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INN WATER

Promoting social innovation to renew
multi-level and cross sector water governance

D4.4: InnWater Governance Platform #V1

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Project Consortium

EXECUTIVE SUMMARY

D4.4 InnWater Governance Platform V1 is the first document describing the platform developed within Task 4.4 (T4.4) of Work Package 4 (WP4). WP4 consists of 4 tasks, the "Water Governance diagnosis tool" in T4.1, the "Cross-sector hybrid dashboard and simulation combining economic and physical indicators" in T4.2, the "Domestic water tariff dashboard" in T4.3, and the "InnWater water governance platform (from raising awareness to support decision making)" in T4.4. This platform will serve as a cornerstone for the final objective of WP4, which is to create a digital tool within the WEFE nexus that facilitates the development of policy-based decision-making strategies in its constituent sectors, and will host the tools from these other tasks, developed within the same work package. It will also incorporate and manage data generated throughout the whole project and enable easy interaction with these components through a user interface, ensuring that users understand the different procedures.

The objective of this deliverable is to explain all the initial decisions regarding the design and development of the platform during the first 12 months (M6-M18). It covers everything from the requirements identified in discussions with stakeholders and end users to the decisions about the platform architecture design that will ensure the correct functioning of the software. Therefore, this document contains information prior to the technical implementation of the platform, right now ongoing, but which will be reported in the future *D4.5 "InnWater Governance platform V2"*.

The deliverable is composed of different sections ordered from less to more technical. The initial sections focus more on the interaction between stakeholders, while the latter sections define the technical actions needed to fulfill the results of these interactions:

- Platform requirements: Outlines the initial design and development specifications for the platform. The requirements identified include ensuring the ease of tool use, enhancing the e-learning experience, defining user pathways, integrating APIs, enabling data export, managing data storage, providing clear indicators, ensuring accurate referencing, facilitating interaction between tools and data, and incorporating an AI assistant. These requirements were gathered from discussions with stakeholders and end users and will guide the technical implementation to ensure the platform functions correctly and meets user needs.
- User interface: Describes the initial steps taken to create the platform's interface, beginning with the creation of a low and a high-fidelity prototype. The low-fidelity prototype focuses on structuring concepts and visual information without detailed design elements. It includes identifying basic navigation through a navbar, offering a first look at platform options via a carousel, and providing initial explanations of the project and tools. The high-fidelity prototype improves the low-fidelity design by refining the structure and incorporating detailed visual styles, technical components, and interactions. This prototype offers a more realistic representation of the final product, allowing for comprehensive user testing and feedback on specific design elements and interactions, ensuring that the final implementation is polished, user-friendly, and meets all defined requirements.
- Backend: The backend of the platform is responsible for orchestrating all system interactions, whether between tools or between the user and the system itself and

executing all necessary computations. The document describes the platform architecture, which defines the data input and output communication protocols, the internal modules that manage the data required by the different tools, and the database system used to store information within the system.

- AI Assistant: Describes the architecture of the AI assistant for the platform. It includes five modules: The Interface Module (handles the user and/or platform requests), Query Treatment Module (processes and directs user queries), Retrieval Module (fetches data from the project documents), Large Language Model (generates responses to queries), and Query-Answer Logger (logs interactions for analysis and optimization). This modular approach ensures efficient query handling, data retrieval, and system scalability, enhancing the user experience by assisting as smoothly as possible.

The EU will benefit from the added value of the idea and design of this work since it introduces software that orchestrates data and digital tools interactions with an added functionality that fully focuses on user interaction, enabling fast navigation, assisting the user while navigating, and letting the user access the project data with AI-based searches. The assistant is implemented using Generative AI technology, currently one of the most important topics within AI, and will showcase a product that implements it in a common scenario (question-answer) and in an uncommon use case (generative e-learning), dynamically guiding the user through the tool.

D4.4 is linked with all the WPs within the InnWater project since the data needs to be collected from all of them. Furthermore, the developed platform will be showcased to the project Pilot Sites (PS) and the WEFE governance community surrounding the project. However, specific technical links exist with other parts of the project:

- T2.1 “Enhanced methodology for expanded and improved application of OECD Governance Assessment Framework”: The main contribution being the theoretical definition of the Water Governance tool. While the link is secondary, it has impacted the definition of the tool’s interactions, defining which governance data can be used by other digital tools.
- T4.1 “Water Governance diagnostic tool”: The first tool to be integrated within the platform. It follows the theoretical definition of T2.1 and will have connections with other tools defined within WP4.
- T4.2 “Cross-sector hybrid dashboard and simulation combining economic and physical indicators”: The task developing a macroeconomic simulation model (i.e., a Computable General Equilibrium model, short: CGE model) and its visualization dashboard. It will also be included as one of the main tools within the platform.
- T4.3 “Domestic water tariff dashboard”: The task developing the water tariff dashboard, a digital tool also integrated within the platform, and highly linked with Reunion Island PS.
- T5.2 “Pilot sites operation”: The platform aims to be a helpful digital tool for end users from the WEFE sectors, and the PS provide the stakeholders and end users that assist in creating it. Furthermore, the tools integrated within the platform will be highly linked with some of the PS.

- T6.3 “Replication assessment throughout Europe”: The developed platform needs to be scalable enough to integrate tools and data outside the project. This task from WP6 will study how the platform can be reused in new locations.

Document information

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Deliverable	**D4.4: InnWater Governance Platform**
Work Package	**WP4: Digital tools for water governance**
Task	**Task 4.4: InnWater water governance platform (from raising awareness to support decision making)**
Lead Beneficiary	Eurecat (EUT)
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Revision history

Version	Date	Author(s)/Contributor(s)	Comments
V1	1/08/2024	Marc Ribalta (Eurecat)	Draft of the deliverable
V1.1	1/08/2024	Oriol Alàs (Eurecat)	Technical review
V1.2	21/08/2024	Natacha Amorsi (OiEau), Philippe Lanceleur (OiEau)	Back-end technical contribution
V2	29/08/2024	Martin Henseler (URN), Marc Ribalta (EUT)	Internal Review

Related deliverables

D4.4 relationship with the different tools within the WP links this deliverable with the other deliverables within WP4 (*D4.1 "Water Governance diagnostic tool", D4.2 "Modelling cross-sectoral interaction with water at river basin level", D4.3 "Methodology for analysing the socio-economic performance of household water demand management policies*"), since the tools will need to be integrated within the InnWater platform and they will need to communicate between them through the platform. Furthermore, this deliverable sets up the

development of the platform which will be reported in the second version of the document, *D4.5 "InnWater Governance Platform V2*".

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ACRONYMS

AI	Artificial Intelligence
CA	Consortium agreement
CGE	Computable General Equilibrium (also named Macroeconomic simulation model)
CMS	Content Management System
EC	European Commission
GA	General Assembly
LLM	Large Language Model
PS	Pilot sites
RAG	Retrieval-Augmented Generation
SC	Steering Committee
WEFE	Water-Energy-Food-Ecosystem
WP	Work Package

INTRODUCTION

Deliverable 4.4-V1 describes the first developments of the InnWater platform, developed in WP4 under the task 4.4 “InnWater water governance platform (from raising awareness to support decision making)”. The aim of the platform is to offer an e-learning tool that englobes all the developments of the InnWater project and lets the user rapidly understand and navigate through them.

The platform will offer different modules with the different data and tools generated during the project and additional layers of learning pathways and an AI assistant that will help the user during the whole navigation.

