Responsive hub for long term governance to destress the Mediterranean Sea from chemical pollution (RHE-MEDiation)

D1.1 – Setting-up of demo-sites network strategy report

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LIST OF ACRONYMS AND ABBREVIATIONS

EC	European Commission
EQS	Environmental Quality Standards
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulations
HE	Horizon Europe
HLS	High-Level Stakeholders
KS	Key Stakeholders
NGO	Non-Governmental organizations
NPO	Non-Profit organizations
PFAS	Polyfluorinated Substances
PO	Project Officer
PVO	Private Voluntary Organization
SME	Small and Medium-sized Enterprises
TG	Target Group
WFD	Water Framework Directives
WP	Work Package
WQS	Water Quality Standards
WT	Water Treatment
WWTP	Wastewater Treatment Plant

APPLICABLE DOCUMENTS

[AD1] European Commission, Directorate-General for Research & Innovation, Grant Agreement Number 101113045 The RHE-MEDiation project, 2023

[AD2] RHE-MEDiation Consortium Agreement, version 1.0

EXECUTIVE SUMMARY

A stakeholder networking strategy helps to identify the actors involved, ensures they are well informed about the project, and guarantees that their interests and needs are addressed. In the RHE-MEDiation project, a state-of-the-art networking strategy was implemented with the aim to develop and implement citizen empowerment around the theme of chemical pollutants removal from waters, in different geographical contexts where such an environmental stress is of concern (HOT SPOT areas). The proposed methodology is expected to facilitate empowered citizens, scientists and business stakeholders to liaise with government officials and other related parties to stimulate fund raising, promote prioritisation of policy actions, foster new standards and laws to improve the local environmental conditions, ameliorate the inhabitants' quality of life, preserve the biodiversity and natural resources, and contribute to set the basis of a better management of water, as common good whose access is mandatory to guarantee the planet life survival. Importantly, this engagement process is envisioned to continue well beyond the conclusion of the RHE-MEDiation project.

To accomplish these objectives, a general stakeholder mapping, a stakeholder engagement, and citizen empowerment strategies were developed in compliance with GDPR regulations. SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was then used to understand demo-site specific scenarios and recommend clear and attainable goals for a successful implementation of the networking strategy at demo-sites.

Employing this top-down strategy was crucial as it enables the creation of a comprehensive demonstration site networking strategy that acknowledges the inherent variations of each demo-site while ensuring consistency and synergy for effective project management at the highest level.

1 INTRODUCTION

1.1 Background

The RHE-MEDiation lighthouse aims to establish a responsive hub deploying long-term governance centred on the mission to destress the Mediterranean Sea from chemical pollution, including peak concentrations in known HOT SPOTS. Specifically, it seeks to address the most impactful contaminants that currently affect Mediterranean resources and pose a short-term threat to its survival if no action is taken. These components, such as heavy metals, pesticides, PFAS which are also known as forever chemicals, because they are extremely persistent, should be halted and removed from both fresh- and waste waters before they enter the sea [AD1].

In this regard, the RHE-MEDiation project will deploy chemical pollution remediation technologies that will be integrated with existing water/wastewater treatment systems at different demonstration sites and monitored with mobile and fixed sensing systems. This monitoring will allow the assessment and validation of the technology for long-term use. Moreover, by involving five assisted regions, the feasibility of the remediation approach will be further evaluated. The project is also expected to quantify and demonstrate the transfer of governance efficiency from the lighthouse to the citizens, stakeholders, and policy makers, who are the main recipients of the RHE-MEDiation action stream, aiming to bring benefits to future generations. The 'RHE-MEDiation project Local Communities' approach, serving as the primary driver for mobilizing a critical mass to free the Mediterranean Sea from chemical pollution, will be tested in their capacity to upscale interests from local to national and then bring best practices and experience matured to the EC's attention for further actions to be taken within the Mission context. The overall project activity is distributed across eight work packages (WP), and this deliverable will primarily focus on WP1, Task 1.1 Setting-up of demo-sites network strategy.

WP1 aims to develop the structure, content, and processes of the RHE-MEDiation ecosystem (Figure 1) to generate value for long-term exploitation and replication. This action is planned to be accomplished through three stages. Firstly, an evolutionary holistic model will be created to combine technology, business capacity associated with the chemical pollution distress action, social acceptability and accountability, and governance processing based on a regulatory innovation paradigm. Secondly, modalities will be established to share and export data for exploitation in other Mission Lighthouses and Blue Parks. Thirdly, processes will be designed for reporting, monitoring, and coordinating implementation activities under the control of the Mission Implementation Support Platform. These actions are fulfilled through seven tasks (T1.1÷T1.7).

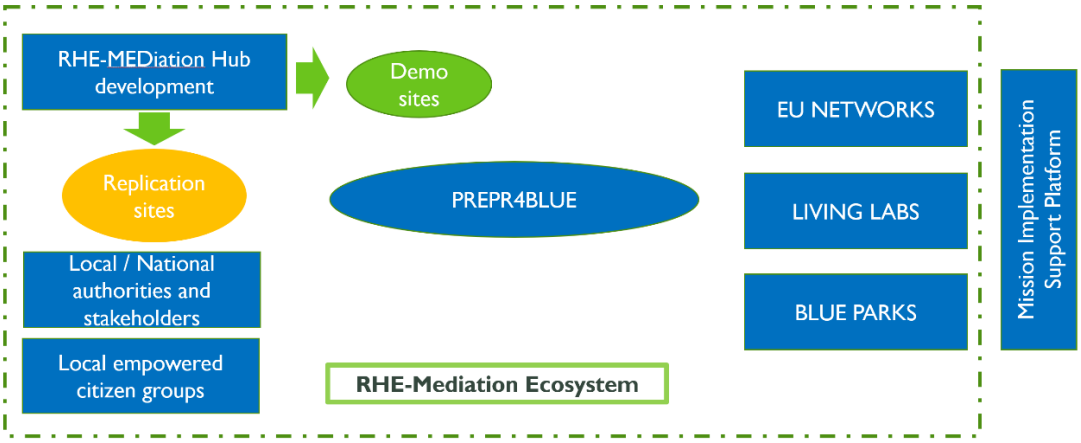


Figure 1: The RHE-MEDiation Ecosystem.

Task 1.1 will take care of developing the stakeholder engagement strategy at the demonstration site levels. This includes:

- Stakeholder mapping.
- Selection of optimal engagement methods.

The described methodology proposes an evolution of the state-of-the-art stakeholders mapping and engagement practices through tailoring to site and local needs. Additionally, within T1.1 the modalities for an engagement strategy to empower citizens within the RHE-MEDiation project will be established.

Overall, the document is a practical guide for stakeholders and citizen engagement for the RHE-MEDiation project, whilst being intended for use by partners at the demonstration sites.

1.2 Deliverable organisation

D1.1 organisation is structured according to the following scheme:

- Section 1 introduces the document.
- Section 2 describes a general networking strategy that ensures homogeneity and synergy for ease of management at the RHE-MEDiation project's top level. The high-level stakeholder groups analysis, mapping, and anticipated levels of engagement is presented in this section, following a scenario that best reflects the RHE-MEDiation project's target for stakeholder engagement. In the analysis, baseline assumptions will be made to anticipate the interest and influence a given high-level stakeholder group may have on the project, though it is difficult to assess "interest" due to its subjective nature. During implementation, we anticipate a change in this aspect is possible. Henceforth, within the project period different engagement channels will be used to align the interest level of a given key stakeholder with the interest level of its high-level stakeholder group. This is because the scenario defined in this section is expected to best guarantee effective stakeholder engagement. The citizen empowerment model that will be applied in the RHE-MEDiation project is introduced in this section.
- Section 3 discusses the customized methodology for each demonstration site, considering a SWOT analysis that was carried out to understand demo-site specific scenarios. Moreover, clear and attainable strategies are recommended for the successful implementation of the networking, based on the results of the SWOT analysis.
- Section 4 reports the conclusions.

2 NETWORKING STRATEGY FOR STAKEHOLDERS

A stakeholder networking strategy is crucial in participatory innovation projects as it helps to identify the actors involved, ensures they are appropriately informed about the project, and guarantees that their interests and needs are addressed throughout the project. In this regard, this chapter will serve as the foundation for recommending the appropriate networking strategy for the RHE-MEDiation project demonstration sites.

Project Stakeholders represent individuals or organizations who are directly or indirectly impacted by the project process while stakeholders' engagement can be defined as a transparent, interactive process by which societal actors and innovators become mutually responsive to each other, with a focus on the acceptability, sustainability, and societal desirability of the innovation process and its marketable products [1]. Adequate planning of these two components is important for successful project implementation.

Figure 2 presents the life cycle of a stakeholder networking strategy, slightly modified with respect to the original version [2]. In a typical participatory project, the first step is to perform a careful analysis of the internal and external opportunities regarding the acceptability of the challenge and threats or obstacles that may limit the interest and further the engagement. This analysis is instrumental to understand how stakeholder groups should be informed and which arguments should be appropriately highlighted to maximise the success of the project. Next, once stakeholders are identified and involved, adequate private data protection policies will be deployed to collect and store the necessary data relevant to the project.

The influence matrix proposed by [3] will be used to categorise stakeholders' interest and their influence on the project outcomes that is instrumental in mapping stakeholders into priority groups and choosing the optimal level of engagement.

Subsequently, a stakeholder engagement plan will be devised that adheres with private data protection policies. At this point, the engagement plan can be rolled out to initiate a one-way or the two-way communication with stakeholder groups, and communication should take place. It is important to evaluate the stakeholder feedback as the project progresses and adjust the engagement plan accordingly.

