WP3 reflects a thorough understanding of the complexities involved in water and ecosystems governance. While data gaps exist, the proactive stakeholder engagement, regulatory insights, and consideration of ecosystem services showcase a holistic and integrated approach toward achieving sustainable water management in the designated demo areas. Addressing data gaps and effectively managing conflicts will be critical for the success of governance strategies.

Table 2 below offers a thorough summary of the necessary data for all the demonstration sites. It aims to shed light on data availability and constraints for each case, enhancing comprehension of the subject.

*Table 2 Data availability for all demo sites (WP3).*

| WP3 Water and ecosystems governance and socio-economic assessment (BU) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Availability of historical data (groundwater level, streamflow and instream water quality) | x | x | x | groundwater level and quality only | x | x | x | x | x |
| Knowledge on management regulation of the different demo areas | x | x | x | x | x | x | - | x | x |
| Water network efficiency (within the agri-food system) | x | - | x | from irrigation consortium | - | - | - | - | N/A |
| Stakeholder mapping process (through participatory platforms | x | x | x | x | x | x | x | x | x |
| Stakeholder engagement process (living labs) | x | x | x | x | x | x | 2024 | x | x |
| Water allocations, upstream (Forest/ Park authorities)-downstream (Farmers authorities) water rationing | x | - | x | ENAS (Water agency) | x | x | x | x | N/A |
| Data regarding land use and crop choices | x | x | - | x | x | x | - | x | x |
| Previous assessment of regulating habitat, provision and information functions of the ecosystem (Ecosystem Service or Nature's Contribution to people | - | x | - | - | - | x | - | - | x |
| Conflict among stakeholders/users | x | x | x | x | x | x | x | x | x |

## 2.3. WP4 Co-design of multi-sectoral solutions (UNIPR)

The primary emphasis of Work Package 4 (WP4) revolves around Co-designing multisectoral solutions, a collaborative process in which stakeholders from various sectors work together to develop integrated solutions for effective and sustainable outcomes in water management practices.

For each case study, a more detailed analysis is carried out, focusing on aspects such as the model type, its availability and its purpose. In addition, the objectives each model applied are examined in detail and the availability of hydrological and climatological data is assessed. These elements are examined in detail in the following sections to provide a comprehensive understanding of each demo site.

1. Purpose of Investigation:
    - The investigation has a clear purpose across demo sites, emphasizing the need for understanding and improving water systems within the OurMED project. This targeted approach ensures focused efforts aligned with project objectives.
2. Advanced Numerical Models:
    - The presence of advanced numerical models, such as the coupled Surface water/groundwater/water quality model (mHM-Nitrate), showcases a commitment to sophisticated modelling techniques. The plan to update and integrate the model with digital twins for defining ecological thresholds indicates a forward-looking and technology-driven strategy.
3. Modelling Approaches:
    - Different modelling approaches are employed across demo sites, including surface water, groundwater, and GW/Flow models. This diverse set of models reflects a holistic understanding of water systems, covering both quantity and quality aspects.
4. Operational Enhancement:
    - For specific demo sites like Sidi Salem Dam, there are plans to link existing models for enhanced operational capabilities. This application-oriented approach signifies a practical use of modelling for optimizing water transfer, irrigation practices, and managing ecological flow.
5. Multi-Sectoral Water Management:
    - Active involvement of agencies and consortia in defining indicators related to ecological flow, water use efficiency, and ecological status indicates a multi-sectoral approach. Collaboration with the Jordan Farmers Union (JFU) and limited engagement with irrigation cooperatives highlight diverse stakeholder participation.
6. Data-Driven Modelling:

- Availability of comprehensive data, including groundwater levels, streamflow, and water quality indices, underscores a strong data-driven modelling approach. This ensures the reliability and accuracy of the models, supporting effective decision-making.

7. Climate Data Utilization:
    - Utilizing long-term climate data for both temperature and precipitation across multiple stations is valuable. This data is crucial for understanding climate patterns, predicting water system dynamics, and making informed decisions about water management.
8. Collaborative Approach:
    - The engagement with agencies and consortia in defining indicators and collaborating on multi-sectoral water management signifies a collaborative approach. This involvement is critical for aligning solutions with practical needs and ensuring the success of the project.

In conclusion, the approach taken in WP4 across demo sites demonstrates a combination of advanced modelling techniques, data-driven decision-making, and collaborative multi-sectoral efforts. Leveraging technology, engaging stakeholders, and utilizing comprehensive data sources position the project well for achieving sustainable water management solutions within the OurMED initiative.

Table 3 below outlines the essential data requirements for the demonstration sites discussed earlier. Its purpose is to elucidate the availability and constraints of data for each case, facilitating a deeper understanding of the subject.

*Table 3 Data availability for all demo sites (WP4).*

| WP4 Co-design of multi sectoral solutions (UNIPR) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| purpose of investigation in the demo site | | x | | | | | x | | |
| Availability of numerical/smart model for the dome site (GW model, surface water model, combined model, water distribution, water management, decision support system, quantity or quality models) | x | x | x | x | x | - | x | x | N/A |
| Model completion timeline and software availability | x | x | x | x | x | x | x | x | N/A |
| Alternative strategies to achieve the objectives of Our MED | - | - | - | - | - | - | - | - | N/A |
| Active Agencies, irrigation/reclamation Consortia on the site defining indicators of ecological flow, water se efficiency, safe groundwater abstraction, good ecological status, etc.) | x | x | x | x | x | x | limited | - | N/A |
| Availability of data required for Hydrological and water quality model (Groundwater level, Streamflow, Water Quality Indices, etc.) | - | x | x | x | - | - | x | x | - |
| Availability of precipitation data for thirty years and more in the historical period (1985-2023) | x | x | x | x | x | x | x (1960-2014) | x (1980-present) | x |
| Availability of temperature data for thirty years and more in the historical period (1985-2023) | x | x | x | x | x | x | x(1960-2014) | x (1980-present) | x |

## 2.4. WP5 Development of tailored Nature-based Solutions (UNINA)

Work package 5 (WP5) is dedicated to the development of customized nature-based solutions, with a particular focus on the careful study of hydrological dynamics in the intended context. At the same time, a crucial focus is placed on understanding soil permeability and erodibility. Furthermore, the evaluation extends to scrutinizing funding mechanisms, including the investigation of EU and national subsidies for nature-based solutions (NbS). The assessment also includes an in-depth analysis of water availability for drinking and irrigation purposes and to support ecosystems, as well as a comprehensive inventory of existing natural and artificial water infrastructure. The analysis also includes consideration of current and future climate scenarios, which provide crucial insights for the development of nature-based solutions tailored to the specific hydrological and ecological dynamics of the region.

When considering and collecting all essential information, it is imperative to identify the critical needs for each demo site. These critical needs could include the need to increase water availability, improve water quality, increase monitoring capabilities, and improve the condition of aquatic ecosystems. By identifying the critical needs within each demo site, a basic framework for developing nature-based solutions and formulating more robust water management plans can be established. Consequently, the critical needs of each demo site are described in the following sections and explained in line with these overarching objectives:

1. Data Availability:
    - Across demo sites, there is a comprehensive availability of data related to hydrology, soil permeability, diffuse pollution, water availability, existing water infrastructure, and climate scenarios. This rich dataset provides a solid foundation for the development of nature-based solutions (NbS).
2. Hydrological Insights:
    - Long-term hydrological data, including rainfall, streamflow, and water leakage, is crucial for understanding water dynamics in wet and dry periods. This information allows for the identification of patterns and trends that can inform the design of NbS to address specific hydrological challenges.
3. Soil and Erosion Considerations:
    - The availability of soil permeability and erodibility data, along with information on diffuse pollution, is vital for designing NbS that can mitigate soil erosion, improve soil health, and address pollution concerns. This supports sustainable land management practices.
4. Water Availability and Infrastructure:

- Data on water availability for various needs (drinking water, irrigation, ecosystem) and existing water infrastructure (natural and artificial) is essential. It provides insights into the current state of water resources and helps in identifying areas where NbS can enhance water availability and quality.