This document reflects the first steps towards the development of the platform, introducing the designs that will compose the final version of the platform:

- User-interface prototype: A low-fidelity and high-fidelity version of the prototype, defined and improved with the project partner’s feedback. It structures the key components of the system and defines which tool interactions can be done by the user.
- Back-end architecture: Design of the architecture that will manage the tools interaction protocol and save the data related to the InnWater project. The architecture is key in managing the e-learning pathways within the tool.
- AI assistant: The assistant that will support the user throughout the whole system. It aims at providing feedback and improve data searching with the platform by using Large Language Models that will support the user queries.

The document is the first version reporting the InnWater platform design and will be improved and finished with the full development explanation by M28.

1. PLATFORM REQUIREMENTS

The first step in the InnWater platform definition was to establish a list of requirements that the platform should implement to ensure the final objective is achieved and the final user experiences optimal functionality and satisfaction. This involved an analysis of the needs and expectations of the end-users and stakeholders and writing them down as functional and nonfunctional requirements.

Functional requirements

Functional requirements are specifications that define what a system should do. They describe the system's management protocol, features, and communication, detailing how it should respond to inputs, handle data, and interact with users or other systems. These requirements are crucial for guiding the development process and ensuring the final product meets user needs and expectations. Table 1 shows the functional requirements.

Table 1: Table of functional requirements

Title	Description
Tools use	The users need to be able to use the integrated tools the same way as when used as standalone tools outside the platform.
E-Learning experience	The platform needs to provide an additional layer that aids the user when experimenting with the tools.
Pathways	The platform needs to communicate to the user when a transition between tools can be done.
API integration	The platform can connect with different APIs.
Data Export	The users can export data in different formats (like PDF).
Data storage	The platform needs to hold data from the different work packages and pilot sites in different formats. This data needs to be incorporated if useful for the user.
Clear indicators	The platform homepage needs to present the project and indicate the user the possibilities of the platform.
Referencing	The platform should also reference the InnWater project website and the Zenodo Data Management Plan (and its data).
Tools and data interaction	The system must ensure the thread of interactions between data and tools.
AI assistant	The AI assistant should help the user while using any part of the platform by reacting to the user actions, and also offer the user to interact with the assistant directly in a specific page.

Nonfunctional requirements

Nonfunctional requirements define the system's operational qualities and constraints rather than specific behaviors or functions. They include performance, reliability, scalability, security, and usability. These requirements ensure the system's effectiveness, efficiency, and overall user

experience. Nonfunctional requirements are critical for system architecture and design to meet stakeholders' expectations. Table 2 lists the nonfunctional requirements.

Table 2: Table of nonfunctional requirements

Title	Description
Performance	The response time of the system should be instant when loading the different tools and showing data from
Scalability	The system should be able to handle a minimum increase in load caused by multiple requests without performance degradation.
Flexibility	Ease of adapting to changing requirements and the integration of different tools.
Compliance	Meet the legal and regulatory EU standards.
Interoperability	The platform needs to be compatible with other tools and standards.
Usability	The design of the user interface needs to consider accessibility, efficiency, be engaging, be easy to use, and be error tolerant.

Tools relationship

One of the established functional requirements is the clear definition of the interactions between the tools. The platform must manage these interactions at both the visual level and the information storage and processing levels. Table 3 outlines the needs of each tool and the results each can offer.

Table 3 WP4 tools relationship to be managed by the platform

Tool	Can Use	Can Provide

Water Governance tool	• Specific information related to a scenario that should be assessed. • Information explaining the basics of the simulation models. This can only be used in a very broad introduction.	• Information on the scenario proposed. • Information about the most pressing water governance gaps in a study area, therefore allowing to know which model/instrument of the platform could help address such gaps. • Gathering of potentially useful information for running the other instruments/tools (about i.e., i) mega-trends & resilience, ii) policy, institutions, and regulation, iii) financing, iv) data, monitoring and evaluation, v) engagement & accountability)
CGE model / Macroeconomic simulation model	To simulate results, the CGE model uses the scenario information. The scenarios can be selected from the governance tool.	Scenario results could be used by either the governance tool or the water tariff tool. The CGE model provides as output scenario results which can be used by either the governance tool or the water tariff tool.
Water Tariff tool	The Water Tariff tool can use the CGE model outputs as information to specify the situation for the tariff needs.	The Water Tariff tool provides a specific economic data/assessment for the Reunion Island pilot site.

2. USER INTERFACE DESIGN

Before developing the user interface, it is crucial to prototype, validate and refine the ideas, ensuring the final product effectively meets user needs and expectations. The aim of prototyping is to identify and resolve potential issues early in the process, saving time and resources that would otherwise be spent on fixing problems during or after development. By applying changes on a non-interactive visual prototype, the time spend coding will be far less and straight to the solution desired by the users. Additionally, it allows for iterative testing and improvements, leading to a more user-friendly and well-designed final product.

In the InnWater project, the design has been divided into two stages: low-fidelity[1] and high-fidelity[2]. The low-fidelity prototype focuses on correctly structuring the concepts and information to be visualized. In contrast, the high-fidelity prototype refines the structure and includes enhanced visualization and interactions between defined components.

Low-fidelity prototype

The definition of the prototype was carried out at the beginning of the project with the aim of quickly identifying the tools that needed to be integrated into the platform and how the project data that had to be integrated can be consulted. In this case, no work was done on the communications between tools or the e-learning processes that could be defined in the system.

Figure 1 shows the first version of the platform's home page. This version identifies the basic navigation system between tools via a navbar, provides an initial view of the different options offered by the platform through a carousel, and includes some initial explanations of both the project and the tools. This version of the prototype, visualized in its entirety in the first section of the Annex, has been used to discuss and define the possible functionalities of the platform during the first months of the project. The information displayed in the prototype is mock-up data shown to envision the final product.

[1] https://www.figma.com/resource-library/low-fidelity-prototyping/
[2] https://www.figma.com/es-es/resource-library/high-fidelity-prototyping/

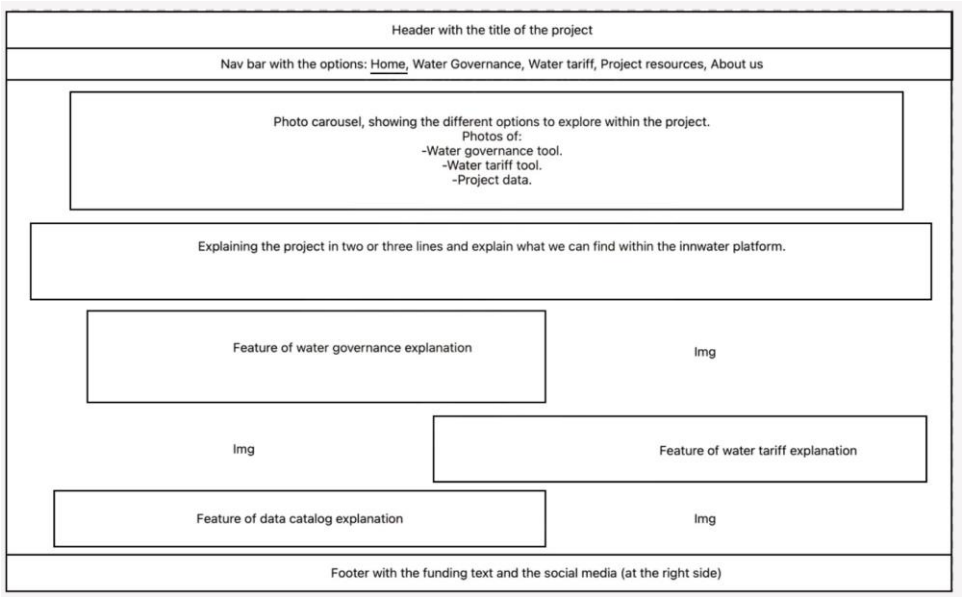


Figure 1 Homepage. Low-fidelity prototype.