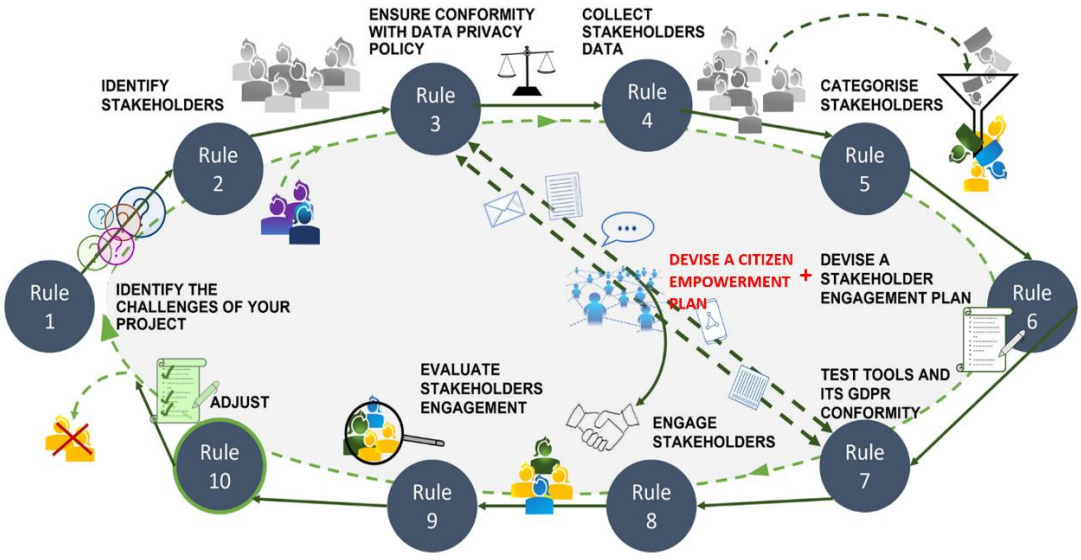


Figure 2: The stakeholder engagement life cycle according to [2], slightly modified to incorporate the citizen empowerment plan (see below).

In the RHE-MEDiation project, the framework proposed by [2] has been slightly modified to explicitly incorporate the component on citizen empowerment. In this regard, circled in Figure 3 are the two primary modes of engagement that will be sought in the RHE-MEDiation project.

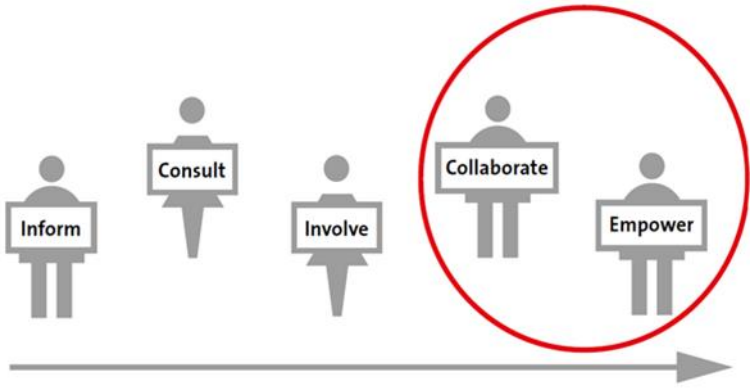


Figure 3: Mode of engagements to be sought of in the RHE-Mediation project ([4]).

The proposed methodology starts from the concept that it is the responsibility of the government to monitor the protection of the environment, whilst it is the specific responsibility of those who impacts the environment to clean it up. Information about the specific recovery action from pollution have to be shared with interested stakeholders and sufficient data will be made available also to the public to acknowledge the changes in water quality. This is why co-design tasks with stakeholders interested in potential remediation capacities will be set up, as well as adequate visibility about the implementation and monitoring phase is needed. Therefore, the RHE-MEDiation project aims at developing citizens knowledge on water quality to influence decision-makers to invest in projects that improve water quality. Furthermore, the aim is to strengthen the knowledge of local citizens about environmental policies that are important to reduce anthropogenic pollution in surrounding water bodies.

It is expected that the networking strategy identified in this section will guarantee that the stakeholder's voice is appropriately heard in the RHE-MEDiation project during co-design and implementation. Moreover, having it set up at the early stages of the project will allow for the optimal exploitation of available skills and knowledge within the project's scope, ensuring its successful completion.

To do so, a baseline stakeholder networking strategy needed to be developed that conforms to the need of the project but is independent of characteristics attributed to demonstration sites. In Section 3, SWOT analysis will be carried out to understand demo-site specific scenarios and recommend additional directions that may increase its successful implementation.

2.1 Stakeholder analysis and mapping

Stakeholder analysis and mapping are essential tools for the engagement planning, as they help to identify the interests and address reasons for different actors being proactively involved in a project [5].

Typically, projects involve the collaboration and involvement of various stakeholders and interest groups. While there might be enough understanding of these stakeholders, factors such as location, issues, or timing can lead to varying levels of interest or engagement. Therefore, identifying and mapping stakeholders is a skilful process of determining which actors should be considered and included [6].

The main aim of the RHE-MEDiation project is to test and validate remediation technology capable of removing pollutants from WT/WWTP effluents. Additionally, cross-cutting methodologies, tools, and processes that are useful for monitoring water quality will be tested and validated. Furthermore, the project

will generate high-quality data on the state of the effluent and the receiving sea to which the effluent is disposed [AD1]. In this regard, some of the key stakeholders foreseen for in the project for co-design and co-implementation are:

- Those entities who are directly impacted by the change of water quality in the demonstration sites.
- Businesses and industries that may be interested in the reuse of high-quality effluent for different purposes.
- Organizations that advocate education, research and Innovation as applied to Water quality, Wastewater plants, the Environment and Health in the broad and specific terms, etc.
- SME and professionals that may be directly involved in supply and construction related to the demonstration sites.
- Authorities in the Municipality, where the project is planned to be deployed.
- Government and non-government organizations that advocate for the environment and water quality.
- Industries that may adopt the remediation technology for treating effluent in their premises.

Overall, the RHE-MEDiation project will involve multi-stakeholders that directly impact and are impacted by the project. In this regard, the Penta-helix model can be applied to map target groups and their interests and influence on the project. The Penta-Helix model serves as a valuable tool for facilitating discussions, mapping interests, and maintaining project balance. It is particularly effective when dealing with complex issues involving multiple stakeholders who represent diverse interests within a specific site or problem. This model enables the consideration of stakeholder interests, relationships, and the identification of different stakeholder types and actors during the engagement planning process. Additionally, the model can be adapted to address representative samples of stakeholders, without the need to specifically name individual stakeholders. Instead, it focuses on exploring relevant stakeholder types. Furthermore, each stakeholder type can be represented at varying levels, such as High, Medium, and Low, providing a metric for assessing the degree of stakeholder involvement in a project [7] [8] [9] [10].

Subsequent subsections will briefly introduce the Target Groups (TG), the High-Level Stakeholder (HLS) groups and their expected interests and influence in the RHE-MEDiation project, following the Penta helix model.

2.1.1 Target groups

Having established clear reasons for engagement, the first step in stakeholder mapping is to identify the Target groups. In this regard, the target groups are selected according to the Pent-helix model.

This target groups represent:

1) ***Businesses:*** They act as enablers, as entities that carry out business processes in creating added value and maintaining growth. They are often aggressive, competitive, take risks and are prepared to fail [7].
2) ***Administration:*** The government acts as a regulator that also carries out planning, implementation, licensing, policies on public innovation, and connect public and private enterprise [7].
3) ***Civic Society:*** They are accelerators. They play a role in gathering people with the same interests that are also relevant to the potential development. It also includes NGOs or third sector that is accountable to a community (excluding private lobby groups) [7].
4) ***Knowledge:*** Organizations that advocate knowledge sharing, research, and innovation, as well as aid in identifying potential and developing today's technology, are a source of knowledge with relevant new concepts and theories [7].

5) ***Capital:*** This includes stakeholders which have resources (land, finance, water, wastewater etc.). They are more risk averse and tends to involve small incremental change [7].

2.1.2 Mapping high-level stakeholder groups

The initial stakeholder mapping undertaken during the project proposal phase and the key stakeholders that were highlighted earlier were used to identify the categories of high-level stakeholder groups in a Target group, see Table 1.

Table 1: Target groups and high-level stakeholder groups in the RHE-MEDiation project.

No.	Capital	Businesses	Administration	Civil Society	Knowledge
1	Water utilities	3rd party contractors that may be involved in the project	Authorities	Citizens	Universities
2	Wastewater treatment plants owners	that may use the generated effluent	Policy Makers	Civil society organizations	Research and development centres, including national and local laboratories
3	Public Investor	Financial opportunity developers			Professional experts, associations, consulting companies
4	Private Investors	that generate wastewater			
5	Financial Institutions	that are impacted by the HOTSPOTS			
6		Other businesses			

2.1.3 Interest and influence of High-level Stakeholder groups

In this section, a more detailed stakeholder analysis is carried out on high-level stakeholder groups to understand their interest and influence on the project. This information will be instrumental for designing an optimal engagement strategy. The following key information will be used for each high-level stakeholder group to understand to which degree (High, Medium, Low) their interest and influence lays.