5. Climate Scenario Planning:
    - Considering current and future climate scenarios is fundamental for developing resilient NbS. This data enables the design of solutions that can adapt to changing climatic conditions, ensuring long-term effectiveness and sustainability.
6. Identification of Critical Needs:
    - Understanding the critical needs of each demo site, such as improving water distribution and quality under low-flow conditions, naturalizing specific zones, or enhancing groundwater and wetland water quality, guides the development of targeted and impactful NbS.
7. Funding Mechanisms:
    - Knowledge of funding and financing mechanisms, particularly from EU directives, provides insights into available resources for implementing NbS. This understanding is crucial for ensuring the feasibility and long-term success of proposed solutions.
8. Monitoring and Maintenance:
    - The identification of potential sites for new monitoring stations, coupled with maintenance support, is essential for continuous data collection and adaptive management. This ensures the effectiveness of NbS over time and allows for adjustments based on real-time monitoring.
9. Stakeholder Involvement:
    - The development of NbS should involve stakeholders and local communities. The availability of comprehensive data ensures that solutions are tailored to the specific needs and challenges of each demo site, fostering greater acceptance and success.
10. Deadline Considerations:
    - Some demo sites have specific deadlines for tasks such as identifying potential monitoring sites (e.g., March 2024). Adhering to these deadlines is critical for maintaining the project timeline and achieving the planned objectives.

Overall Impression: WP5 demonstrates a robust approach to NbS development, leveraging extensive data availability to design tailored solutions for each demo site. The emphasis on understanding critical needs, climate scenarios, and funding mechanisms, coupled with proactive monitoring and stakeholder involvement, positions the project for successful implementation of sustainable and effective nature-based solutions.

Table 4 below outlines the essential data requirements for the demonstration sites discussed earlier. Its purpose is to elucidate the availability and constraints of data for each case, facilitating a deeper understanding of the subject.

*Table 4 Data availability for all demo sites (WP5).*

| WP5 Developments of tailored nature-based solutions (UNINA) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Hydrology (rainfall data, streamflow, water leakage, Aquifer recharge, etc.) for long duration (several years in Wet/ Dry periods) | x | x | x | some | x | x | x | x | x |
| Soil permeability and erodibility | x | x | x | x | x | x | - | Mar 2024 | x |
| Diffuse pollution data at the Demo sites | x | x | - | x | x | - | - | - | N/A |
| Water availability (Drinking water, irrigation needs, Ecosystem needs) | x | x | x | x | x | x | x | x | x |
| Existing natural and Artificial water infrastructure (rivers, reservoirs, etc.) | x | x | x | x | x | x | x | x | x |
| Current and future climate scenarios | - | x | - | x | - | x | - | x | x |
| Funding and Financing Mechanisms for the adoption of NbS (EU and national subsidies) | x | x | x | - | - | x | - | - | N/A |
| Identification of potential sites for the installation of new monitoring stations (with maintenances support | - | x | x | x | - | - | x | - | N/A |
| Critical need for the Demo site (increase water quality, improve water quality, improve monitoring capabilities, improve state of aquatic ecosystem | x | x | x | x | - | x | x | x | x |

## 2.5. WP6 Innovative technologies and Decision Support System (AGRI)

Work Package 6 (WP6) focuses mainly on dynamic analyses and monitoring of water resources in the specified regions. The data infrastructure for the comprehensive study of water resources includes essential shapefiles. These shapefiles cover climatic stations, streamflow gauges, river networks, groundwater basins when required, and locations of water-related ecosystem spots of special interest as needed. Additionally, shapefiles provide information on water infrastructures such as dams and irrigation channels, as well as main agricultural and urban demands when necessary. Furthermore, the integration of remote access to real-time data is emphasized, encompassing precipitation, temperature, streamflow, groundwater conditions, and water quality indices, all at the finest time scale.

1. Shapefiles:
    - Climatic stations: Available across all regions.
    - Streamflow gauges: Available in most regions, except for AGIA and possibly others.
    - River network: Available across all regions.
    - Groundwater basins: Available in all regions.
    - Water infrastructures: Available in most regions, with some regions expecting availability in the future (e.g., ARBOREA, MUJIB).
    - Main agricultural/urban demands: Available in all regions.
    - Locations of water-related ecosystem spots: Available in most regions.
2. Remote Access to Data:
    - Real-time precipitation: Available but not remotely accessible in most regions, with periodic updates.
    - Real-time temperature: Available but not remotely accessible in most regions, with periodic updates.
    - Real-time streamflow: Available but not remotely accessible in most regions, with periodic updates.
    - Real-time groundwater: Availability varies; not available in JUCAR, AGIA, and possibly others.
    - Real-time water quality indices: Available but not remotely accessible in most regions, with periodic updates.
3. Overall Assessment:
    - The availability of shapefiles related to climatic stations, river networks, groundwater basins, and water infrastructures is relatively good across regions.
    - Remote access to real-time data, especially for groundwater and water quality indices, seems limited, with periodic updates rather than real-time access.
    - Streamflow gauges are available in most regions, but there are exceptions like AGIA where this data is not available.

This analysis suggests a generally good availability of essential data for the WP6 activities, though improvements in real-time data access could enhance decision-making capabilities.

WP6 in the OurMED project exhibits substantial data availability, primarily in the form of shapefiles detailing climatic stations, streamflow gauges, river networks, groundwater basins, and water infrastructures across demo sites. While acknowledging real-time data availability for precipitation, temperature, streamflow, groundwater, and water quality indices, limitations in remote access pose challenges. Timelines for shapefile completion indicate ongoing efforts, but improvements in remote data access are recommended for more efficient real-time monitoring. Regular maintenance and updates to data access systems are crucial for sustained reliability. Overall, WP6 provides a solid foundation, with opportunities to enhance data access and integration for a more dynamic decision support system.

WP6 plays a pivotal role in the OurMED project by integrating innovative technologies and developing a decision support system to enhance water resource management in the Mediterranean region. The availability of shapefiles, encompassing climatic stations, streamflow gauges, river networks, groundwater basins, and water infrastructures, establishes a comprehensive spatial framework. This foundational data is essential for understanding the hydrological landscape and forms the basis for decision-making.

However, challenges are identified in terms of remote access to real-time data, particularly for temperature, streamflow, groundwater, and water quality indices. Improving remote access capabilities would enhance the system's efficiency in monitoring and responding to dynamic environmental conditions. The project outlines timelines for completing certain shapefile datasets, indicating ongoing efforts to collect and organize data.

The integration of real-time data into decision support systems is crucial for providing timely and accurate information to stakeholders. The success of WP6 depends on the effective utilization of available data, addressing gaps in remote data access, and ensuring the maintenance and sustainability of data access systems. Collaboration among project partners, stakeholders, and technological experts will be key to overcoming challenges and maximizing the impact of the decision support system.

In summary, WP6 serves as a technological backbone for the OurMED project, aiming to empower decision-makers with the tools and information necessary for sustainable water management in the Mediterranean region. The ongoing efforts to enhance data access and integration reflect a commitment to staying adaptive and responsive to the evolving needs of the project.

Table 5 below outlines the essential data requirements for the demonstration sites discussed earlier.

*Table 5 Data availability for all demo sites (WP6).*

| WP6 Innovative technologies and Decision Support System (AGRI) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Shapefiles | | | | | | | | | |
| Climatic stations | x | x | x | x | x | - | x | x | N/A |
| Streamflow gauges | x | x | - | - | x | - | x | x | N/A |
| River network (non-European countries: Morocco, Tunisia, Jordan) | x | x | - | x | x | x | x | JAN 2024 | x |
| Groundwater basins | x | x | x | x | x | x | x | x | x |
| Water infrastructures (dams, irrigation channels) | x | x | x | x | x | - | x | MAR 2024 | x |
| Main Agricultural, Urban demands | x | x | x | x | x | - | x | x | x |
| Locations of water-related ecosystems spots of special interest | x | x | x | x | x | x | - | x | x |
| Remote access to data of: | | | | | | | | * | N/A |
| Real-time precipitation at the finest scale | x | x | - | - | x | - | - | - | N/A |
| Real-time temperature at the finest scale | x | x | - | - | x | - | - | - | N/A |
| Real-time streamflow at the finest scale | x | x | - | - | x | - | - | - | N/A |
| Real-time groundwater at the finest scale | x | - | x | - | x | - | - | - | N/A |
| Real-time water quality indices | x | - | x | - | x | - | - | - | N/A |

*None of the data sets can be accessed remotely, but can be updated periodically.