High-fidelity prototype

After ensuring that the functionalities defined in the low-fidelity prototype met the stakeholders' expectations, the focus was on improving the visualization and defining different forms of interaction between sections. This was accomplished using a high-fidelity prototype, which refines the components and text that the solution must include.

Figure 2 shows the evolution of the homepage in the high-fidelity version. This iteration includes defined display styles, technical components (such as a carousel and links to YouTube), and text for each section. At the top, there is an explanatory text about the project, followed by an explanation of the tool. Below that, each YouTube video is accompanied by a text explanation of the corresponding tool.

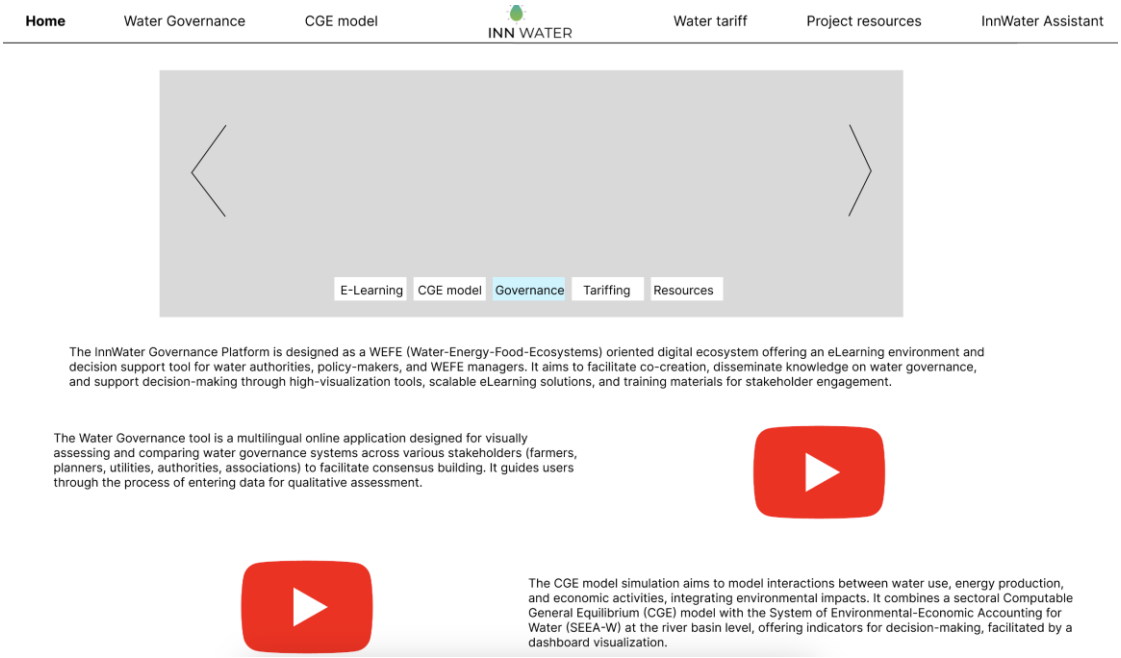


Figure 2 Homepage high-fidelity prototype

Figure 3 shows the potential visualization of the Macroeconomic simulation model (or CGE model), a tool developed in T4.2 that will be integrated into the system in the future. While the visualization specifics are determined within the execution of T4.2, the prototype defines the basic parts of the tool, such as the selection of scenarios to be computed and the visualization of results in various formats (tables and plots). It also outlines the interactions between tools, such as the relationship with the Water Governance tool defined within the scope of T4.1. This version of the prototype has been used to establish these relationships between tools, and the results of each can be seen in the second section of the appendix.

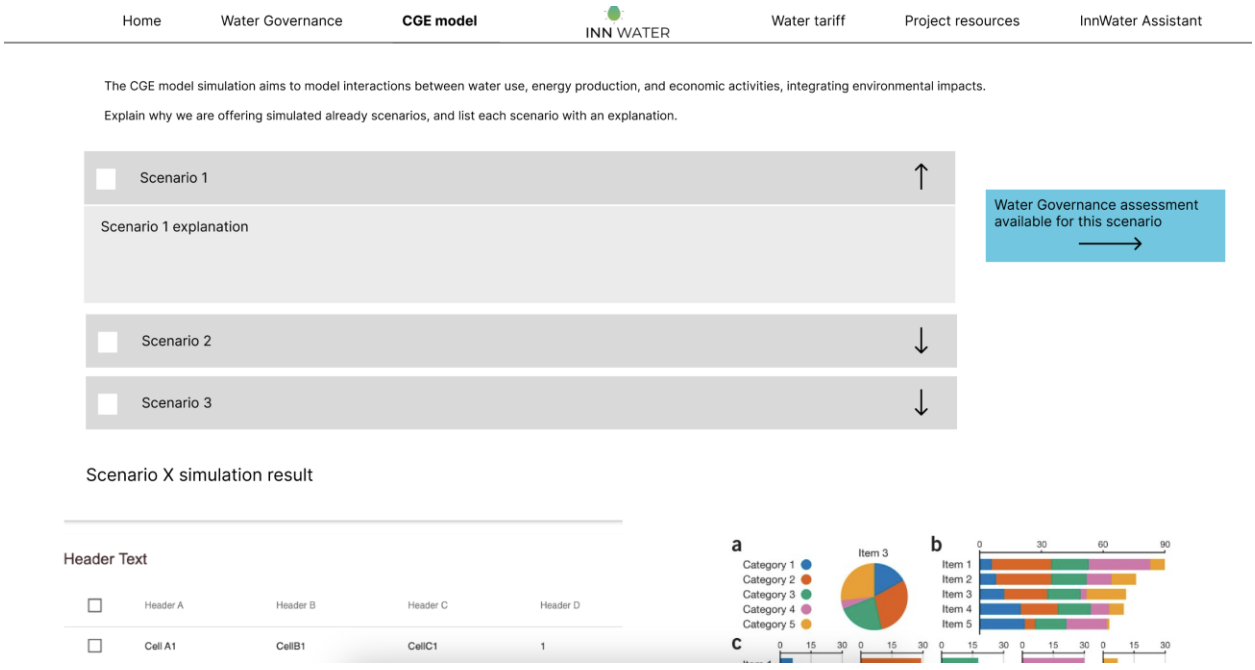


Figure 3 Macroeconomic simulation model (or CGE Model), scenario selection

3. BACKEND

The backend is the non-visual part of the platform, responsible for orchestrating the interactions between the tools. It stores all previously generated project information as well as new data generated by user interactions, and executing system computations of AI automatically to assist the user when needed.

Backend

3.1.1 Architecture & Technological Foundation

The InnWater Governance Platform relies on a Drupal framework for all its developed tools. Drupal is a popular Content Management System (CMS) designed to provide the functionalities needed for an online collaborative space. With a vast community of developers and users, Drupal holds a significant portion of the CMS market [3]. Built on the Symfony PHP framework, Drupal is known for its robust features. One of its key strengths is the extensive library of modules—nearly 40,000—that enhance its capabilities.
InnWater utilizes a specialized Drupal environment called ePLANETe, tailored for research and education. Currently undergoing a major overhaul, it will soon be customized to meet InnWater's specific needs. This platform is a tailored Drupal server.
Among the benefits of using the Drupal ePLANETe environment for InnWater, here are some of the most valuable for the project:

- Drupal's ePLANETe environment offers InnWater well-known languages like Symfony, PHP, and JavaScript.
- A CMS enables collaborative research by allowing researchers to input content while developers enhance the UX/UI.
- Drupal's modular design lets us focus on key goals and add features progressively.
- Drupal is scalable and secure, with a large developer community (nearly 1 million) that regularly updates it.
- Drupal supports about 100 languages and is fully open source, aligning with European Community guidelines.
- Drupal includes both a backend and frontend.