- **Drive**: What are the main drivers behind the stakeholder joining the project?
- **Incentives**: What Incentives the stakeholder get by joining the project?
- **Challenges**: What challenges the stakeholder has that the project can answer?
- **Needs**: What does the stakeholder need that the project may provide?
- **Interest**: Expected Level of interest of the stakeholder to participate to the project (High, Medium, and Low)?
- **Influence/power**: How they will influence the project (High, Medium, and Low)?

A detailed mapping of the high-level stakeholder groups' interest and influence has been presented in Table 2. Given the static nature of this table and the dynamic nature of the RHE-MEDiation project, it is crucial to emphasize that the degree of "interest" and "influence" is subject to change based on new knowledge, which may affect the level of engagements assigned to high-level stakeholder groups in the project. Therefore, any

updates made to this mapping will be promptly communicated to demo-site partners to ensure they can align their engagement plans accordingly.

Table 2 will be available in the repository, and a similar mapping process will be conducted during the project implementation for key stakeholders at each demo-site. A common database will be shared among the consortium for this purpose.

In Figure 4 and Figure 5, data presented in columns 9 and 10 of Table 2 are plotted, respectively.

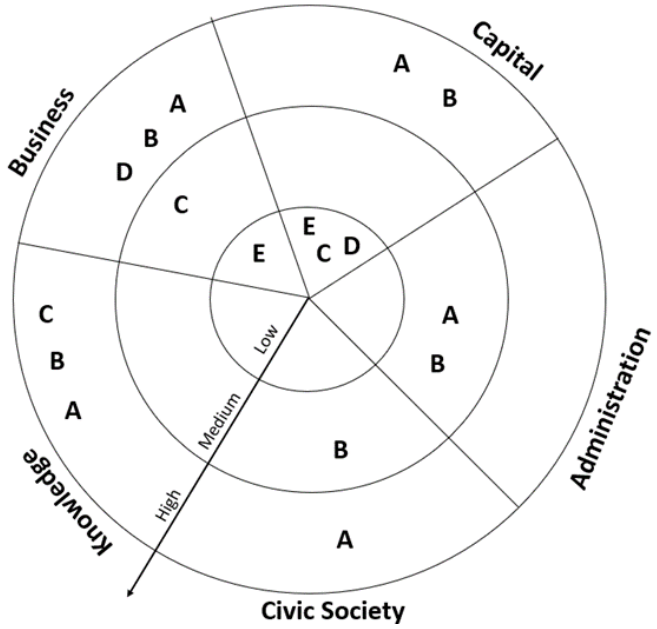


Figure 4: Expected physical level of interest in the RHE-MEDiation project for identified high-level stakeholder groups. See Table 2, column 2, to correlate the reference letters with the high-level stakeholder groups and column 9 for the degree of interest.

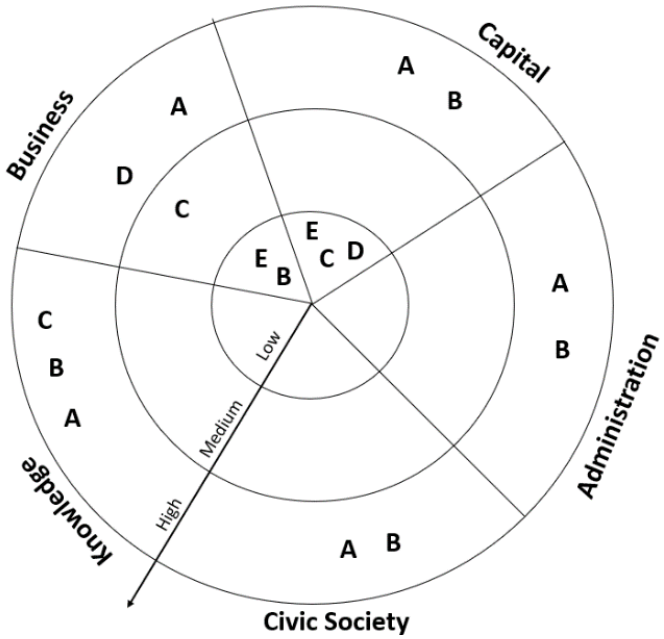


Figure 5: Expected physical level of influence in the RHE-MEDiation project for identified high-level stakeholder groups. See Table 2, column 2, to correlate the reference letters with the high-level stakeholder group and column 10 for the degree of interest.

Table 2: Interests and influences of high-level Stakeholder groups in the RHE-MEDiation project.

Target Group	High-Level stakeholder group		Interest				Influence	Degree of Interests*	Degree of Influence**
	ID.	Name	Drive	Incentives	Challenges	Needs			
Capital	A	Water utilities	Project is under domain of services	Build partnership, access to new technology and knowledge, training for staff	System efficiency, outdated systems, Personnel capacity, meet demand whilst achieving WQS	Technology transfer, Build partnership, new technology and Knowledge, Training for staff	Co-design and implementation, monitoring strategies, help in dissemination and exploitation	High	High
	B	Wastewater treatment plants owners	Project is under domain of services	Build partnership, new technology, new knowledge, training for staff	System efficiency, outdated system, Personnel capacity, meet demand whilst achieving WQS	Technology transfer, Build partnership, new technology and Knowledge, Training for staff	Co-design and implementation, monitoring strategies, help in dissemination and exploitation	High	High
	C	Public Investors	environment sustainability, future business opportunities, exploitation	Idea and technology to invest in, brand building, clean environment	Modern, sustainable, green WT/WWT Technologies to invest in	The remediation technology delivers its promise, prove that there is a need for the technology	Exploitation, financial support	Low	Low
	D	Private Investors	environment sustainability, future business, exploitation	technology to invest in, brand building	Modern, sustainable, green WT/WWT Technologies to invest in	The remediation technology delivers its promise, prove that there is a need for the technology	exploitation	Low	Low
	E	Financial Institutions	environment sustainability, future business, exploitation, support	technology to invest in, brand building, clean environment	business models to invest in, way to support the community	business models to invest in and ways to support the community	financial support, exploitation	Low	Low
Businesses	A	3rd party contractors involved in the project	sign contracts, get profit, gain experience, develop capacity	Earn profits, gain experience, develop capacity	Earn study income, get contracts, work on state-of-the-art projects	Paid for their service, proper project management, feel part of the project	Co-design and implementation, exploitation, implementation	High	High

	B	That may use generated effluent	having no other option, the possibility of exploitation, to get informed	information, building partnership, supporting their community	Cost and availability of water for use	able to produce improved effluent for intended purpose	exploitation, dissemination,	High	Low
	C	Industries that generate wastewater	To use the remediation technology once it is proven to work	Modern technology and knowledge	respecting national regulations, costs of treatment, availability of treatment technology	the project to be successful and improve effluent characteristics	exploitation, implementation, financial support, co-design with citizen and government	Medium	Medium
	D	That are directly impacted by the HOTSPOTS	To be part of the solution for a pollution-free environment.	pollution free zones, a technology able to reduce existing pollution	having no other option to clean the hotspots	the water to be cleaned, the technology to work to influence the municipality	dissemination, communication, influence the municipality and the industries to fund on such projects,	High	High
	E	Financial opportunity developers	future business, exploitation	technology to lobby investors to invest in	business ideas	A technology that works, A business idea to invest on	exploitation, dissemination, co-design	Low	Low
Administration	A	Authorities	protect water bodies, project within the national agenda, environmental sustainability	increase the societies trust in them, make the environment clean for citizens	a remediation technology that works, creating an effective platform for stakeholder collaboration on the water quality	a remediation technology that works, creating an effective platform for stakeholder collaboration on water quality	dissemination, exploitation, communication, co-design, co-implementation, financial support	Medium	High
	B	Policy Makers	protect water bodies, project within the national agenda, environmental sustainability	increase the societies trust in them, make the environment clean for citizens	a remediation technology that works, creating an effective platform for stakeholder collaboration on the water quality	a remediation technology that works, creating an effective platform for stakeholder collaboration on water quality	dissemination, exploitation, communication, co-design, co-implementation, financial support	Medium	High

Civic Society	A	Citizens	a technology able to clean the hotspots, being empowered to challenge state of water quality in their municipality	Clean water, support from government find cleaning water bodies	unpleasant pollution hotspot, smell, affect their health	a technology able to clean the hotspots, being empowered to challenge state of water quality in their municipality	empower citizens on water quality, influence stakeholders to protect the environment, dissemination	High	High
	B	Civil society organizations	Project is under domain of services, clean environment, clean water	Clean environment, healthy citizen	a remediation technology that works, creating an effective platform for stakeholder collaboration on the water quality	a remediation technology that works, creating an effective platform for stakeholder collaboration on the water quality	help empower citizens on water quality, influence stakeholders to protect the environment, dissemination, exploitation, supporting the project	Medium	High
Knowledge	A	Universities	The project is of interest, availability of validated date, collaboration	build collaboration, new knowledge, site visit for students, publication, research, monitored data, build capacity	build collaboration, environment to test such technologies, availability of knowledge, capacity (infrastructure and personnel)	calibration, transfer knowledge and technology, make data available, organize workshops	dissemination, co-design, co-implementation, empower students	High	High
	B	Research and development centres, including national and local laboratories	The project is of interest, availability of validated date, collaboration	build collaboration, new knowledge, publication, research, monitored data, build capacity	build collaboration, environment to test such technologies, availability of knowledge, capacity (infrastructure and personnel)	collaboration, transfer knowledge and technology, make data available, organize workshops	dissemination, co-design, co-implementation, empowerment	High	High
	C	Professional experts, consulting companies, Professional associations	The project is of interest, availability of validated date, collaboration	build collaboration, new knowledge, monitored data, build capacity	build collaboration, environment to test such technologies, availability of knowledge, capacity	collaboration, transfer knowledge and technology, make data available, organize workshops	dissemination, co-design, co-implementation, empowerment	High	High

2.2 Model for Citizen empowerment

Government and industries are expected to work hand in hand to protect the environment from pollution and to preserve it for the future. At the same time sufficient data on water quality must be available for the public (interested stakeholders) to observe these changes. In addition to their roles in the RHE-MEDiation project design and implementation, it is highly desirable that residents at the demonstration sites could acquire the knowledge needed to influence local and national decision-makers to invest in projects that aim to improve the water quality in their area. Furthermore, it is also crucial to strengthen the knowledge of citizens about policies they should advocate for to reduce anthropogenic pollution in surrounding water bodies.