## 2.6. WP7 Upscaling and ecological assessment of water-related Ecosystems (TdV)

Work Package 7 (WP7) focuses on upscaling and ecological assessment of water-related ecosystems in the Mediterranean region (MED). The initiative includes a wide range of key data sources and assessments to provide a holistic understanding of ecological dynamics. These include data on water storage and distribution, long-term trends from 1990 to 2020, delineation maps of water-related ecosystems, land use and land cover (LULC) changes, vegetation dynamics, surface water dynamics, databases on protection and conservation status, maps detailing anthropogenic pressures on natural wetland ecosystems, groundwater basins delineation and capacity assessments, water quality data for the main Mediterranean water bodies, and regional climate models, including future projections. These different datasets contribute to an ecological assessment that takes into account the complex interplay between ecological, hydrological and socio-economic factors. The results of this work package are crucial for the development of sustainable management strategies and policies for water-related ecosystems across the Mediterranean region.

WP7 stands as a crucial component in the OurMED project, providing a solid foundation for upscaling and assessing water-related ecosystems. The inclusion of diverse datasets and collaborative efforts with other work packages positions WP7 as a key contributor to the project's success.

1. Water Storage and Distribution:
    - Long-term trends (1990-2020) data available for water storage and distribution across all demo sites.
2. Wetland and Land Use/Land Cover (LULC) Maps:
    - Wetland-related data, potential wetland areas, and LULC maps for monitoring sites accessible.
3. Vegetation and Surface Water Dynamics:
    - MODIS time series potential for pan-Med vegetation dynamic maps.
    - Plans to produce SWD maps from optical and SAR satellite images.
4. Protection Status and Conservation:
    - Database on protection status, including updated information on Protected Areas (PAs) with IUCN categories, available.
5. Groundwater Basins and Water Quality:
    - Partial information on groundwater basins and delineation across certain demo sites.
    - Water quality data accessible via the Gemstat repository.
6. Climatic Models and Socio-economic Data:
    - Plans for pan-Med climatic models, future projections, and socio-economic datasets including demography, GDP, HDI, and water usage.
7. Challenges and Uncertainties:
    - Indicates uncertainty or partial availability for certain datasets, signaling potential gaps in data coverage.
8. Integration with MWO Assessments:

- Collaboration with MWO enhances the reliability and relevance of the ecological assessment.

9. Collaboration with Other Work Packages:
    - Collaborative efforts with UNIPR and SocialGrids strengthen the dataset diversity and overall assessment.
10. Future-oriented Approach:
    - Consideration of future projections and climatic models reflects a forward-looking approach.
11. Overall Data Richness:
    - WP7 demonstrates a rich collection of data across various ecological aspects, contributing to a comprehensive understanding of water-related ecosystems in the Mediterranean region.

In summary, WP7 encompasses a diverse range of datasets, providing a solid foundation for upscaling and ecological assessments within the OurMED project. While certain challenges and uncertainties exist, collaborative efforts and future-oriented planning enhance the overall strength of data availability in this work package. Table 6 outlines the accessibility of data for each demonstration site.

*Table 6 Data availability for all demo sites (WP7).*

| WP7 Upscaling and ecological assessment of water-related Ecosystems (TdV) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Data for water storage distribution in the Med area and long-term trends (1990-2020) | x | x | x | x | x | x | x | x | Available (UFZ, TdV) |
| Regional (pan-Med) water-related ecosystems delineation maps (current situation) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Available (TdV) |
| Regional (pan-Med or national LULC and LULC Changes maps (1990 vs. 2020) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Available (TdV) |
| Regional (pan-Med) vegetation dynamic maps (long-term time series 1990-2020) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | MODIS |
| Regional (pan-Med surface water dynamic maps (long-term time series 1990-2020) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | To be produced (RSS) |
| Regional (pan-Med) database on the protection status (current situation) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Available (TdV) |
| Regional (pan-Med database on the conversation status of water bodies and other water-related ecosystem (current situation) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Available (TdV) |
| Regional (pan-Med) maps of anthropogenic pressure and natural wetland ecosystems (wetland intensity use) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | To be produced (RSS, TdV) |
| Groundwater basins delineation and capacity (local, national, and regional scales) | - | - | - | - | x | x | x | - | x |
| Water quality data at the main Med water bodies (mid and long-term time series) | - | - | - | - | x | x | x | - | available (Gemstat) |
| Regional (pan Med) climatic models, including future projection (PP, T° and EVT) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | available (UNIPR) |
| Other relevant socio-economic datasets at national scales, (demography, GDP, HDI, water usage per sector, etc.,) including long-tern trends (1990-2020) | - | - | - | - | x | x | x | - | Available (TdV) |

## 2.7. WP8 Impact, engagement and sustainability (SEMIDE)

Work package 8 (WP8) focuses on the development of a water management plan based on socio-economic analysis and sustainability. Stakeholder involvement, exploration of existing funding sources and a thorough understanding of the benefits of a solution are essential. Stakeholder engagement ensures a comprehensive and collaborative decision-making process, while the assessment of funding sources provides the necessary financial basis for sustainable initiatives. At the same time, careful consideration of the benefits of the solution demonstrates its socio-economic and environmental viability. This combination provides a solid framework for an effective water management plan.

In assessing WP8, focusing on Impact, Engagement, and Sustainability, key observations emerge. Stakeholder engagement appears robust across all demo sites, a critical factor for project success. While financial incentives and funding sources are identified in most sites, the MED-Region presents a unique context indicating potential gaps or differences. The acknowledgment of existing national initiatives and active involvement in other EU projects underscores alignment with broader goals and collaboration. However, detailed economic estimations, including CAPEX, OPEX, and benefits/revenues, are limited, leaving room for further development. The overall sustainability planning demonstrates a holistic approach, incorporating financial and stakeholder considerations. Challenges lie in the lack of detailed stakeholder engagement strategies, and a cross-demo site comparison offers opportunities for shared learning. The MED-Region's financial incentives prompt the need for additional information or context clarification. In conclusion, WP8 provides a foundation for project success but would benefit from more detailed financial estimations to enhance impact assessment. Table 7 outlines the accessibility of data for each demonstration site.

*Table 7 Data availability for all demo sites (WP8).*

| WP8 impact, engagement and sustainability (SEMIDE) | BODE | JUCAR | AGIA | ARBOREA | MUJIB | SEBOU | MEDJERDA | KONYA | MED-REGION |
|---|---|---|---|---|---|---|---|---|---|
| Stakeholder engagement (linked to wp3) | x | x | x | x | x | x | x | - | x |
| Financial incentives funding sources (subsidies, loans, donations at national, local and international level + EU fund | x | x | - | x | - | x | x | - | N/A |
| Existing national and regional initiatives, policies/ strategies, regulation | x | x | - | - | x | x | x | x | x |
| Involvement in other EU projects | x | x | x | x | x | - | x | - | x |
| Estimation of CAPEX, OPEX, Benefits and revenues of solutions implemented in demo sites | x | x | x | - | - | - | x | - | N/A |

## 2.8. General overview of data availability in each package

Tables 8, 9, provided below offer a comprehensive overview of the availability of data necessary for each work package, along with highlighting limitations and areas where specific data categories are not available. Analysis reveals that while a substantial amount of data is accessible, some datasets remain partially complete. Furthermore, it is evident that significant efforts are required to enhance the collection of comprehensive climatological, hydrological, and related data, ensuring it remains up to date. Additionally, there is a pressing need for a deeper understanding of stakeholder engagements, including any conflicts that may arise between them, as well as an exploration of the socio-economic aspects inherent within the water management plan. Such insights are crucial for further refinement and improvement of the existing water management strategies.

The analysis of data availability across the various work packages in the OurMED project reveals a mixed landscape with strengths and potential challenges.

1. Strengths:

    - Historical Water Data: The project benefits from substantial availability of historical water data, which is crucial for understanding past trends and making informed decisions.
    - Hydrogeological Data: The availability of hydrogeological data is generally robust, providing a strong foundation for assessing groundwater resources.
    - Stakeholder Engagement: Stakeholder engagement data is substantial, indicating a strong emphasis on involving relevant actors in the project.