3.1.2 Why the Drupal ePLANETe platform?

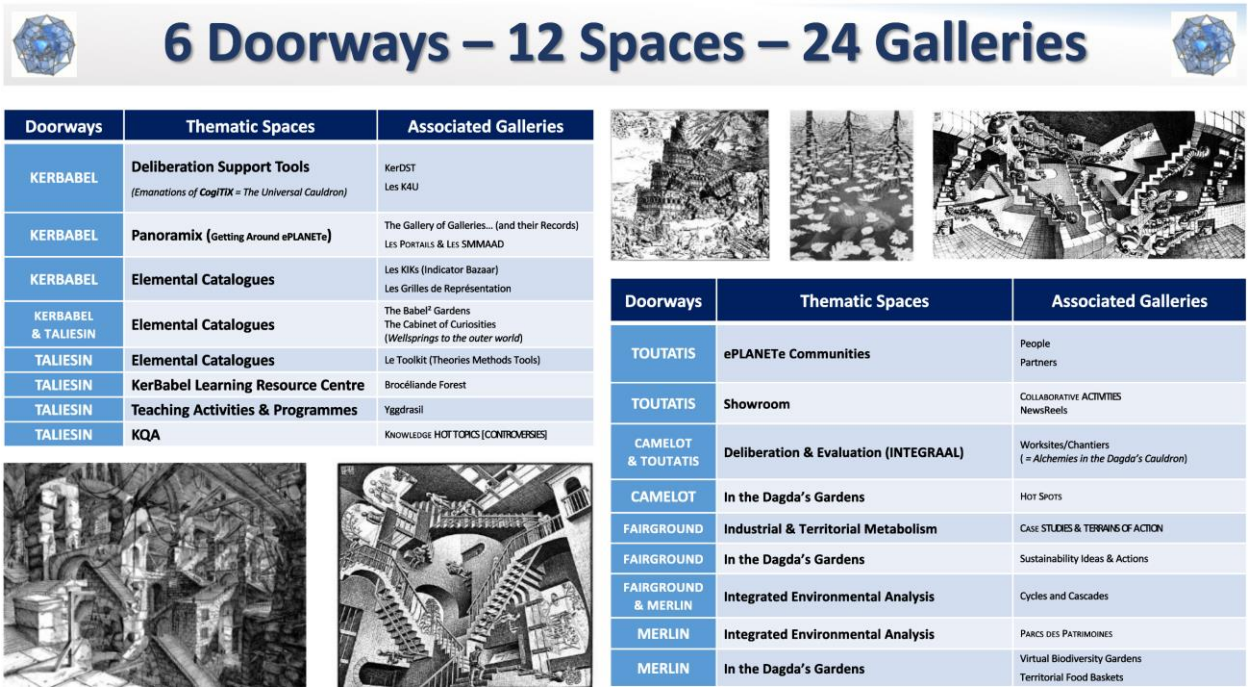
We refer to "platform" as a comprehensive hub that includes all the functionalities needed from production (data generation and estimation features) to consumption (communicating different components and functionalities). The ePLANETe platform is designed to meet the challenge of creating a collaborative space for sharing knowledge on sustainable development.
The platform is both scalable and adaptable, allowing new components to be integrated as it's used by various projects. These projects contribute to and enhance the breadth of topics covered by ePLANETe. That's why we often use "environment" interchangeably with "platform."
ePLANETe is specifically crafted to support the circular co-creation of content by diverse groups such as students, researchers, stakeholders, and communities formed around projects. It enables

[3] https://www.drupal.org/project/usage/drupal

users to showcase their results without the need to develop a separate website for dissemination [4].

The current ePLANETe platform is available and explained at the address http://www.eplanete.blue/, and the next release will be launched officially by mid-2025.

Following the different principles of sustainability, data is categorized into specific groups, such as "People," "Partners," "Case Studies," and more, totaling 24 categories. Within each category, both generic and specialized content types are proposed to meet the requirements of various environmental issues. The methodology used to manage the data will enable the inclusion of InnWater data, which will be easily integrated, categorized and represented afterwards within the platform interface.



3.1.3 What are the specific advantages of ePLANETe?

ePLANETe provides a range of standard features that make it easy to set up a Project Portal right away while taking into account the potential end users' needs and feedback. For example, having everything in one large system is not efficient. It can slow down updates (as the site becomes too cumbersome) and make it difficult to manage multiple technologies simultaneously.

For that reason, the possibility is offered to create a completely new Portal website (also using Drupal) that integrates ePLANETe content via iFrame along with other external content interfaces. This approach enables us to easily build a portal that is both consistent and coherent.

ePLANETe is designed to centralize all the necessary online tools for different user groups: project members, the public, and others.

To sum up the key features:

- The ePLANETe technical team does not take over other teams' development work. Instead, it integrates various HTML product interfaces into the project portal using iFrames.

[4] https://theses.fr/2019SACLV050

- Fast set up of a project portal directly on the ePLANet platform or by using a separate website (Drupal is recommended). In that case, the content from ePLANETe can be embedded into this portal via an iFrame.
- ePLANETe is designed for handling multiple projects. Its organized structure and content make creating project portals faster.

3.1.4 How the InnWater Project will utilize the ePLANETe platform?

The InnWater project plans to leverage the ePLANETe platform for various tasks in order to streamline processes, enhance data management, and improve overall project outcomes. The platform provides a dedicated web environment for the project, known as the "portal" for the InnWater Governance Platform that will gather the different tools developed by WP4. This portal is created using ePLANETe's "Build My Own Portal" (BMOP) feature. Different profiles can be set to configure the Portal (i.e. coordinator, Author, Editor). The current ePLANETe system is in its early Alpha 3 version, and OIEau will assist with the initial setup of the Portal.

Currently, the portal isn't separated from InnWaters' website but is hosted within the same spaceFigure 4. Each chosen Gallery adds a link to the project menu, accessible only to project members. A specific theme is applied to give the Portal a unique look and feel, based on the selected options. Then the profile coordinator can add new pages to the Portal, incorporating other tools as iFrames. This allows each Work Package to focus on its own development without the need to constantly sync with other teams. OiEau will handle the task of integrating all the components for the final release of the Portal.