Citizen engagement, within the framework of a nation, state, urban area, or local community, refers to the capacity of regular individuals to unite, engage in discussion, and proactively address significant problems or concerns they have identified [11]. The scope of participation can vary, from simply being informed about decisions or actions to providing input and feedback (such as through public hearings), offering advice on planning initiatives, and influencing the implementation processes [12].

According to [13], community engagement encompasses a range of objectives, including decision-making, fostering relationships, and building capacity. The importance placed on these objectives vary depending on the governing team responsible for the strategy. While these objectives are not mutually exclusive, their prioritization can differ across different projects. Some engagement processes primarily focus on decision-making, while others strike a balance between relationship development and capacity building. In certain cases, all three objectives hold equal significance. As this topic is explored further on, the following conceptualized objectives, as the three vertices of a triangle, have been set: (1) decision-making, (2) relationship development, and (3) capacity building.

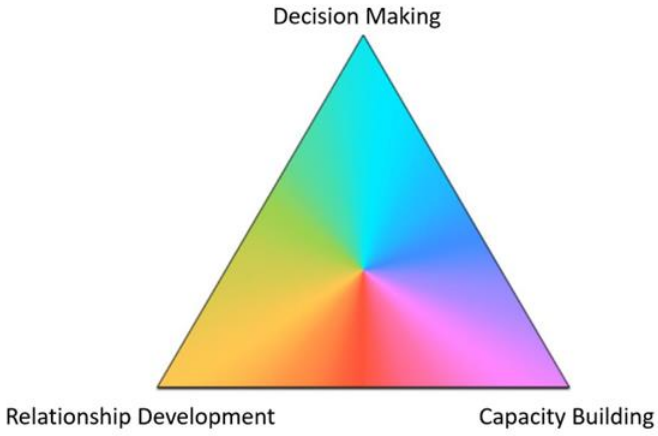


Figure 6: The Community Engagement Triangle [6].

Citizen empowerment, as described by [11], pertains to the provision of opportunities and accessibility by leaders and representatives, enabling individuals to enhance their capabilities and actively engage in community development and decision-making. Although related to citizen engagement, citizen empowerment emphasizes the strengthening of contributions from both individuals and groups in various aspects, including institutional development, infrastructure planning, resource allocation, and more [14]. The underling steps involved are depicted in Figure 7. These steps will be elaborated upon in the following subsections.

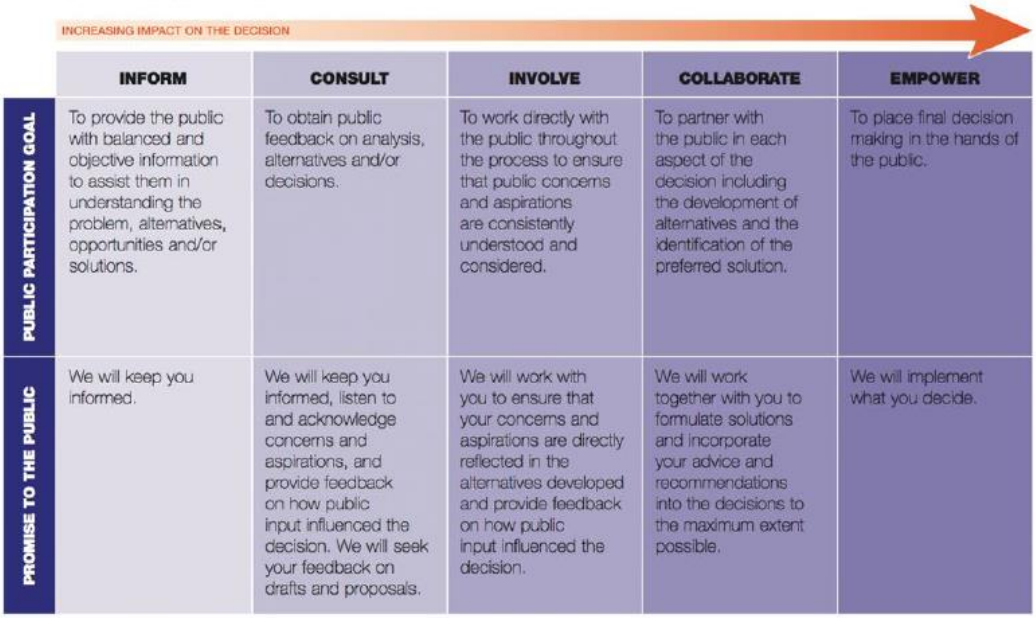


Figure 7: Public Participation Spectrum [14].

Strategy for citizens' empowerment activity to be implemented in the RHE-MEDiation project will address the following key points:

Public Awareness Campaigns: Launch comprehensive public awareness campaigns to educate citizens about the impact of water pollution and the potential of microalgae-based technologies as a solution. For instance, various established communication channels, such as social media, community workshops, public events, and educational programs in society, to disseminate information.

Community Engagement: Involve local communities in the pollution remediation process. Establish community forums or citizen action groups where people can share ideas, express concerns, and actively participate in decision-making related to the microalgae-based technologies as a solution. Foster a sense of ownership and responsibility among citizens towards their environment.

Accessible Information: Ensure that relevant information regarding the microalgae-based solution, its benefits, and its implementation is readily accessible to the public. Create user-friendly resources, fact sheets, and online platforms where citizens can access data, guidelines, and progress reports related to pollution remediation efforts.

Training and Skill Development: Offer training and skill development programs to empower citizens to take practical actions. This could include workshops, public lectures, and trainings.

Collaborative Partnerships: Collaborate with local NGOs, environmental organizations, and academic institutions to strengthen the citizen empowerment strategy. These partnerships can provide additional resources, expertise, and help extend the outreach of pollution control initiatives.

Open Dialogue and Feedback Mechanism: Encourage open dialogues between citizens, policymakers, and experts. Establish a feedback mechanism that allows citizens to share their concerns, suggestions, and grievances related to pollution control efforts and biobased solutions implementation.

Visit Demonstration Projects: Invite citizens to visit and participate in these projects to witness the tangible impact of their involvement.

In this regard, a citizen empowerment strategy for the RHE-MEDiation project is recommended in the subsequent subsections. In Section 3, SWOT analysis will be further used to understand demo-site specific scenarios and recommend additional directions to increase its successful implementation.

The steering committee that will be formed by the local partners at each demo-site will consult the local citizens about the plan before its implementation. The overall strategy can be broken down into five components, as depicted in Figure 8.

2.2.1 Key components to citizen empowerment

The key components of the engagement plan for citizen empowerment at the demonstration sites, as shown in the first block of Figure 8, consists of four elements.

The first element involves utilizing data and simple mapping sheets to empower the local citizens. These citizen scientists (i.e., local citizens) are not expected to have expert knowledge in water quality monitoring, nor will they be subjected to rigorous training in the specific field. In particular, the project aims to provide data related to the water quality characterization of the WT/WWTP and the receiving sea. Citizen scientists will then regularly plot this data on a user-friendly mapping sheet. A sample mapping sheet is provided in Annex A.

The second element involves empowering citizen scientists about Environmental Quality Standards (EQS) and the impact of contaminants, which can be obtained from the Water Framework Directive (WFD) or other EC/national standards. For the engagement process, we will focus on the contaminants being monitored at the demonstration site. It is expected that the EQS of contaminants will be also indicated on the user-friendly mapping sheets.

The third element is the local citizen themselves and how they will be organized for the empowerment. The aim as will be reported in subsequent activities will be to build focus groups consisting of 5 to 8 persons whilst the fourth element is, to integrate the EU mission to Restore Our Oceans and Seas by 2030 into all aspects of the engagement.

Overall, this task will be completed prior to the monitoring phase of the RHE-Mediation project.

2.2.2 Citizen focus groups

As shown in the second block of Figure 8, focus groups consisting of 5 to 8 local citizens will be created. The number of working groups will determine whether a single contaminant or contaminants within a specific category will be assigned to each group, or if only a few contaminants will be assigned regardless of their grouping. During this phase of the engagement, concise and relevant information will be communicated to each focus group by a steering committee at each demo-site. Additionally, some focus groups will focus on activities such as collecting images and engaging in social media campaigns to influence change in the community. This task will be completed before the monitoring phase of the RHE-Mediation project.

2.2.3 Involve Citizen directly in the project

This action will be carried out during the monitoring phase of the RHE-Mediation project. Each focus group will receive monitored data on the state of the WT/WWTP and the receiving sea. The data plots will be shared within and with other focus groups during meetings that will be planned periodically, both offline and online. Again, the planning and organizing of these tasks will fall under the steering committee of each demo-site. Additionally, some of the focus groups will produce simple images that are representative of the state of the sea or surrounding water as the project monitoring progress. This action corresponds to block three of Figure 8.