2. Challenges and Areas for Improvement:

    - Real-Time Data: There is a noticeable limitation in the availability of real-time data, particularly for climatic and water-related variables. Real-time data is crucial for monitoring current conditions and responding dynamically.
    - Citizens' Science Data: Limited availability of citizens' science data suggests a potential area for expansion. Engaging the public in data collection can enhance the project's scope and community involvement.
    - Incomplete Data for Some Solutions: Some work packages, such as WP5 (Development of Tailored Nature-based Solutions), exhibit partial data for key elements like pollution data and funding mechanisms. This could impact the comprehensive development of solutions.

3. Recommendations:

- Enhanced Real-Time Monitoring: Consider implementing strategies to enhance real-time monitoring capabilities, possibly through the integration of advanced sensor technologies and data-sharing platforms.
- Community Involvement: Encourage and facilitate increased citizens' science participation to broaden the data sources and foster community engagement.
- Focused Data Augmentation: Target specific areas where data availability is partial and explore opportunities to augment datasets, especially for pollution data and funding mechanisms.

4. Overall Implications:

- The project is well-positioned with substantial data for key aspects, indicating a strong foundation for research and implementation.
- Addressing limitations in real-time data and specific partial datasets will enhance the project's overall effectiveness.
- Regular assessments of data availability and adjustments in data collection strategies can optimize project outcomes.

In conclusion, while the project benefits from significant data resources, proactive measures to address specific limitations can contribute to a more robust and comprehensive OurMED initiative.

*Table 8 Data availability for all the Work Packages.*

| WP2 Demonstration sites, statuses, and needs (TUC) | |
|---|---|
| Category | Data availability |
| Water Storage, Distribution and Demands | Substantial |
| Hydrogeological data, groundwater, Streamflow, Precipitation | Substantial |
| Maps, descriptions, images, EO products | Partial |
| Citizens Science Data | Limited |
| Soil properties | Near complete |

| WP3 Water and ecosystems governance and socio-economic assessment (BU) | |
|---|---|
| Category | Data availability |
| Historical water data | Near complete |
| Water network, management and conflicts | Limited |
| Stakeholder engagement, Living Labs | Near complete |
| Land Use and Ecosystem | Partial |

| WP4 Co-design of multi-sectoral solutions (UNIPR) | |
|---|---|
| Category | Sites |
| Is a numerical/smart model available for the site? | 7 |
| Category | Data availability |
| Climate historical data | Substantial |
| Station data (number, locations, etc) | very limited |

*Table 9 Data availability for all the Work Packages.*

| WP5 Development of tailored Nature-based Solutions (UNINA) | |
|---|---|
| **Category** | **Data availability** |
| Hydrology and permeability | Substantial |
| Pollution data (including new monitoring sites) | Partial |
| Water availability, needs and infrastructure | Complete |
| Climate Scenarios | Partial |
| Funding and Financing Mechanisms | Partial |

| WP6 Innovative technologies and Decision Support System (AGRI) | |
|---|---|
| **Category** | **Data availability** |
| Climatic stations | Substantial |
| Hydrogeological data, water infrastructure | Substantial |
| Water demands and spots of interest | Substantial |
| **Remote access data** | |
| Real-time climatic data | Limited |
| Real time water data | Limited |

| WP7 Upscaling and ecological assessment of water-related Ecosystems (TdV) | |
|---|---|
| **Category** | **Data availability** |
| water storage and distribution in the MED area | Near complete |
| Groundwater Basins | Partial |
| Socio-economic datasets at national scales | Partial |

| WP8 Impact, engagement and sustainability (SEMIDE) | |
|---|---|
| **Category** | **Data availability** |
| Stakeholders engagement | Substantial |
| Existing funding sources and initiatives | Partial |
| Benefits of solutions | Partial |

# 3. Data availability for demo sites

## 3.1. Case study Agia

The Agia demonstration site within the OurMED project exhibits a substantial level of data availability in critical categories such as water storage, distribution, hydrogeology, groundwater, streamflow, and precipitation. This robust foundation suggests a comprehensive understanding of the hydrological dynamics in the region, forming a strong basis for effective water resource management.

While hydrological and water-related data are well-represented, there is room for improvement in other areas. Mapping, descriptions, and the use of Earth Observation (EO) products are identified as partially available, indicating potential opportunities for enhancing spatial understanding and utilizing advanced monitoring tools.

Citizens' science data availability is limited, suggesting a potential area for increased community involvement and data collection efforts. This could strengthen the participatory aspect of the project, fostering a sense of ownership and collaboration among local residents.

On a positive note, soil properties data are near complete, providing valuable insights for ecosystem management and infrastructure planning. This comprehensive information contributes to a more holistic understanding of the Agia site's characteristics.

In summary, while Agia benefits from substantial data in key domains, ongoing efforts to enhance mapping, encourage citizens' science participation, and promote continuous data collection will further elevate the project's effectiveness in sustainable water management and ecosystem preservation.

The overall assessment of data availability for the Agia demonstration site in the OurMED project is as follows:

### 3.1.1. Data Availability

Strengths:

- The AGIA demonstration site exhibits robust data availability, covering various aspects such as water storage and distribution, historical in-situ data, ecosystem states, hydrogeological data, and Earth Observation products.
- Groundwater level time series, streamflow data time series, and soil properties data are available, contributing to a comprehensive dataset.
- Availability of high-resolution monitoring sensor images and real-time water quality indices enhances monitoring capabilities.

Areas for Improvement:

- Clarification is needed on the availability of images from low-cost cameras, citizens science data, and specific details about Earth Observation products

### 3.1.2. Governance and Socio-economic Assessment

Strengths:

- The AGIA project acknowledges the importance of governance and socio-economic assessment.
- Historical data on groundwater level, streamflow, and instream water quality support governance and assessment efforts.
- Water network efficiency, stakeholder mapping, and engagement processes are considered, with a focus on water allocations and potential conflicts among stakeholders/users.

Areas for Improvement:

- Further details on previous ecosystem assessments and data regarding land use and crop choices (ideally time series) need clarification.

### 3.1.3. Multi-sectoral Solutions

Strengths:

- The investigation in the demo site has a clear purpose, and a numerical/smart model (GW model) is available.
- Multi-sectorial water management involves active agencies and consortia defining indicators for ecological flow, water use efficiency, safe groundwater abstraction, and ecological status.
- Availability of data required for hydrological and water quality models, including climate data (precipitation, temperature) for thirty years, strengthens the multi-sectoral approach.

Areas for Improvement:

- Details on surface water modelling plans, indicators specified by agencies, and specific objectives of OurMED regarding the model need clarification.

### 3.1.4. Nature-based Solutions

Strengths:

The AGIA project addresses various components of nature-based solutions, including hydrology, soil permeability, water availability, and existing water infrastructure.

- Identification of funding and financing mechanisms, along with the identification of potential sites for new monitoring stations, strengthens the nature-based solutions approach.

Areas for Improvement:

- Clarification is needed regarding the availability of data on diffuse pollution at demo sites and current/future climate scenarios.

### 3.1.5. Innovative Technologies and Decision Support System

Strengths:

- The availability of shapefiles for climatic stations, groundwater basins, water infrastructures, and main agricultural/urban demands enhances the technological and decision support aspects.
- Remote access to real-time data for precipitation, temperature, and water quality indices contributes to real-time monitoring capabilities.

Areas for Improvement:

- Clarification is needed on the availability of streamflow gauges, river network shapefiles, and when remote access to temperature and groundwater data is needed.

### 3.1.6. Upscaling and Ecological Assessment

Strengths:

- Data for water storage and distribution in the MED area and long-term trends (1990-2020) are available.

Areas for Improvement:

- Details on groundwater basins delineation and capacity, water quality data of main Med water bodies, and relevant socio-economic datasets at national scales need clarification.

### 3.1.7. Impact, Engagement and Sustainability

Strengths:

- Stakeholder engagement is actively considered and linked to governance efforts.
- The project is involved in other EU projects, and there is an acknowledgment of the estimation of CAPEX, OPEX, benefits, and revenues of implemented solutions.

Areas for Improvement:

- Further details on financial incentives, funding sources, and existing national/regional initiatives, policies, and regulations could provide a more comprehensive understanding.