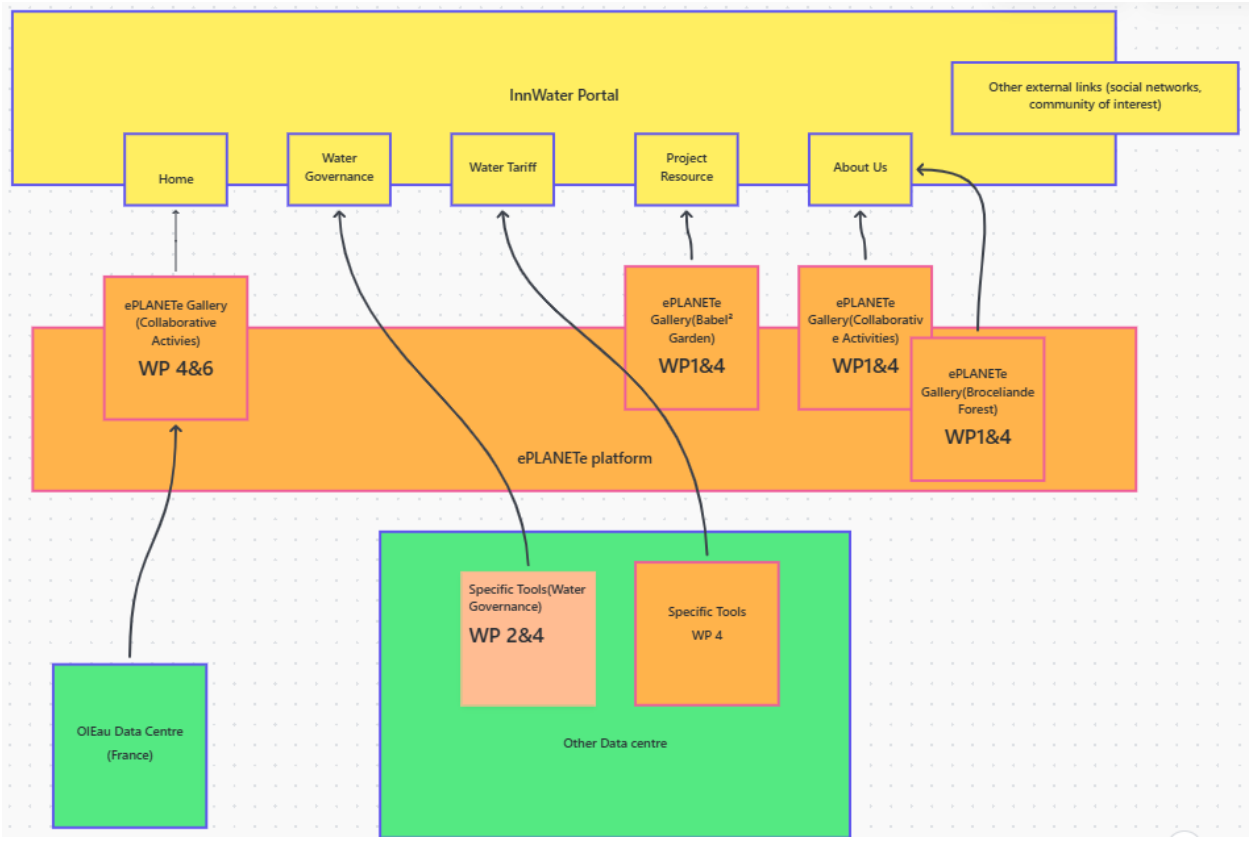


Figure 4 Illustration of the interactions between ePLANETe, the Water tools, and the Portal

3.1.5 About data exchange

ePLANETe can share its content through APIs, but it mainly serves as a descriptive and organizational platform. The detailed data from tools like Water Governance and Water Tariff come from their own research and technical spaces. While these interfaces will be integrated into the Portal, ePLANETe is not responsible for releasing or providing direct access to their data. As the ePLANETe version 2024 is still under heavy development, more technical information will come during the coming year.

4. AI ASSISTANT

Large Language Models

Large language models (LLMs) are artificial intelligence algorithms designed to understand, generate, and interact with human language. At their core, LLMs are a type of neural network architecture named Transformer that have been trained on vast amounts of text data, allowing them to learn the statistical properties of language. This training involves processing extensive corpora, including books, articles, websites, and other textual sources, which helps the models grasp the nuances of grammar, context, and even subtle linguistic patterns.
A Transformer architecture employs mechanisms such as self-attention to weigh the importance of different words in a sentence, enabling the model to consider its context more effectively. Through this process, the model learns to predict the next word in a sequence, which is fundamental to its ability to generate coherent and contextually relevant text. And this is a key aspect of LLMs, their ability to generalize from the training data to new, unseen text. This is what enables them to generate human-like responses and understand prompts that they have not explicitly encountered during training.
To develop the AI assistant, an open-source and free LLM provided by entities of international high technological reputation will be used. These models can be found in the open repository of Hugging Face[5], which includes models from international organizations (Meta, Google, X), including European ones (Mistral). The metric for choosing the model will be based on the accuracy of the answers and the success rate under a set of test data (the golden dataset), specially prepared using relevant project information.
Within the assistant, the LLM focuses on generating answers based on the information provided by the system, whether from project documentation or tool use recommendations for the user. The LLM structures the response according to the context it receives.

RAG

Retrieval-Augmented Generation (RAG) is an advanced AI technique that enhances text generation by integrating retrieval-based methods. In this system, a retriever model first searches a vast corpus to find relevant documents or passages based on an input query. These retrieved documents then inform the generative model, which synthesizes a coherent and contextually accurate response. This hybrid method leverages the extensive knowledge base of the retriever to ground the responses of the generative model, reducing hallucinations and improving the overall informativeness and accuracy of generated text.

The RAG platform

One of the primary goals of the platform is to help users understand how the tools work and avoid any misunderstandings about the platform's overall operation. Additionally, the platform

[5] https://huggingface.co/models

aims to provide users with project data in two ways: the ability to download any file and the option to consult information from the files without needing to download them.
Visually, users will see the assistant represented in two ways. Reactively, while using the tools, they will receive recommendations on how to use the system. Proactively, they can navigate to a specific section with a chat feature, where they can write and address their specific doubts, answered back with the response and the reference document.
To meet all these requests, an architecture composed by five different modules can be visualized in Figure 5.

- Interface module: The interaction layer of the user interface and the AI-based system. The API, depending on the needs of the interface, will ask the system to resolve either a question done by the user or to help the user reactively.
- Query treatment module: This module ensures that each query is processed and directed into the appropriate system component (either RA or LLM) based on the nature of the desired pipeline. First, it will analyze the type of query—reactive or proactive—and determine which parts of the system to use. Then, the wording of the query will be optimized to improve LLM retrieval and performance.
- Retrieval module: This part of the system deals with the retrieval of data from a structured database or filesystem. It comprises subcomponents responsible for indexing the data, retrieving relevant information based on queries, and post-retrieval processing. The list of expected files to be retrieved can be seen in Table 4.
- Large Language Model (LLM): Represents the large language model tasked with generating responses based on the input it receives. The model used will be open source, free of use and accessible by any user.
- Query-Answer logger: This component logs all the queries and the ecosystem surrounding them for analysis and optimization purposes. It also helps in refining the system's performance based on user interactions and system outputs.
- Together, these modules interact to process and respond to user queries, aiming at the compartmentalization of the complexity. By structuring the system into distinct modules, each dedicated to specific functions, the architecture simplifies the management of individual processes and enhances the system's overall scalability. It also aims to ease the maintenance and upgrades of each component without disrupting the other parts of the system.