2.2.4 Democratise the process in the project

This phase is dedicated to democratizing the activities carried out in the RHE-MEDiation project, specifically related to data plots generated by citizen scientists, the communication strategy and results published in the RHE-MEDiation project. Citizen focus groups will engage in assessing the conformity of plots generated by the different focus groups with those generated by RHE-Mediation project. In addition, the citizen scientists are expected to enhance the visibility of dissemination activities carried out by the RHE-MEDiation project social media accounts through sharing of their stories or and advising the projects' social media team to create online contents that would reach a wider audience.

2.2.5 Influence the outcome

This engagement is anticipated after the monitoring period, when RHE-MEDiation project's capability to address the pollution problem in the hotspots is known. This stage is anticipated to empower citizens to evolve from citizen scientists to citizen advocates and local champions that influence the outcome of the water quality of surrounding water bodies.

The expected engagement between empowered citizens, government officials, and other stakeholders will depend on the outcome of the on-site monitoring activity. The following scenarios may be anticipated:

- If the RHE-MEDiation technology improved the effluent characteristics and the receiving sea, then the interested stakeholders' group / empowered citizens should liaise for a change in the approach of the government to allocate funds to implement such technologies to increase water quality.
- If the RHE-MEDiation technology improved the effluent characteristics but not the receiving sea, then the interested stakeholders' group / empowered citizens could advocate for a strict policy on major contaminant contributors in the region (non-point sources) to change the funds allocated by government officials to increase the distribution of such technologies in the territory to enable an increased water quality with measurable characteristics, or push industries to adopt decentralized WWTP with the remediation technology.

Nonetheless, it is acknowledged that regardless of the project outcome, empowered local citizens will continue to collaborate with government officials and other stakeholders to advocate for improved funding, laws, environmental policies, and other aspects related to water quality. This engagement will persist even after the conclusion of the RHE-Mediation project.

To avoid any risk of not fully exercising citizen empowerment in the RHE-MEDiation project, in addition to involving local citizens, higher education students will be invited to join the citizen scientists, and all possible means to incentivize the activity will be sought. Moreover, the performance of individual focus groups will be continuously assessed. This assessment will help the steering committee at each demo-site understand which focus groups are the most engaging. Since these activities are not binding and depend on an individual's interest, more attention will be given to those focus groups that are functioning well. Members of a focus group that are not performing well, on the contrary, will be dispersed among active focus groups to boost the spirit of individual members.

This process will have a dedicated section on the RHE-MEDiation project's website. Furthermore, the project's social media accounts will be used to communicate and disseminate citizen engagements, personal stories, testimonies, and more to reach a wider audience of the Journey to empowerment.

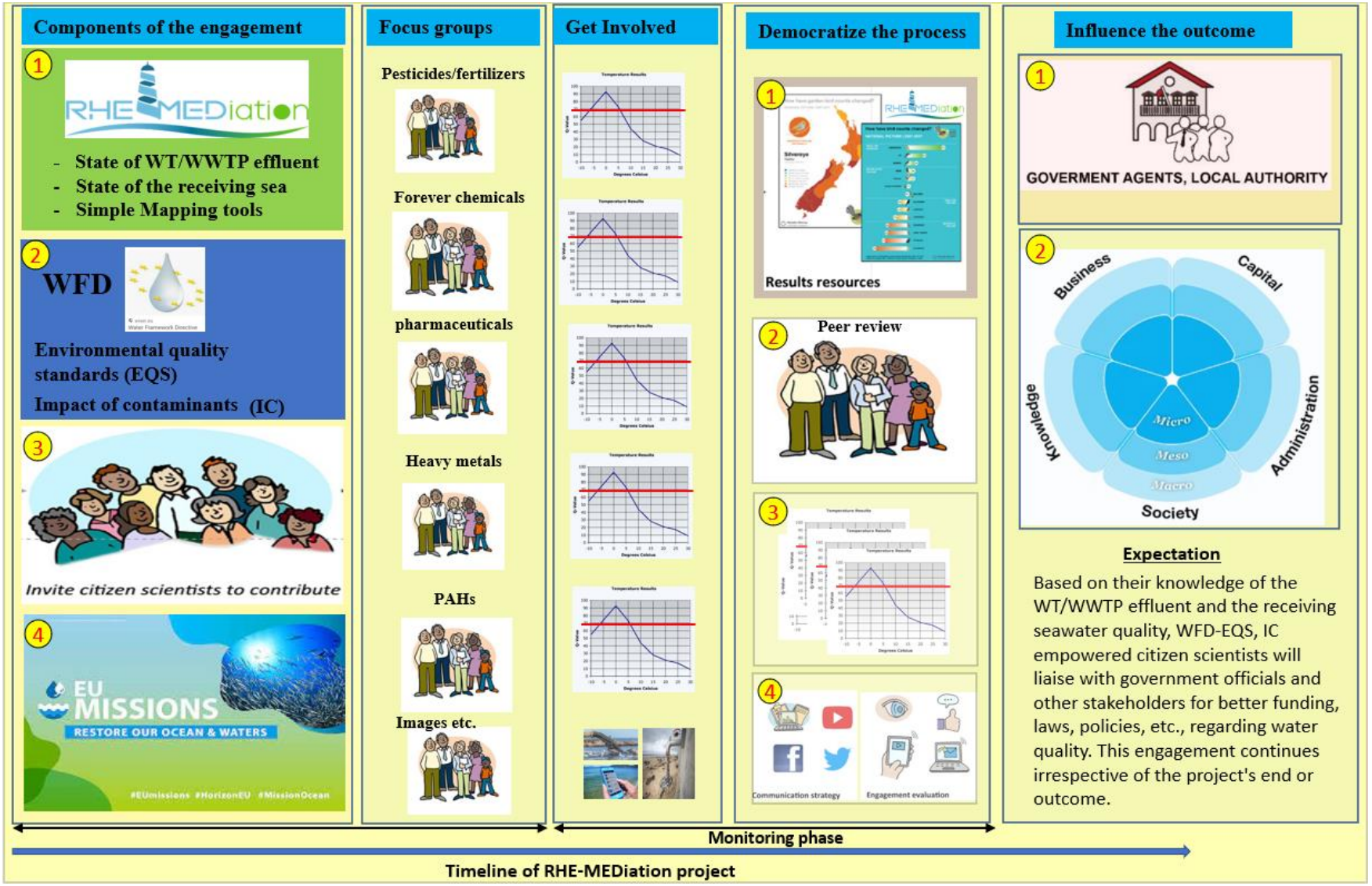


Figure 8: The citizen empowerment model to be implemented at each demonstration site in the RHE-MEDiation project.

2.3 Engagement strategy for stakeholders and empowering citizens

2.3.1 Levels of Engagement

Generally, five levels of engagement are anticipated in the RHE-MEDiation project. Namely, inform, consult, involve, collaborate and empower [15]. The latter level of engagement will be used only for citizen empowerment process that is discussed in Subsection 2.2 whilst the former four levels of engagements will be used for stakeholder engagement activities and depending on the type of stakeholder involved one, a combination, or all of them - at varying degrees and intensity may be used in an engagement activity [6].

2.3.1.1 Inform

The strategy aims to provide stakeholders with essential information and updates regarding the project or decision, ensuring they remain informed. It is the responsibility of stakeholders to review the published material. This level of stakeholder engagement is considered minimal, with communication primarily being one-way, and active stakeholder input is not actively sought. Nonetheless, transparency and awareness play crucial roles. Stakeholders in the Informing Level exhibit a low to moderate level of interest and possess limited or no direct influence on the decision-making process. Engagement channels such as social media corporate pages, press release outlets, project blogs and company blogs, project websites, digital newsletters and emails, and public announcements can be utilized for this purpose [6].

2.3.1.2 Consult

Consulting entails actively seeking feedback, opinions, and suggestions from stakeholders. It goes beyond merely informing and provides an opportunity for them to express their perspectives. Stakeholders are invited to contribute their input, and their viewpoints are considered during the decision-making process. These stakeholders exhibit a moderate to high level of interest in the project, but their influence may be low to moderate. To engage with them effectively, surveys and questionnaires may be used [6].

Additionally, for stakeholders who possess a high level of influence but a low level of interest, a more personalized consulting approach will be pursued. In this case, engagement channels such as real-time sharing of project issues, involving them in the review of documents related to areas that may increase their interest, and employing personalized communications can be employed [6].

2.3.1.3 Involve

Stakeholders in this group have a high level of interest and a moderate to high level of influence on the project. Consequently, they are regarded as partners rather than mere recipients of information and are granted the opportunity to offer input and impact the final outcomes. At this level of stakeholder engagement, their valuable knowledge, experiences, and perspectives are recognized as crucial in enhancing the project's results. Building trust, mutual respect, and shared responsibility between the project and these stakeholders is achieved by involving them in brainstorming, problem-solving, and idea generation. Their contributions will play a key role in shaping the project's objectives, strategies, and implementation plans. Communication in this context follows a two-way process, actively encouraging ongoing dialogue and exchange. Timely and relevant information must be provided to them, while they, in turn, will share their concerns, ideas, and suggestions. Open communication channels, including workshops, focus groups, and participatory processes, enable meaningful contributions from stakeholders. Establishing feedback mechanisms to update stakeholders on how their input has influenced the project nurtures transparency, highlights the value placed on their contributions, and ensures continued engagement throughout the project's lifespan [6].