### 3.1.8. Overall Recommendations

1. Clarify Unspecified Details: Seek additional information to clarify unspecified details, including the availability of images from low-cost cameras, citizens science data, and specific details about Earth Observation products.
2. Enhance Monitoring and Assessment Details: Provide more specific information on previous ecosystem assessments, data regarding land use and crop choices, surface water modelling plans, and objectives of OurMED regarding the numerical model.
3. Nature-based Solutions Optimization: Clarify details on the availability of data on diffuse pollution at demo sites and current/future climate scenarios to optimize nature-based solutions.
4. Technological Precision: Clarify the availability of streamflow gauges, river network shapefiles, and when remote access to temperature and groundwater data is needed for more precise technological planning.
5. Upscaling and Ecological Assessment: Provide additional details on groundwater basins delineation and capacity, water quality data of main Med water bodies, and relevant socio-economic datasets at national scales to enhance upscaling and ecological assessment efforts.
6. Engagement and Sustainability: Offer more details on financial incentives, funding sources, and existing national/regional initiatives, policies, and regulations for a comprehensive understanding of impact, engagement, and sustainability

## 3.2. Case study Bode

The Bode demonstration site in the OurMED project exhibits a substantial data foundation in hydrogeology, groundwater, and water-related infrastructure. This robust dataset enables a comprehensive understanding of the region's hydrological dynamics. While data on soil properties and water availability is near complete, there's room for improvement in diffuse pollution assessment and climate scenario modelling. The site's identified critical needs, including enhancing water distribution and quality under low-flow conditions, guide focused interventions. Efforts to augment funding insights and optimize monitoring networks will further fortify sustainable water management in the Bode region. The overall assessment of data availability for the Bode demonstration site in the OurMED project is as follows:

Certainly, let's analyse the BODE demonstration site across different dimensions.

### 3.2.1. Data Availability

Strengths:

- The BODE demonstration site demonstrates strong data availability across various parameters, including the current situation of water storage and distribution, historical in-situ data, demonstration site descriptions, and hydrogeological data.
- Time series data on ecosystem states, high-resolution monitoring sensor images, and Earth Observation products contribute to a comprehensive dataset.
- Groundwater level time series, streamflow data time series, and soil properties data are well-documented.
- Remote access to real-time data, including precipitation, temperature, streamflow, groundwater, and water quality indices, enhances real-time monitoring capabilities.

Areas for Improvement:

- Clarification is needed regarding the availability of Earth Observation products, citizens science data, and certain aspects of climate data.

### 3.2.2. Governance and Socio-economic Assessment

Strengths:

- The BODE project demonstrates a robust governance and socio-economic assessment framework.
- Historical data on groundwater level, streamflow, and instream water quality supports governance and assessment efforts.
- Knowledge on management regulations and water network efficiency is in place.
- Stakeholder engagement is emphasized through participatory platforms, living lab meetings, and a stakeholder mapping process.
- Water allocations, upstream-downstream water rationing, and data on land use and crop choices are considered.

Areas for Improvement:

- Details on a previous assessment of regulating, habitat, provisioning, and information functions of the ecosystem are not specified.

### 3.2.3. Multi-sectoral Solutions

Strengths:

- The project has a clear purpose for the investigation in the demo site.
- A numerical/smart model (mHM-Nitrate) is available, calibrated until 2020, with plans for an update and integration with a digital twins platform.
- Multi-sectorial water management involves active agencies and consortia defining indicators for ecological flow, water use efficiency, safe groundwater abstraction, and ecological status.
- Identified conflict among stakeholders/users (Upstream/downstream water uses) is acknowledged.

Areas for Improvement:

- Additional details on the purpose of the investigation and the specific indicators defined by agencies could provide a more comprehensive understanding

### 3.2.4. Nature-based Solutions

Strengths:

- Hydrology data for long durations, soil permeability, and erodibility data are available.
- The project addresses water availability for drinking, irrigation, and ecosystem needs.
- Existing natural and artificial water infrastructure is considered.
- Funding mechanisms, including EU directives, are acknowledged.

Areas for Improvement:

- Specifics on current and future climate scenarios and the identification of potential sites for new monitoring stations need clarification

### 3.2.5. Innovative Technologies and Decision Support System

Strengths:

- Shapefiles for climatic stations, streamflow gauges, river network, groundwater basins, water infrastructures, and main agricultural/urban demands are available.

- Remote access to real-time data for precipitation, temperature, streamflow, groundwater, and water quality indices is provided.

Areas for Improvement:

- The determination of when remote access to real-time data is needed could enhance the precision of monitoring efforts.

### 3.2.6. Upscaling and Ecological Assessment

Strengths:

- Data for water storage and distribution in the MED area and long-term trends (1990-2020) are available.

Areas for Improvement:

- Details on groundwater basins delineation and capacity, water quality data of main Med water bodies, and relevant socio-economic datasets at national scales need clarification.

### 3.2.7. Impact, Engagement, and Sustainability

Strengths:

- Stakeholder engagement is ongoing and linked to governance efforts.
- Financial incentives and funding sources at national, local, international levels, including EU funds, are considered.
- The project is involved in other EU projects.
- The estimation of CAPEX, OPEX, benefits, and revenues of solutions implemented in demo sites is acknowledged.

Areas for Improvement:

- Further details on the estimation of CAPEX, OPEX, benefits, and revenues could provide a more comprehensive understanding of the project's impact.

### 3.2.8. Overall Observations

1. Clarify Unspecified Details: Seek additional information to clarify unspecified details, including Earth Observation products, citizens science data, previous ecosystem assessments, and specific indicators defined by agencies.
2. Enhance Monitoring and Assessment Details: Provide more specific information on current and future climate scenarios, identification of potential monitoring

station sites, groundwater basins delineation, and relevant socio-economic datasets.

3. Precision in Remote Monitoring: Specify when remote access to real-time data is needed for a more targeted and efficient monitoring approach.
4. Comprehensive Impact Estimation: Provide additional details on the estimation of CAPEX, OPEX, benefits, and revenues to enhance the understanding of the project's impact.
5. Continuous Stakeholder Engagement: Ensure continuous and robust stakeholder engagement throughout the project's lifecycle.
6. Integration of Climate Scenarios: Integrate current and future climate scenarios into project planning for enhanced adaptability.

By addressing these areas, the BODE project can further strengthen its overall effectiveness and contribute to sustainable water management in the demonstration site.

## 3.3. Case study Jucar

The Jucar region has an extensive dataset covering various important aspects, including water

infrastructure, hydrological data and dynamics, geo-information, citizen science data and soil properties. This wealth of information provides a comprehensive understanding of the water resources and environmental dynamics in the region. This wealth of information makes the Jucar region well equipped for informed decision making and strategic planning in various areas and allows for a nuanced examination of the region characteristics and challenges. The JUCAR demonstration sites, as part of a comprehensive water management project, exhibit robust data availability, governance structures, and a focus on multi-sectoral and nature-based solutions.

### 3.3.1. Data Availability

- JUCAR has comprehensive data available for water storage, distribution, and ecosystem states.
- Historical in-situ data, including rainwater, water levels, and temperature, is accessible.
- Various maps, including land use, land cover, wetlands, and geological maps, are available.
- Time series data on ecosystem states, hydrogeological data, and high-resolution sensor images are present.

- Groundwater level and streamflow data time series are well-documented.

### 3.3.2. Governance and Socio-economic Assessment

- There is knowledge on management regulations, stakeholder engagement, and water allocations.
- Data on land use, crop choices, and potential conflicts among stakeholders are available.

### 3.3.3. Multi-sectoral Solutions

- The purpose of investigation in the demo site is specified.
- Multi-sectorial water management is in place, with indicators defined by relevant agencies.

### 3.3.4. Nature-based Solutions

- Hydrological data, soil characteristics, and water availability for various needs are considered.
- Climate scenarios, existing water infrastructure, and funding mechanisms are addressed.
- There's a focus on improving the naturalization of the Albufera lake zone.

### 3.3.5. Innovative Technologies and Decision Support System

- Shapefiles for key elements and remote access to real-time data are available.

### 3.3.6. Upscaling and Ecological Assessment

- Data for water storage, distribution, and long-term trends are accessible.
- Groundwater basins delineation and capacity details are yet to be specified

### 3.3.7. Impact, Engagement, and Sustainability

- Stakeholder engagement, financial incentives, and existing initiatives are well-documented.
- Involvement in other EU projects is acknowledged.
- Estimation of CAPEX, OPEX, benefits, and revenues is considered.