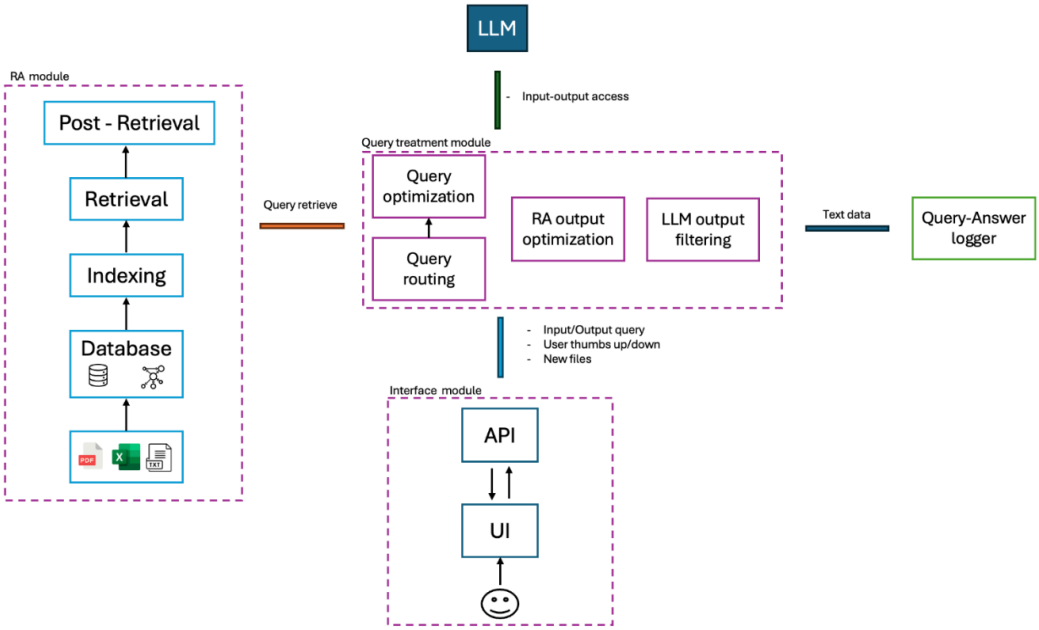


Figure 5 AI Assistant, architecture

Table 4 Expected documents to be integrated

Document name	WP/PS	data security
InnWater technical description	WP1	Yes
D2.1 Enhanced water governance assessment tool	WP2	No
D3.1 Citizen Engagement in Europe in the 21st Century	WP3	No
D3.2: The InnWater Citizen Engagement Methodology A practical guidance tool and analysis framework for the creation of River Basin Water Forums	WP3	No
WP3 Presentation guidance General Assembly	WP3	No
WP3 Presentation progress	WP3	No
D4.1 Water Governance diagnostic tool	WP4	Yes
D5.1 Preliminary Pilot Sites Implementation Guide	WP5	No
InnWater LinkedIn posts	WP6	No
Policy briefs	WP6	No
Sister projects policy briefs	WP6	No
D6.7 Replication methodology implementation and progress	WP6	No
Concepts articles	WP6	No
Presentations on the Middle Tisza pilot, in English as well as in Hungarian	PS5	No
Notes on interviews with various stakeholders in the pilot area	PS5	No

CONCLUSIONS AND PERSPECTIVES

During the design process of the InnWater Governance Platform, it has become clear that it is strongly linked to two concepts that have served as a basis for defining most of the requirements: an orchestrator platform of smaller individual tools and the project data, and the implementation of the user interface offering e-learning methods. These facts have influenced the requirements extraction process, focusing more on the opinions of stakeholders regarding interaction with the platform and tools, rather than on technical functionalities such as data standardization or specific AI algorithms.

One of the main influences in the definition of the architecture is the potential interaction of tools, currently defined under future theoretical operation. These tools are in constant development, and there is a possibility of adding new interactions or discarding previously defined ones. This risk must be considered every time a tool is integrated into the system, and previously defined behaviors must be reviewed and readapted.

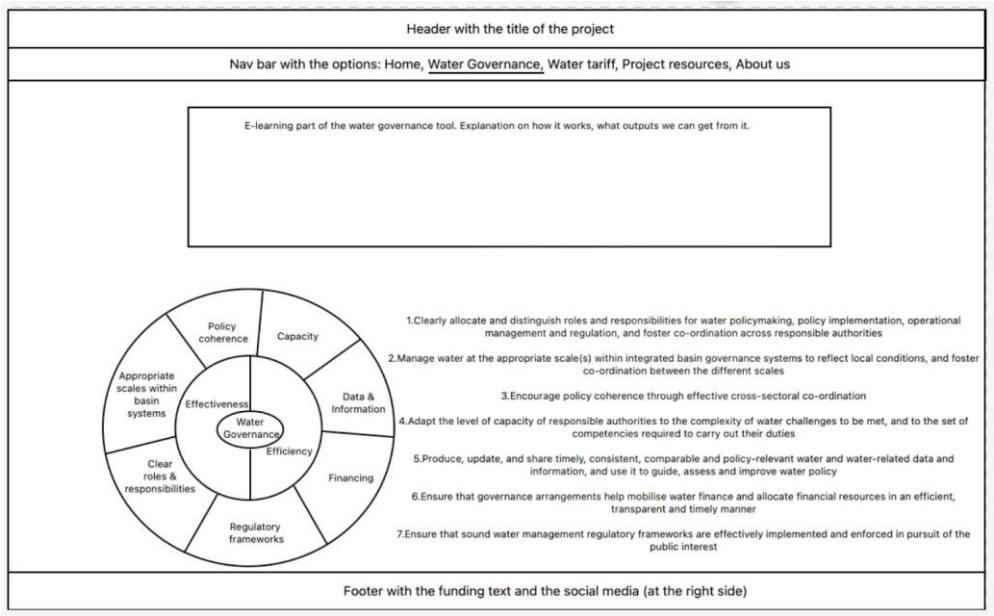
The integration of different tools into the platform, developed individually and with their own designs, can cause display problems in the user interface. Each tool has different display windows and interaction requirements that need to be supported by the platform when these components are integrated using the "iFrame" resource[6]. Additionally, each tool can have its own backend with a different communication protocol, requiring adaptation time. All these factors can hinder future development and must be considered in advance during planning.

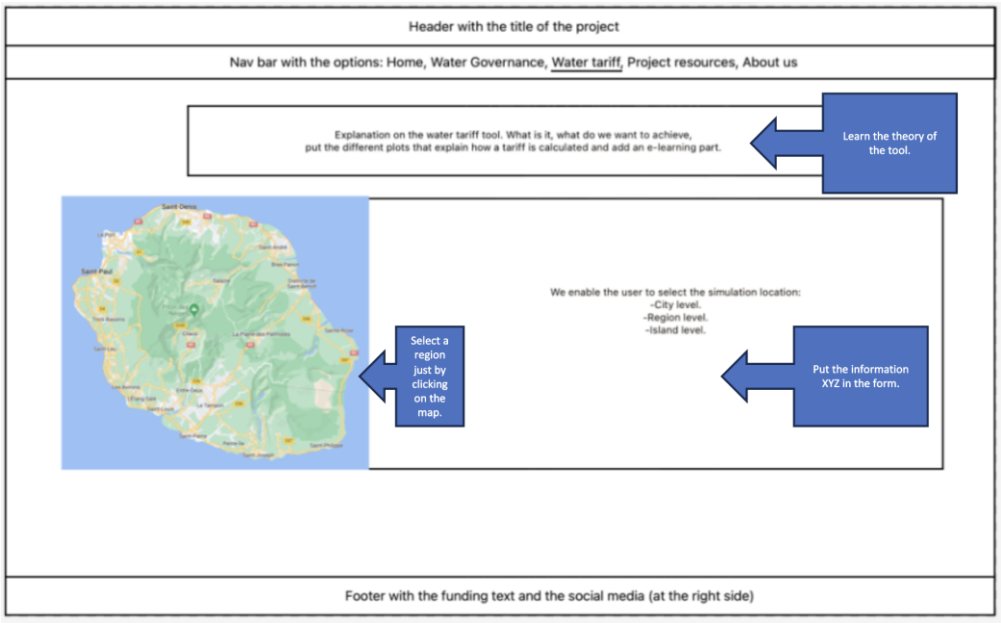
The assistant based on generative AI is promising and has a high expectation of innovation within the project. Using LLMs for eLearning actions is part of the state of the art in this type of technology, and the project will focus on two very interesting typologies for the EU community. However, this state-of-the-art innovation in the assistant will bring barriers that must be addressed during development. Specifically, RAG methodologies require significant time and processing for the data used to extract information. Ensuring that these documents are properly handled and that the execution of the assistant scales computationally when a large amount of data is included is vital for the future of the platform.