2.3.1.4 Collaborate

These are the fundamental components, the highest level, of engaging with the interested stakeholders. They involve stakeholders who have a high level of interest, commitment, and influence in the project. Collaborative stakeholders actively participate in decision-making and their input is given equal importance alongside other considerations. This implies that they can actively contribute to shaping the project or decision and have a sense of ownership, so it is crucial to treat them as integral members of the team. They may review the project risk register in real-time, collaborate in developing relevant process documents, contribute guest posts to the project and consortium blogs [6].

2.3.1.5 Empower

Empowerment goes beyond collaboration, as it involves transferring power to a citizen/community. To achieve this, it becomes crucial to ensure that the community possesses the appropriate skills and knowledge. By strengthening the capacity within the community, residents' skills and potential to participate in decision-making processes increase, leading to more resilient and better-connected communities, capable of effectively coping with challenges and changes [16].

In the RHE-MEDiation project, adopting an Asset-Based Community Development (ABCD) approach adds value by mobilizing individuals, associations, and institutions to unite and leverage their strengths and knowledge concerning the topic of water quality. This approach encourages them to advocate for stricter policies and actions by the government to remediate HOT SPOTS within their territory or beyond. [17].

As far as stakeholder engagement is concerned, the anticipated levels of engagement that can be sought in the RHE-MEDiation project can be presented for the high-level stakeholder groups, as in Figure 9. The data presented in Table 2 was used to the generate the “interest “and “influence “matrix as described in [3].

Naming of high-level stakeholders is different from that presented in Figure 4 and Figure 5. The first letter of the target group is added for ease of distinguishing the high-level stakeholder groups on the grid plot. That is **CS** (civic Society), **B**(business), **C** (capital), **K** (Knowledge) and **A** (Administration).

The advantage with Figure 9 is that of having a clear visualization tool to see which level of engagement is appropriate for a given high-Level stakeholder group. This becomes handy when multiple stakeholders are involved in a project. The visualization tool can also be updated regularly to understand the stakeholder dynamics at the various levels of the project.

From Figure 9, also shows that the main levels of engagement anticipated in the RHE-MEDiation project are inform, consult, and collaborate. In Table 3, these engagement levels and "Empower" are presented together with different Work Packages in the RHE-Mediation project that deal with tasks to be carried out in a demonstration site. These includes WP1, 3, 4 and 7. As the scope of WP7 are much broader to categorise under a demonstration site, it is not included in Table 3.

Taking into consideration the different Work Packages and tasks indicated in Table 3, in Annex A, Figure 15, the anticipated frequency of engagement activities for the different levels of engagements in the RHE-MEDiation project were plotted qualitatively against the month from the beginning of the project.

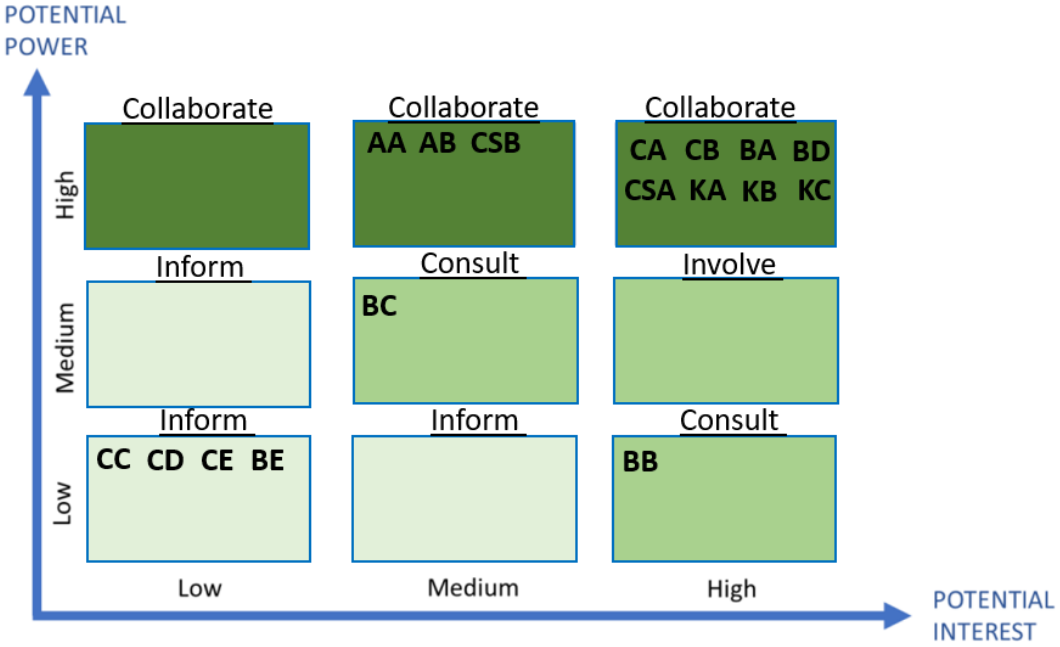


Figure 9: Influence interest matrix for High-level stakeholder groups to anticipate level of engagement in the RHE-MEDiation project (adapted from [16]. The first letters of the target group (CS= Civic Society, B=Business, C= Capital, K= Knowledge and A= Administration) is added prior to the ID (Table 2, column 2) of a High-level stakeholder group whilst degree of interest and influence are those indicated in Table 2, columns 9 and 10, respectively.

Table 3 : Expected levels of engagements at each Demo-site in the RHE-MEDiation project.

WP	Task	Levels of Engagement			
		Inform	**Consult**	**Collaborate**	**Empower**
WP1	1.1	▪ Invitation will be sent to identified stakeholders in the demo-sites to join the RHE-MEDiation project.			
	1.2	▪ Invitation will be sent to identified stakeholders in the demo-sites to join the RHE-MEDiation project. ▪ Invitation to attend the 1st demo-site workshop will be communicated to stakeholders. ▪ Periodic communications will be shared among stakeholders about project progress.	▪ Online surveys will be sent to stakeholders in the demo-sites who have agreed to join the RHE-Mediation project to understand their interest on the project. ▪ Online surveys will be sent to selected stakeholders who attended the 1st demo-site Workshop.	▪ The 1st workshop will deploy co-design activities with stakeholders.	▪ Invite citizens at the demo-sites to register for the citizen empowerment. ▪ Surveys will be sent to citizen scientists who agreed to join the citizen empowerment program to understand their interests and expectations. ▪ Different options to incentivize the citizen empowerment process would be sought off.
	1.3	▪ Invitation will be sent to identified local to national level stakeholders to join the RHE-MEDiation project. ▪ Periodic communications will be shared among stakeholders about project progress.	▪ Online surveys will be sent local to national level stakeholders who have agreed to join the RHE-Mediation project to understand their interest on the project.	▪ Different engagement channels will be sought with local to national level authorities and policy makers for assessing the need for remediation	▪ Invite citizens at the demo-sites to register for the citizen empowerment. ▪ Surveys will be sent to citizen scientists who agreed to join empowerment. ▪ A first meeting between citizens involved in the empowerment program will be held at each demo-sites. ▪ Materials for the citizen empowerment activities will be prepared and disseminated to demo-sites. ▪ The citizen scientist will be grouped under different focus groups. ▪ Channels for periodic meeting b/n citizens of a focus group will be established. ▪ Options to incentivize the citizen empowerment process would be sought.

				technologies for HOT SPOTS.	
WP3	3.1 3.2 3.3	▪ Invitation will be sent to identified local to national level stakeholders to join RHE-MEDiation project. ▪ Periodic communications will be shared among stakeholders about project progress.	▪ Online surveys will be sent local to national level stakeholders who agreed to join the RHE-Mediation project to understand their interest on the project.		▪ Invite citizens at the demo-sites to register for the citizen empowerment. ▪ Surveys will be sent to citizen scientists who agreed to join the citizen Empowerment program to understand their interests and expectations. ▪ Materials for the citizen empowerment activities will be distributed to focus groups. ▪ Focus group will carry out period meetings. ▪ Different options to incentivize the citizen empowerment process would be sought off.
WP4	4.1 4.2 4.3	▪ Invitation will be sent to identified local to national level stakeholders to join RHE-MEDiation project. ▪ Periodic communications will be shared among stakeholders about project progress. ▪ Invitation to attend the 2nd and 3rd demo-site Workshops will be communicated.	▪ Online surveys will be sent local to national level stakeholders who have agreed to join the RHE-Mediation project to understand their interest on the project. ▪ Online surveys will be sent to selected stakeholders who attended the 2nd and 3rd demo-site workshops.	▪ Different engagement channels would be sought for collaborative actions with High-Level stakeholder groups indicated under Figure 9 during the 2nd and 3rd workshops.	▪ Focus groups will perform activities that they choose to be involved in. ▪ Different options to incentivize the citizen empowerment process would be sought off. ▪ Focus groups will carry out period meetings to discuss about findings. ▪ Focus groups will discuss the RHE-MEDiation project with other stakeholders during the 2nd Workshop. ▪ Focus groups will present their findings in the 3rd Workshop. ▪ Citizen scientists will liaise with government officials and other stakeholders for better funding, laws, policies, etc., regarding water quality. This engagement continues irrespective of the RHE-MEDiation project's end or outcome.

2.3.2 Engagement channels

Engagement channels serve as means for project participants to actively involve themselves in various aspects of a project. These channels are chosen based on the objectives and desired outcomes of the engagement. In Table 4, a list of some of the potential engagement channels that may be sought in the RHE-MEDiation project along with their anticipated outputs are presented.

Table 4: Engagement channels [19].