### 3.3.8. Overall Observations

1. The project seems well-structured, with a strong emphasis on data collection, stakeholder engagement, and multi-sectoral solutions.
2. Comprehensive datasets support various aspects of water management, from hydrology to socio-economic factors.
3. The use of innovative technologies and a decision support system is evident.
4. The focus on nature-based solutions aligns with sustainable water management practices.
5. Groundwater basins delineation and capacity, as well as certain climatic models, require further clarification

Recommendations:

- Provide additional details on groundwater basins delineation and capacity for a more comprehensive analysis.
- Continue stakeholder engagement and ensure active participation in living lab meetings.
- Regularly update and maintain the numerical/smart model for effective decision-making.
- Consider enhancing real-time data accessibility for better monitoring and management.

This analysis provides a snapshot of the project's strengths and areas that may benefit from further attention. Adjustments and improvements in the specified areas could enhance the project's overall effectiveness in achieving its objectives.

## 3.4. Case study Arborea

The Arborea region has an extensive dataset covering various important aspects, including water infrastructure, hydrological data and dynamics, geo-information, citizen science data and soil properties. This wealth of information provides a comprehensive understanding of the water resources and environmental dynamics in the region. However, there is a notable lack of geospatial data, particularly in satellite-based observations and remote sensing products satellite-based observations and remote sensing products. Moreover, there is a lack in data regarding public contribution to environmental monitoring and community generated data. There’s also an absence of ground water level time series. These limitations restrict the comprehensive spatial analysis and monitoring capabilities in the Arborea region. Efforts to close these gaps could significantly improve the completeness of data and analytical potential for effective water resources management in the area.

### 3.4.1. Data Availability

Strengths:

- Comprehensive data availability with information on water storage, historical in-situ data, demonstration site descriptions, and hydrogeological data.
- Groundwater level time series, high-resolution monitoring sensor images, and real-time data provide a robust foundation for monitoring.

Areas for Improvement:

- Clarification needed on the availability of time series data on ecosystem states, streamflow data, and specific Earth Observation products

### 3.4.2. Governance and Socio-economic Assessment

Strengths:

- Clear understanding of management regulations and efficiency within the agri-food system.
- Stakeholder engagement processes, including mapping, are planned, addressing potential conflicts between dairy farmers, fishermen, and environmental agencies.

Areas for Improvement:

- Specifics on previous ecosystem assessments and conflict resolution strategies could enhance the socio-economic assessment.

### 3.4.3. Multi-sectoral Solutions

Strengths:

- Existing numerical groundwater model (FEFLOW) enhances the investigation.
- Active involvement of agencies and consortia in defining indicators for multi-sectorial water management.
- Availability of data for hydrological and water quality models, along with climate data, supports holistic solutions.

Areas for Improvement:

- More details on the surface water modelling plans and specific objectives of OurMED regarding the numerical model.

### 3.4.4. Nature-based Solutions

Strengths:

- Identified critical needs for improving groundwater quality and wetland water quality.
- Consideration of funding mechanisms and potential sites for new monitoring stations supports nature-based solutions.

Areas for Improvement:

- Further details on funding mechanisms and current/future climate scenarios would provide a more comprehensive approach.

### 3.4.5. Innovative Technologies and Decision Support System

Strengths:

- Availability of shapefiles for climatic stations, river networks, and water infrastructures supports technological aspects.
- Remote access to real-time data enhances decision support capabilities.

Areas for Improvement:

- Clarification on the availability of streamflow gauges and when remote access to temperature and groundwater data is needed.

### 3.4.6. Upscaling and Ecological Assessment

Strengths:

- Data availability for water storage and distribution in the MED area and long-term trends strengthens upscaling efforts.

Areas for Improvement:

- Additional details on groundwater basins delineation, water quality data of main Med water bodies, and relevant socio-economic datasets would enhance ecological assessment.

### 3.4.7. Impact, Engagement, and Sustainability

Strengths:

- Active stakeholders' engagement and clear financial incentive and funding source considerations.
- Participation in other EU projects and plans for estimating CAPEX, OPEX, benefits, and revenues demonstrate sustainability efforts.

Areas for Improvement:

- More information on existing national/regional initiatives, policies/strategies, and regulations would provide a more comprehensive understanding.

### 3.4.8. Overall Recommendations

1. Clarify Unspecified Details: Seek additional information to clarify unspecified details, including time series data on ecosystem states, streamflow data, and specific Earth Observation products.
2. Enhance Socio-economic Assessment: Provide more specific information on conflict resolution strategies, previous ecosystem assessments, and additional socio-economic data.
3. Surface Water Modelling Details: Offer more details on surface water modelling plans and specific objectives of OurMED regarding the numerical model.
4. Funding Mechanism Clarification: Provide additional details on funding mechanisms and current/future climate scenarios for a more comprehensive approach to nature-based solutions.
5. Technological Precision: Clarify the availability of streamflow gauges and provide details on when remote access to temperature and groundwater data is needed for more precise technological planning.
6. Ecological Assessment Enhancement: Offer additional details on groundwater basins delineation, water quality data of main Med water bodies, and relevant socio-economic datasets to enhance ecological assessment.
7. Comprehensive Sustainability Overview: Provide more information on existing national/regional initiatives, policies/strategies, and regulations for a comprehensive understanding of impact, engagement, and sustainability.

## 3.5. Case study Mujib

The Mujib area is characterized by a commendable compilation of data series that provide an essential basis for a comprehensive analysis and understanding. However, significant information gaps have been identified, particularly in the map data, including GIS map, land use maps, topographical maps, where the available dataset is deficient. In addition, data series on runoff in the Mujib area are limited, which restricts the capture of the full range of hydrological dynamics. Addressing these data gaps would improve data completeness and analytical capabilities and provide a stronger basis for effective decision-making and management in the Mujib region.

### 3.5.1. Data Availability

Strengths:

- Comprehensive data availability with information on water storage, historical in-situ data, demonstration site descriptions, hydrogeological data, and groundwater level time series.
- Integration of citizen science data adds a participatory dimension.

Areas for Improvement:

- Limited streamflow data timeseries might affect the completeness of hydrological assessments.

### 3.5.2. Governance and Socio-economic Assessment

Strengths:

- Availability of historical data and knowledge on management regulations.
- Stakeholder mapping and engagement processes enhance the socio-economic assessment.

Areas for Improvement:

- Clarification needed on water network efficiency and the existence of conflicts among stakeholders.

### 3.5.3. Multi-sectoral Solutions

Strengths:

- Presence of a numerical groundwater model and plans for surface water modelling enhance multi-sectoral investigations.
- Active involvement of agencies and consortia in defining indicators for water management.

Areas for Improvement:

- Detailed information on the available numerical model and its scope would be beneficial.

### 3.5.4. Nature-based Solutions

Strengths:

- Identified critical needs for improving water availability, quality, and monitoring capabilities.

- Consideration of funding mechanisms and identification of potential monitoring sites supports nature-based solutions.

Areas for Improvement:

- More details on funding mechanisms and current/future climate scenarios would provide a more comprehensive approach.

### 3.5.5. Innovative Technologies and Decision Support System

Strengths:

- Availability of shapefiles for climatic stations, streamflow gauges, river networks, and other infrastructure supports technological aspects.
- Remote access to real-time data enhances decision support capabilities.

Areas for Improvement:

- Clarify when remote access to temperature and groundwater data is needed for more precise technological planning.

### 3.5.6. Upscaling and Ecological Assessment

Strengths:

- Data availability for water storage, distribution, groundwater basins, and long-term trends strengthens upscaling efforts.
- Inclusion of water quality data and socio-economic datasets adds depth to ecological assessments.

Areas for Improvement:

- More details on groundwater basins delineation and future projections of climatic models would enhance ecological assessment.

### 3.5.7. Impact, Engagement, and Sustainability

Strengths:

- Active stakeholders' engagement and consideration of financial incentives and funding sources.
- Participation in other EU projects and plans for estimating CAPEX, OPEX, benefits, and revenues demonstrate sustainability efforts.

Areas for Improvement:

- More information on existing national/regional initiatives, policies/strategies, and regulations would provide a more comprehensive understanding.