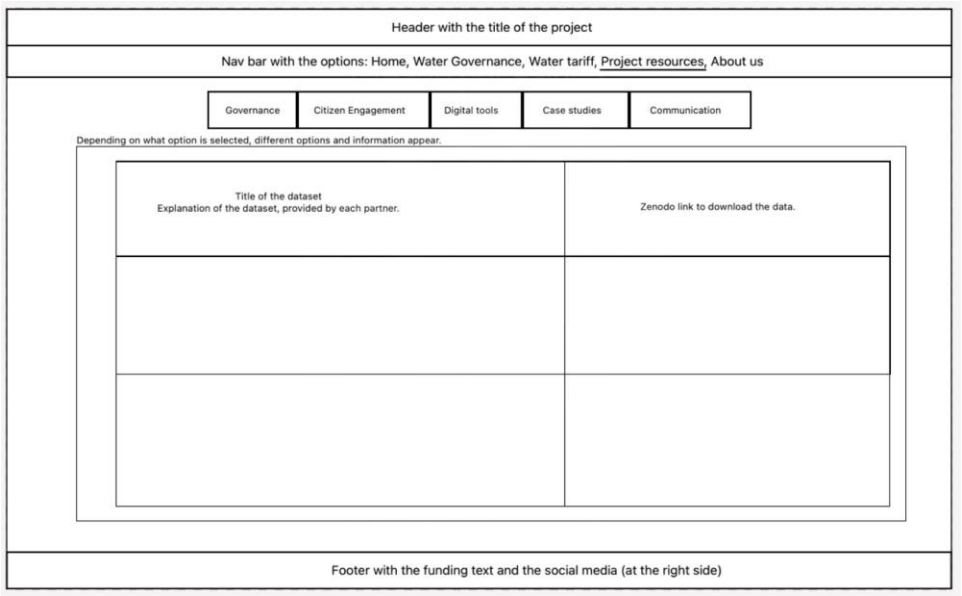
[6] https://developer.mozilla.org/en-US/docs/Web/HTML/Element/iframe