No.	Engagement channel	Potential outputs
1	Workshops	▪ To provide project updates and information ▪ To collaborate on tasks. ▪ To keep stakeholders informed
2	Correspondence by phone/email	▪ To disseminate information related to the project. ▪ To invite stakeholders to participate in events, tasks, workshops, meetings, webinars, or to complete surveys etc. in the project.
3	Formal Meetings	▪ To communicate specific information to a group of stakeholders. ▪ To discuss technical aspects of the project with a group of stakeholders ▪ To liaise with Stakeholders regarding the project. ▪ To liaison between local citizens and politicians to promote citizen empowerment.
4	Public meeting	▪ To communicate project information to a broader audience. ▪ To enhance stakeholder awareness of the project.
5	Focus group meetings	▪ To engage local community regarding the project. ▪ To empower citizens.
6	Surveys and questionnaires	▪ To understand perspectives of stakeholders about the project. ▪ To gather data for analysis and comparison.
7	One to one interview	▪ To understand the perspective of stakeholders. ▪ To develop personal connections with stakeholders. ▪ To gather information.
8	Print, online and social media	▪ To communicate and disseminate project-related information to stakeholders.
9	Project website	▪ To communicate project-related information to stakeholders.

At the proposal phase of the RHE-MEDiation project, three physical workshops were identified to be conducted at each demonstration site, totalling nine workshops.

The first workshop is in WP1. It will be held at each demo-site to introduce the project and model to local stakeholders. The second workshop is part of WP4, which aims to validate, demonstrate, and monitor the project's progress. This event aims to inform stakeholders about the tasks to be carried out as part of this work package. The third workshop is also in WP4 and aims to present the results of the piloting activities to the different stakeholders.

A timeline for organizing these workshops is presented in Annex A, Figure 15.

2.4 Standardized Rules for Contacting Stakeholders

2.4.1 First Contact with stakeholders

For a harmonized stakeholder engagement, the following steps and rules will apply when stakeholders are first contacted:

- The first step is to invite stakeholders to join the RHE-MEDiation project. This invitation will be published on the projects' communication channels (website, social media, flyers, newsletters, etc.). Additionally, it will be sent to identified stakeholders whose contact is publicly available.
- If the contact data of a stakeholder is not publicly available, the first contact will be done by a local partner. Only when a stakeholder has joined the RHE-MEDiaiton project, can personal data be used for further communication.
- A standard invitation letter will be drafted and shared with all consortium partners and will also be published on the project's website to facilitate the first contact with a stakeholder.
- A registration form (e.g., Google Form) may be embedded in this invitation letter to allow the stakeholders to subscribe to the RHE-MEDiation project. The form will consist of:
    - A general introduction to the RHE-MEDiation project.
    - The objective of the RHE-MEDiation project.
    - Target groups/ high level-stakeholder groups in the project (who should register).
    - Information about the personal data collected for the project.
    - A consent form that will provide information about the context and purpose of the stakeholder's contribution to the project, as well as more details on how their personal data will be used and further stored. Stakeholders will be asked to confirm this form before registering. The content of this form will be in line with the project's ethical requirements.
- After the first contact and when the stakeholder consent to join the project is verified, a short questionnaire will be sent to ask the stakeholders about their interest in- and expectations of the project. Responding to this questionnaire will be on a voluntary basis [18].

2.4.2 Targeted engagement and communication

Identified stakeholders that have joined the RHE-MEDiation project will be assigned to the appropriate engagement type and channels in accordance with their position in Figure 9 and as communicated in Table 3. Furthermore, various communication channels such as the project website, newsletter, social media, or other dissemination materials will be used to raise awareness about the project and to invite external stakeholders to subscribe to the project's network [18].

2.5 GDPR compliant database

To ensure GDPR compliance throughout the project, before activities start, a detailed information sheet and an information consent form will be prepared to inform stakeholders about the projects, to ensure that all stakeholders have fully understood the information and do not feel pressured or coerced into giving consent. Moreover, a GDPR privacy notice to describe the way to collect, treat, share and retain personal data will be prepared and also distributed to the partners at each demo-site, moreover local partners assistance may be requested in situations where translation to local languages, is needed. If the demonstration site is in a nation outside the European Union, checks will be conducted to ensure that the form is in line with national legislations. Only stakeholders who have officially give the consent will be part of the RHE-MEDiation project.

Additionally, during online events or events that require participant consent, new stakeholders to the RHE-MEDiation project will be provided with the appropriate consent form that matches the type of engagement channels they will be involved in.

In particular, the GDPR privacy notice will explicitly mention the different communication and dissemination events in which all stakeholders are expected to participate. Furthermore, the GDPR privacy notice will be accessible through the project's website.

2.6 Managing the stakeholders' network

Whenever a key stakeholder at a demo-site joins the RHE-Mediation project, relevant information pertaining to the stakeholder should be saved properly. Similarly, stakeholders that were involved in the engagement activity as well as their key inputs and feedbacks should be properly saved to this database. Thus, allowing a metrics to be developed to measure the success of the engagement activity (i.e., for instance, on the bases of the number and relevance of stakeholders involved and the quality of their inputs and feedbacks).

The responsibility of managing the database lies with the steering committee comprised of local partners that will be established at each demo-site. Furthermore, this stakeholder information should be saved in a DGPR compliant, uniform, and standardized format that is harmonized across all demonstration sites and shared by the project co-ordinator.

As far as stakeholder data is involved, in accordance with the RHE-MEDiation consortium agreement [AD2], demo-site partners will have full autonomy and only data that does not pertain to "Privacy data" can be stored at the project top level and shared with the consortium. Figure 10 describes the direction of flow of stakeholder data in the RHE-MEDiation project, in the diagram "Output" reference relevant data that excludes private data of a stakeholder.

Stakeholders will be invited to join the RHE-MEDiation mailing group. The email group will be organized based on various criteria, including the demo-site location, target group, high-level stakeholder group, and the desired mode of engagement. Privacy data pertaining to this group will only be managed at the RHE-MEDiation project level.

Once a stakeholder engagement activity has concluded, the engagement process, as well as the input and feedback received from the stakeholders should be documented and assessed. This enables us to gauge the effectiveness of the engagement and plan any necessary follow-up actions. In the RHE-MEDiation project, this process is particularly significant as the planned engagements involve consultation, co-design, and implementation, and their outcomes can influence the execution of actions within the project.

In the RHE-MEDiation project each engagement activity will be documented in a report, detailing the objective, methodology, participants, a summary of stakeholder concerns and expectations, discussion highlights, and a list of outputs. Moreover, as part of this review process, stakeholders who participated in the engagement activity will be recorded to the project's database, a task entrusted to the consortium partner leading the stakeholder activity with the support of the project coordinator.

Equally important is the need to inform the stakeholders who were part of the engagement activity about the results of their involvement. In the RHE-MEDiation project, CNR, as the Leader of WP7 (Dissemination, Communication, and exploitation of project results), will communicate the findings to the stakeholders and the public, with the support of the consortium partner responsible for leading the stakeholder activity and the project coordinator.

As per the periodic engagement activities conducted at each demo-site for empowering citizens, a steering committee will be established to assess and, if necessary, enhance the engagement activities to achieve the

expected level of citizen empowerment. Similar communication channels used previously will be employed to share the outputs with stakeholders and the public.

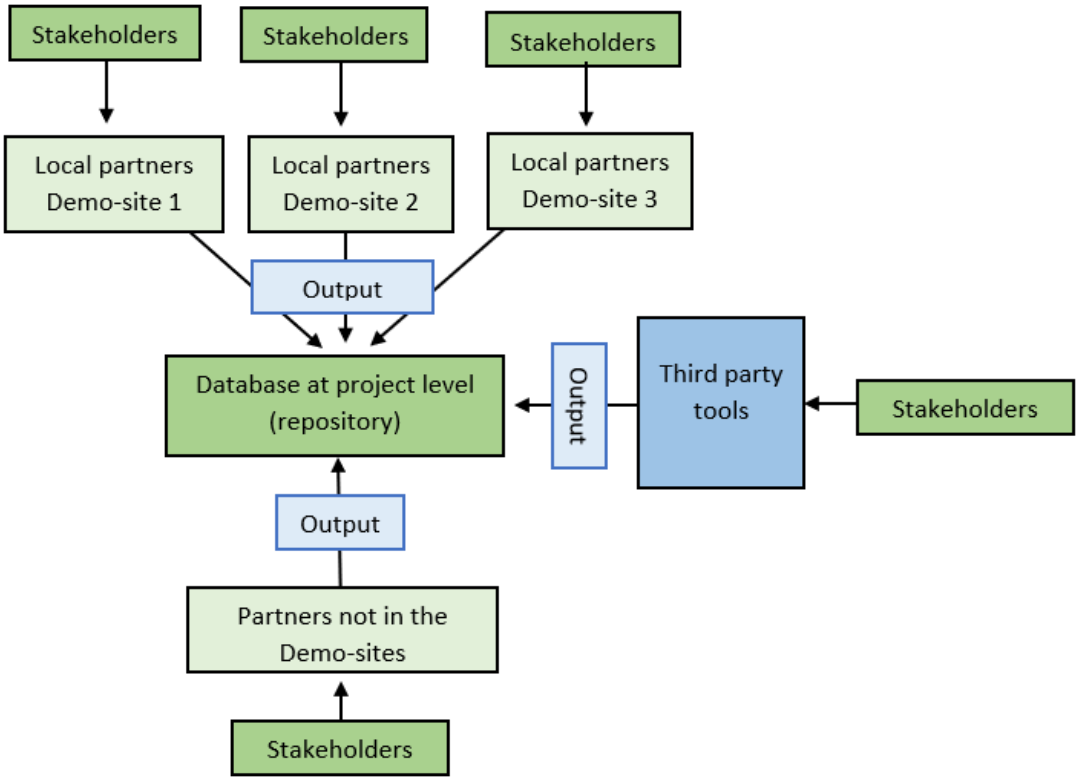


Figure 10 : Direction of Stakeholders data flow in the RHE-Mediation project.