### 3.5.8. Overall Recommendations

1. Clarify Unspecified Details: Seek additional information to clarify unspecified details, including streamflow data timeseries, water network efficiency, and conflicts among stakeholders.
2. Numerical Model Details: Provide more details on the available numerical groundwater model, including its scope and capabilities.
3. Enhance Socio-economic Assessment: Provide more specific information on water network efficiency, the existence of conflicts among stakeholders, and any previous assessments of regulating ecosystem functions.
4. Funding Mechanism Clarification: Provide additional details on funding mechanisms and current/future climate scenarios for a more comprehensive approach to nature-based solutions.
5. Technological Precision: Clarify when remote access to temperature and groundwater data is needed for more precise technological planning.
6. Ecological Assessment Enhancement: Offer additional details on groundwater basins delineation, future projections of climatic models, and other relevant socio-economic datasets to enhance ecological assessment.
7. Comprehensive Sustainability Overview: Provide more information on existing national/regional initiatives, policies/strategies, and regulations for a comprehensive understanding of impact, engagement, and sustainability

## 3.6. Case study Sebou

The Sebou region has an extensive dataset covering various important aspects, including water infrastructure, hydrological data and dynamics, geo-information, citizen science data and soil properties. This wealth of information provides a comprehensive understanding of the water resources and environmental dynamics in the region. There is a lack in data regarding public contribution to environmental monitoring and community generated data. This limitation can introduce uncertainties and reliability issues in the datasets, impacting their utility for making critical water management decisions. Efforts to close this gap could significantly improve the completeness of data and analytical potential for effective water resources management in the area.

### 3.6.1. 1. Data Availability

Strengths:

- Comprehensive data availability covering water storage, historical in-situ data, demonstration site descriptions, hydrogeological data, and time series data on ecosystem states.
- Inclusion of high-resolution monitoring sensor images, low-cost camera images, and Earth Observation products.

Areas for Improvement:

- Limited citizen science data may be expanded for a more participatory approach.

### 3.6.2. Governance and Socio-economic Assessment

Strengths:

- Availability of historical data, knowledge on management regulations, stakeholder mapping, and engagement processes.
- Identification of conflicts among stakeholders/users adds depth to socio-economic assessment.

Areas for Improvement:

- Clarify water network efficiency status for a more comprehensive assessment.

### 3.6.3. Multi-sectoral Solutions

Strengths:

- Active involvement of agencies and consortia in defining indicators for multi-sectorial water management.
- Numerical groundwater model availability enhances multi-sectoral investigations.

Areas for Improvement:

- Provide more details on the available numerical model and its capabilities.
- Expand on agencies and consortia involvement for a more detailed understanding.

### 3.6.4. Nature-based Solutions

Strengths:

- Identified critical needs for freshwater and ecosystem services conservation and enhancement.
- Consideration of funding mechanisms supports the adoption of Nature-based Solutions (NbS).

Areas for Improvement:

- Further details on funding mechanisms and current/future climate scenarios would enhance the nature-based solutions approach.

### 3.6.5. Innovative Technologies and Decision Support System

Strengths:

- Availability of shapefiles for river networks and groundwater basins.
- Consideration of real-time data for precipitation, temperature, streamflow, groundwater, and water quality enhances technological capabilities.

Areas for Improvement:

- Specify when remote access to temperature and groundwater data is needed for more precise technological planning.

### 3.6.6. Upscaling and Ecological Assessment

Strengths:

- Data availability for water storage, distribution, groundwater basins, and long-term trends.
- Inclusion of water quality data and socio-economic datasets adds depth to ecological assessments.

Areas for Improvement:

- Provide more details on groundwater basins delineation and other relevant socio-economic datasets.

### 3.6.7. Impact, Engagement, and Sustainability

Strengths:

- Active stakeholder engagement and consideration of financial incentives and funding sources.

- Involvement in national and regional initiatives adds to sustainability efforts.

Areas for Improvement:

- Provide more details on involvement in other EU projects for a comprehensive understanding.
- Further details on CAPEX, OPEX, benefits, and revenues would enhance the assessment.

### 3.6.8. Overall Recommendations

1. Numerical Model Details: Provide more details on the available numerical groundwater model, including capabilities and scope.
2. Expand Citizen Science: Consider expanding citizen science data for a more participatory approach.
3. Enhance Socio-economic Assessment: Clarify water network efficiency and provide more details on agencies and consortia involvement for a comprehensive assessment.
4. Detailed Funding Mechanisms: Offer additional details on funding mechanisms and current/future climate scenarios for a more comprehensive approach to nature-based solutions.
5. Specify Technological Needs: Specify when remote access to temperature and groundwater data is needed for more precise technological planning.
6. Detailed Ecological Assessment: Provide more details on groundwater basins delineation and other relevant socio-economic datasets to enhance ecological assessment.
7. Comprehensive Sustainability Overview: Provide more information on involvement in other EU projects and additional details on CAPEX, OPEX, benefits, and revenues for a comprehensive understanding of impact, engagement, and sustainability

## 3.7. Case study Medjerda

The Medjerda region has an extensive dataset covering various important aspects, including water infrastructure, hydrological data and dynamics, geo-information, citizen science data and soil properties. This wealth of information provides a comprehensive understanding of the water resources and environmental dynamics in the region. However, there is a notable lack of geospatial data, particularly in time series data on ecosystem states. Data obtained from high resolution images are expected to be updated during 2024. Efforts to close this gap could significantly improve the completeness of data and analytical potential for effective water resources management in the area.

### 3.7.1. Data Availability

Strengths:

- Comprehensive data availability for water storage, historical in-situ data, demonstration site descriptions, hydrogeological data, and time series data on ecosystem states.
- Groundwater level time series and streamflow data timeseries enhance the understanding of the hydrological conditions.

Areas for Improvement:

- High-resolution monitoring sensor images are planned for 2024, consider providing details on the expected benefits and applications.
- Specify the time range for historical data and address any gaps in the dataset.

### 3.7.2. Governance and Socio-economic Assessment

Strengths:

- Availability of historical data and stakeholder engagement processes.
- Identification of conflicts among stakeholders/users.

Areas for Improvement:

- Provide more details on knowledge about management regulations and water network efficiency.
- Clarify the scope and objectives of stakeholder mapping and living lab meetings.

### 3.7.3. Multi-sectoral Solutions

Strengths:

- Clear purpose for the investigation in the demo site.
- Numerical/smart model availability for operating Sidi Salem Dam.

Areas for Improvement:

- Provide more details on the available numerical/smart model, including its capabilities and applications.

- Specify indicators defined by agencies and consortia for multi-sectorial water management.

### 3.7.4. Nature-based Solutions

Strengths:

- Identification of critical needs for hydrosystem monitoring, resources prioritization, and soil erosion control.

Areas for Improvement:

- Provide more details on current/future climate scenarios and funding mechanisms.
- Specify the potential sites for installing new monitoring stations.

### 3.7.5. Innovative Technologies and Decision Support System

Strengths:

- Availability of shapefiles, remote access to real-time data for various parameters.

Areas for Improvement:

- Specify when remote access to temperature and groundwater data is needed.
- Provide more details on the objectives when accessing specific data in the demo site.

### 3.7.6. Upscaling and Ecological Assessment

Strengths:

- Data availability for water storage, distribution, groundwater basins, and long-term trends.
- Consideration of water quality data and socio-economic datasets enhances ecological assessments.

Areas for Improvement:

- Provide more details on groundwater basins delineation and other relevant socio-economic datasets.

### 3.7.7. Impact, Engagement, and Sustainability

Strengths:

- Involvement in other EU projects adds to the sustainability efforts.

- Aiming for the estimation of CAPEX, OPEX, benefits, and revenues.

Areas for Improvement:

- Provide more details on stakeholder engagement, financial incentives, and existing national/regional initiatives.
- Clarify the scope and nature of involvement in other EU projects.