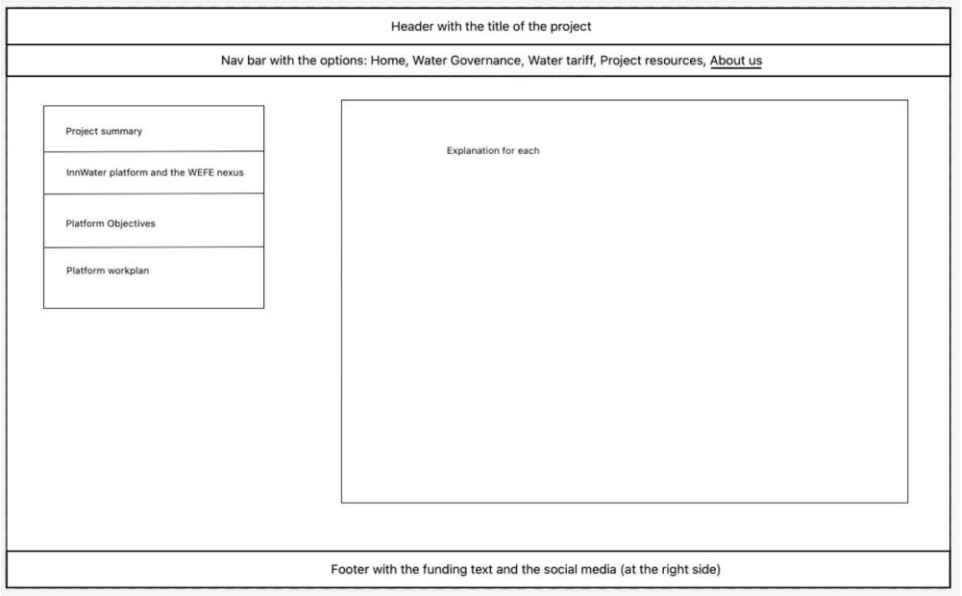
ANNEXES

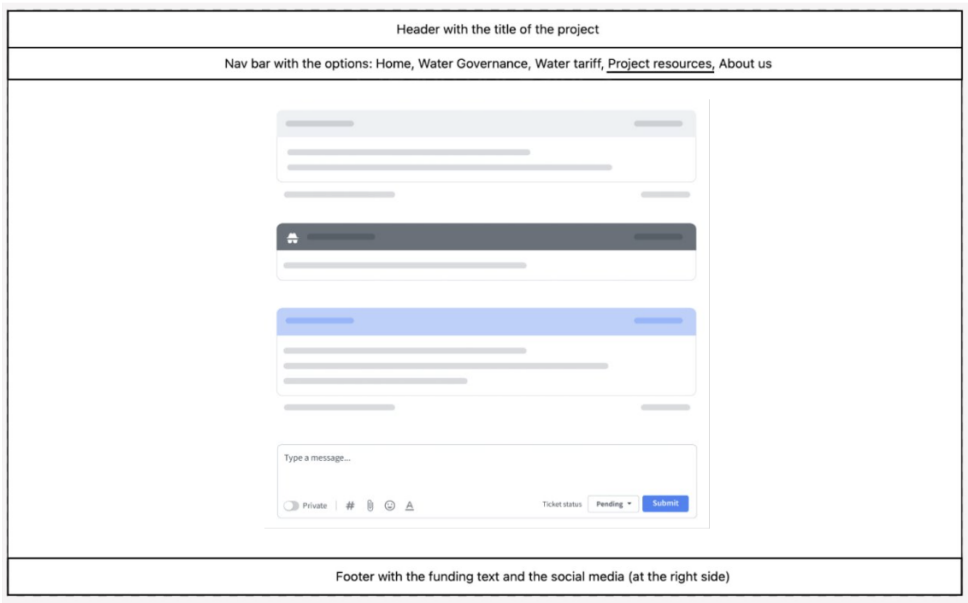
Annex 1: Low-fidelity prototype



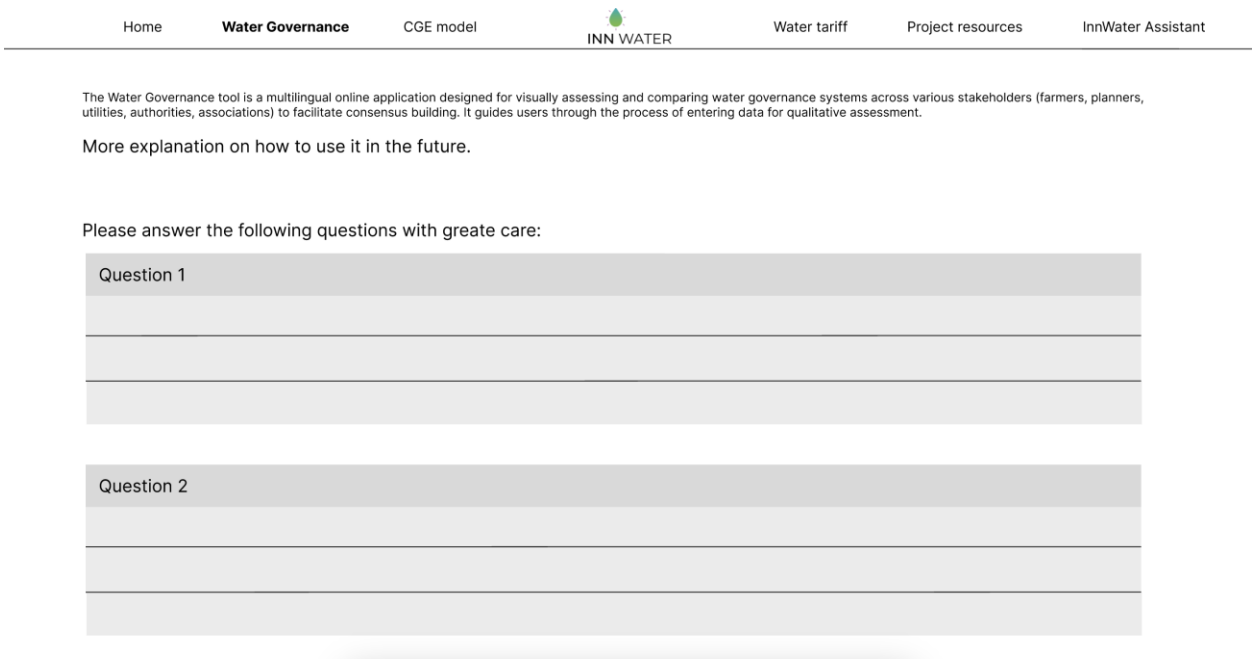



Header with the title of the project
Nav bar with the options: Home, Water Governance, Water tariff, Project resources, About us
Governance
Citizen Engagement
Digital tools
Case studies
Communication
Depending on what option is selected, different options and information appear.
Title of the dataset
Explanation of the dataset, provided by each partner.
Zenodo link to download the data.
Footer with the funding text and the social media (at the right side)


Header with the title of the project
Nav bar with the options: Home, Water Governance, Water tariff, Project resources, About us
Project summary
InnWater platform and the WEFE nexus
Platform Objectives
Platform workplan
Explanation for each
Footer with the funding text and the social media (at the right side)



Annex 2: High-fidelity prototype



Water Governance Assessment

Achieving consensus among various stakeholders in water governance involves several key steps:

1. Inclusive Stakeholder Engagement: Engage all relevant stakeholders, including government authorities, private sector representatives, non-governmental organizations, community groups, and indigenous populations, in the governance process. This inclusiveness ensures that the perspectives and needs of all affected parties are considered.

2. Transparent Communication: Maintain open and transparent communication channels among stakeholders to build trust and ensure that all parties have access to the same information regarding water governance issues, policies, and decisions.

3. Collaborative Decision-Making: Use collaborative decision-making processes that allow for dialogue, negotiation, and compromise among stakeholders. Techniques such as participatory workshops, roundtable discussions, and consensus-building exercises can be effective.

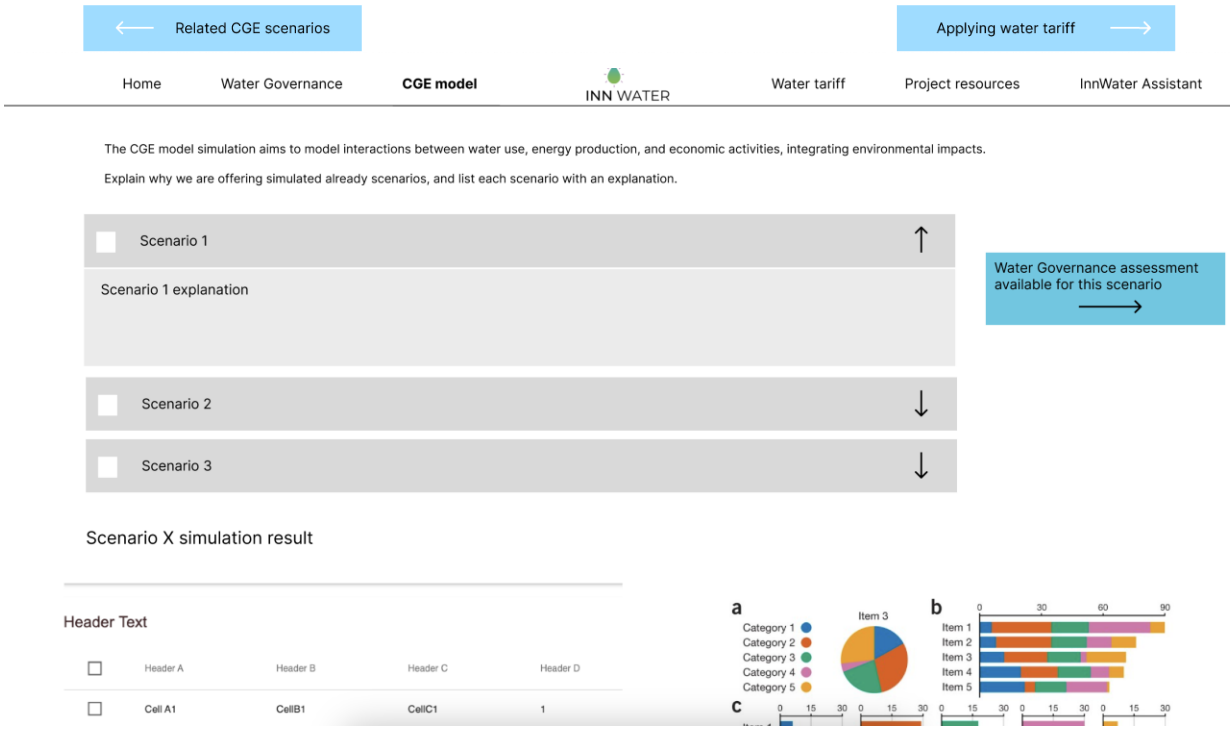
4. Capacity Building: Enhance the capacities of all stakeholders to participate effectively in governance processes. This may involve training on technical aspects of water management, legal and policy frameworks, and negotiation and conflict resolution skills.

5. Shared Vision and Objectives: Work towards developing a shared vision and common objectives for water governance. This can help align the interests and efforts of different stakeholders towards achieving mutually beneficial outcomes.

6. Flexibility and Adaptability: Recognize the dynamic nature of water governance and be prepared to adapt policies and strategies as conditions change or as new information becomes available.

7. Conflict Resolution Mechanisms: Establish mechanisms for resolving disputes among stakeholders. This could include mediation by neutral third parties or agreed-upon arbitration processes.

8. Monitoring and Evaluation: Implement monitoring and evaluation mechanisms to assess the effectiveness of governance practices and the achievement of governance objectives. Feedback from these assessments can inform adjustments and improvements in governance approaches.



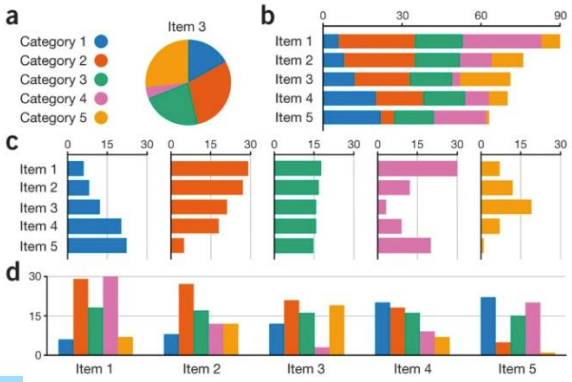
The Water Tariff tool is designed to evaluate the socio-economic impact of household water demand management policies using indicators for affordability, pricing incentives, equity, economic efficiency, and cost recovery. It incorporates a micro-simulation module for detailed analysis on Reunion Island, offering dashboards and web mapping for data visualization and econometric analysis.

Please select the scale of the calculation type:

- Island
- Region
- City

Input data to make the simulation model work

Results and dashboard with the simulation results



← Check water governance assessment

Check CGE model inputs →

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Answer

Answer generated from the user question and the source documents related to the question.

Ask follow-up question...

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