### 3.7.8. Overall Recommendations

1. Numerical/Smart Model Details: Provide comprehensive details on the available numerical/smart model, including its capabilities, applications, and expected outcomes.
2. Stakeholder Engagement: Elaborate on the stakeholder engagement process, financial incentives, and the nature of involvement in other EU projects.
3. Data Time Ranges: Specify the time ranges for historical data and ensure clarity on the planning and benefits of high-resolution monitoring sensor images in 2024.
4. Socio-economic Assessment: Provide more details on knowledge about management regulations, water network efficiency, and the objectives of stakeholder mapping and living lab meetings.
5. Nature-based Solutions: Elaborate on current/future climate scenarios, funding mechanisms, and specify potential sites for new monitoring stations.
6. Innovative Technologies: Specify the objectives and requirements when accessing real-time data in the demo site for more targeted technological planning.
7. Ecological Assessment: Provide more details on groundwater basins delineation and other relevant socio-economic datasets for a comprehensive ecological assessment

## 3.8. Case study Konya

The available dataset in Konya covers water storage and distribution systems, including existing and planned infrastructure. It contains historical in-situ data such as precipitation, water levels, temperature. Also, detailed descriptions of demonstration sites, supported by geologic maps, maps describing land use, land cover and wetlands. Nevertheless, there are notable limitations, particularly with geospatial and remote sensing data. The dataset foresees an update of hydrological and soil properties data in the first trimester of 2024, underlining the commitment to continuous improvement for research. This limitation can introduce uncertainties and reliability issues in the datasets, impacting their utility for making critical water management decisions.

### 3.8.1. Data Availability

Strengths:

- Comprehensive data availability for water storage, historical in-situ data, demonstration site descriptions, and hydrogeological data.
- Availability of Earth Observation products, groundwater level time series, and streamflow data timeseries.
- Plans for high-resolution monitoring sensor images and soil properties data in the near future.

Areas for Improvement:

- Expand time series data on ecosystem states beyond NDVI for a more holistic assessment.
- Specify the scope and applications of hydrogeological data to be collected in January 2024.
- Provide more details on the limitations of Citizens Science data.

### 3.8.2. Governance and Socio-economic Assessment

Strengths:

- Availability of historical data and plans for stakeholder engagement.
- Identification of potential conflicts around water allocations.

Areas for Improvement:

- Provide more details on knowledge about management regulations and water network efficiency.
- Specify the scope and objectives of stakeholder mapping and the living lab meetings.

### 3.8.3. Multi-sectoral Solutions

Strengths:

- Clear purpose for the investigation in the demo site.
- The presence of a groundwater model, with plans to link surface water and groundwater.

Areas for Improvement:

- Provide more details on the available groundwater model, including its capabilities, applications, and expected outcomes.

- Clarify the nature of non-binding quotas implemented by irrigation cooperatives.

### 3.8.4. Nature-based Solutions

Strengths:

- Clear identification of the critical need for sustainable resource management and balance between upstream and downstream users.

Areas for Improvement:

- Specify current/future climate scenarios, funding mechanisms, and potential sites for new monitoring stations.
- Provide more details on diffuse pollution data at demo sites.

### 3.8.5. Innovative Technologies and Decision Support System

Strengths:

- Availability of shapefiles and plans for remote access to real-time data.

Areas for Improvement:

- Specify when remote access to temperature and groundwater data is needed.
- Provide more details on the objectives when accessing specific data in the demo site.

### 3.8.6. Upscaling and Ecological Assessment

Strengths:

- Availability of data for water storage, distribution, and long-term trends.
- Engagement in stakeholder involvement and financial estimation of solutions.

Areas for Improvement:

- Clarify the status of groundwater basins delineation and capacity, water quality data, and socio-economic datasets.

### 3.8.7. Impact, Engagement, and Sustainability

Strengths:

- Stakeholder engagement, financial incentives, and participation in other EU projects.
- Estimation of CAPEX, OPEX, benefits, and revenues.

Areas for Improvement:

- Provide more details on stakeholder engagement and the nature of involvement in other EU projects.
- Specify existing national/regional initiatives, policies/strategies, and regulations.

### 3.8.8. Overall Recommendations

1. Groundwater Model Details: Elaborate on the available groundwater model, including capabilities, applications, and expected outcomes.
2. Data Time Ranges: Specify the time range for historical data and any gaps in the dataset.
3. Socio-economic Assessment: Provide more details on knowledge about management regulations, water network efficiency, and the objectives of stakeholder mapping and living lab meetings.
4. Nature-based Solutions: Specify current/future climate scenarios, funding mechanisms, and potential sites for new monitoring stations. Provide more details on diffuse pollution data.
5. Upscaling and Ecological Assessment: Clarify the status of groundwater basins delineation and capacity, water quality data, and socio-economic datasets.
6. Stakeholder Engagement: Provide more details on stakeholder engagement, existing national/regional initiatives, policies/strategies, and regulations.
7. Innovative Technologies: Specify the objectives and requirements when accessing real-time data in the demo site for more targeted technological planning.

## 3.9. Case study Med-Region

In the context of the work packages carried out in the Mediterranean regions, a recognizable pattern emerges in which the available information and data within each package have obvious characteristics, but at the same time are characterized by identifiable limitations that require further research and updating. This disparity of information is due to the use of different time series for each region, which contributes to a varying completeness of data. It is imperative to take into account the different patterns of water use in the different Mediterranean regions as well as the occurrence of conflicts between users. These dynamics underscore the urgent need to formulate and implement region-specific water management plans. A differentiated understanding is required to address the multiple challenges arising from the different temporal, spatial and socio-economic dimensions in the Mediterranean context.

Overall the data availability for the MED-Region follows:

1. Time Series Data:
    - Historical groundwater data from 1965-2020 is collected and harmonized for Portugal, Spain, France, Italy. Data from Greece, Turkey, and Tunisia is also available.
    - UFZ has historical time series data from 1965 until the present in some Mediterranean (MED) countries.
2. Reservoir Databases:
    - Databases on the location and delineation of all artificial reservoirs (dams, agri. ponds, etc.) in 1990 and 2020 are available for all MED countries (provided by TdV).
3. Wetland Information:
    - Pan-Med map of Potential Wetland Areas, national wetland inventories, and wetland intensity use maps are available for some MED countries (provided by TdV).
    - Conservation and restoration of wetlands are emphasized as Nature-Based Solutions (NbS) to improve water quality and availability.
4. Land Use and Land Cover (LULC):
    - LULC and LULC Change maps for the period 1990-2020 are available for 500 monitoring sites in all MED countries (provided by TdV). Additional LULC maps for some countries are also available.
5. Satellite Data:
    - MODIS time series data could be utilized at the pan-Med scale.
    - Inter- and intra-annual Surface Water Dynamics (SWD) maps at national and regional scales, derived from optical and SAR high-resolution satellite images, are planned to be produced by RSS.
6. Protected Areas (PAs):
    - An updated database on all Protected Areas (PAs) in MED countries, with different protection levels according to the IUCN categories, is available (provided by TdV).
7. Other Data Sources:
    - Gemstat repository (https://gemstat.org/) is mentioned.
    - UNIPR can provide assistance.
    - SocialGrids and MWO assessments contribute to the available data.

### 3.9.1. Overall Recommendations:

1. Hydrogeological Data: Provide more details on hydrogeological data and maps.
2. Sensor Images: Provide more details on the planned high-resolution monitoring sensor images and low-cost camera images.
3. Numerical/Smart Model: Clarify if a numerical/smart model is available or planned for the site and provide details if applicable.
4. Data Access: Specify the objectives and requirements when accessing real-time data in the demo site.
5. Data Status: Clarify the status of groundwater basins delineation and capacity, water quality data, and socio-economic datasets in upscaling and ecological assessment.

It appears that there is a diverse range of data available, including groundwater, reservoirs, wetlands, land use, satellite imagery, protected areas, and various assessments. The data is sourced from different organizations and covers multiple MED countries.

# 4. Conclusion

Throughout the duration of the OurMED project, a dynamic and iterative approach to data management will be employed, ensuring that the information remains current and relevant. Recognizing the evolving nature of ecosystems and the dynamic factors influencing water storage and distribution, a systematic process for data updates will be implemented. Continuous monitoring, feedback loops, and engagement with local stakeholders will facilitate the ongoing collection of real-time data, allowing for adjustments and refinements to the project's strategies and solutions. This commitment to regular data updates underscores the project's adaptability and responsiveness to changing conditions, contributing to the effectiveness and sustainability of the designed water management systems. By embracing this proactive approach to data management, the OurMED project aims to enhance its ability to address emerging challenges and capitalize on new opportunities throughout its lifecycle.