3 RHE-MEDIATION NETWORKING STRATEGY CUSTOMIZED TO DEMO-SITE LEVEL

Stakeholder engagement is a vital part of most projects, as it helps build trust, credibility, and influence with the people and groups that matter to the goals and objectives of a project. However, stakeholder engagement also comes with potential risks and challenges that need to be managed and mitigated effectively.

This section aims to customize the networking strategy that was briefly discussed in Section 2 to suit the specific needs of each demo-site. In this regard, this section will be composed of four sub-sections:

- A short biography of the demo-site is given in the first sub-section.
- In the second sub-section, the key stakeholder analysis and mapping is presented. General information on the identified key stakeholders at each demo-site and how the analysis presented in Section 2 will be customized at demo-site level.
- The last two sub-sections focus on key stakeholder engagement and the citizen empowerment model, respectively. In this regard, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis conducted by each demo-site partners are presented to get a clear view of anticipated scenarios when the engagement strategies described in Section 2 are implemented at a demo-site. This information will be then used to recommend additional strategies at each demo-site.

3.1 The demonstration sites

3.1.1 Italy

The "Mar Piccolo" demo site is a coastal basin situated north of the city of Taranto, covering an area of approximately 20.7 square kilometres with a total volume of 0.152 cubic kilometres. It consists of two main sections: the first bay (Bay I) and the second breast (Bay II), which are separated by the promontory of Punta Penna and Punta Pizzone, see Figure 11.

The specific location for the demonstration site is the 1st inlet of Mar Piccolo. The waters and seabed in Bay I of Mar Piccolo are significantly contaminated by heavy metals, PAHs, and PCBs. The basin was influenced by intense industrialization of the city of Taranto which led to its inclusion among the areas classified as "high environmental risk" (Ministerial Decree No. 349 of 8-7-1998). Subsequently, with Decree No. 468 of 09/18/2001, Taranto was included in the "National program of environmental reclamation and restoration". In 2012, with Legislative Decree 129, the Taranto area was recognized as an area in complex industrial crisis and an extraordinary Commissioner was appointed to implement urgent reclamation, environmentalization and retraining. This intense industrialization process has led to the massive production of waste, which, through past inadequate management, has profoundly contaminated the Mar Piccolo [17].

The site of the SGM srl shipyard will act as a base for allocating the plant to capture and treat the waters coming from the Citrello canal which flow into the first inlet of the small sea. Citrello canal is a significant tributary in the drainage basins.

Figure 11 :The Italian demonstration site. Left: Bird's-eye view of the site. Right: Its location in Mar Piccolo and in Italy (map not to scale).

3.1.2 Greece

The demo-site, located in the Thriassion Plain of the Attica peninsula, is situated approximately 25 km west of the metropolitan area of Athens. The Thriassion Plain encompasses 27.3% of the area and 52% of the population of Western Attica, comprising 2.1% of the total population of the Attica Region. Extensive investigations conducted in the broader Elefsis Gulf area over the past three decades have revealed significant contamination of seawater and marine sediments by both organic and inorganic pollutants. Moreover, because of its oceanographic characteristics (shallow waters) of the Elefsis Gulf, there are quite low currents, which induce anoxic conditions and stratifies the water, especially during the summer. These conditions, combined to a defined thermocline, intensify the pollution problem by favouring the accumulation of sediments and inhibiting the natural destruction/decomposition of pollutants.

Figure 12 :Thriassio Wastewater Treatment Plant. Left: Bird's-eye view of the plant. Right: Its location in Elefsis gulf and in Greece (map not to scale).

The Thriassio Wastewater Treatment Plant serves as the demo-site. It has been operational since 2012 and provides wastewater treatment services to the Municipalities of Aspropyrgos, Elefsina, and Mandra-Idyllia, which previously lacked proper drainage systems. The facility also receives pre-treated liquid waste from industries and business in the surrounding area. Treated sewage is discharged into the Elefsis Gulf via a 1,560 m long diffuser pipeline, located south of the wastewater treatment plant.

3.1.3 Turkey

The Dilderesi basin is situated on the Kocaeli Plateau, to the east/northeast of the Marmara Region. The southern part of the basin is home to numerous industrial establishments, including Organized Industrial Zones, factories, industrial facilities, storage areas, and port facilities. TUBITAK has been monitoring Izmit Bay since 2007 as part of regional and national projects. Monitoring results have identified sediment contamination by heavy metals (such as Pb, Ni, Zn, and Cu), PAHs, and PCBs.

The Dilovası Municipal Wastewater Treatment Plant (WWTP) represents a significant source of pollution in Izmit Bay. The plant has a treatment capacity of 40,000 m^3/day, with approximately 60-70% of the wastewater flow originating from industrial facilities in sectors such as chemistry, plastic, and metal. The treatment process incorporates extended aeration activated sludge technology, phosphorus removal capability, rapid sand filtration, and UV disinfection.

Figure 13: Dilovası Municipal Wastewater Treatment Plant. Left: Bird's-eye view of the plant. Right: Its location in Turkey (map not to scale).

3.2 Key Stakeholder analysis and mapping

Following the identification of target groups and high-level stakeholder groups in Section 2, along with a detailed mapping of their interest and influence as reported in Table 2 and other tables and figures derived from it, a similar procedure will be carried out at each demo site. This will occur when potential stakeholders respond to an online survey that will be communicated to them as soon as they agree to join the RHE-Mediation project.

The survey will inquire about each stakeholder's interests (i.e., drives, incentives, challenges, and needs) as well as the level of influence they would like to have in the RHE-MEDiation project (i.e., being informed, consulted, or involved in collaboration). Based on their responses, we will liaise with them if the level of interest and influence they decide to have is found to be lower than that of their parent's high-level stakeholder group, as presented in Table 2.

Key stakeholders identified to date at each demo-site are presented in Annex B, Table 11, Table 12 and Table 13. They would be continually updated as new stakeholders are identified.

3.3 Strategy for key stakeholder engagement

An analysis has been presented for each demo-site in Table 5, Table 6 and Table 7 using the SWOT scheme and carried out by the steering committee at each demo-site (i.e. local partners) with the aim to provide a clear view of unforeseen scenarios that might potentially impact the implementation of the stakeholder

engagement strategy described in Section 2 on site. These tables also recommend additional strategies based on the SWOT analysis.

Table 5 : SWOT analysis to evaluate the stakeholder engagement strategy for the Italian demo-site.

Strengths	**Weaknesses**
▪ Existence of a network of stakeholders who have already collaborated to address complex environmental issues. ▪ Demo-site partners have strong relations with potential stakeholders. ▪ The use of innovative technology is expected to attract more stakeholders. ▪ The experimental approach, already proven successful in other EU or nationally funded projects, is known to attract many stakeholders. ▪ There is a hypothesis that stakeholders are willing to address environmental problems, particularly regarding the management of the marine ecosystem.	▪ The microalgae treatment is based on a technology that has not been sufficiently tested under various conditions of use. ▪ The use of the microalgae treatment plant, as a service offered for sale, could only be provided under defined experimental conditions. ▪ A scientific team needs to be established to focus on remediation. ▪ The results obtained in the project might not be satisfactory for the site in question, in terms of quantity, quality, or duration. ▪ The presence of multiple legal entities dealing with water management could cause conflicts among stakeholders.
Opportunities	**Threats**
▪ The topic of environmental sustainability is addressed at all levels of education and communication. ▪ The media is very interested in addressing environmental issues. ▪ There is a complex environmental issue at the demonstration site that the government has been trying to address for several years, with the support of various scientific and technical organizations. ▪ There is a high participation rate of young and highly educated people in environmental concerns. ▪ Proposals to solve environmental problems enjoy high social acceptance.	▪ High technology development, investment, and/or operating costs may push away some stakeholders. ▪ Occurrence of technical and scientific problems that could make project activities difficult may push away stakeholders.
Key strategies to be added to the demo-site stakeholder engagement strategy	
▪ The steering committee at the Italian demo-site should conduct a thorough assessment of existing networks to attract more stakeholders to the RHE-MEDIation project. ▪ Prioritize efforts to disseminate information about the innovative technology and the environmental issue the project addresses, encouraging participation from citizens of all ages and backgrounds. ▪ Establish open and effective communication channels with the government to facilitate co-design and ensure the RHE-MEDiation project aligns with the citizen empowerment model. Emphasize to the government that the project follows a standard approach, demonstrating its capability to address the identified problem in the HOT SPOTS. ▪ Clearly communicate the project's objectives, methodologies, and results to potential stakeholders. Once stakeholders are onboard, maintain regular communications and sessions to enhance their understanding and engagement with the project. ▪ The steering committee at each demo-site should proactively identify major sources of conflict among stakeholders and be prepared to address them in advance.	

Table 6 : SWOT analysis to evaluate the stakeholder engagement strategy for the Greece demo-site.

Strengths	Weaknesses
▪ There are extensive business stakeholders that may join the Ecosystem within the Greece market, including suppliers, distributors, retailers, and other key partners. ▪ The local partner responsible for facilitating the stakeholder engagement activity on-site has no known competition with other utilities. Additionally, they boast a well-recognized national brand and has established relationships with other stakeholders, which will be particularly instrumental when initially establishing contact with key stakeholders. ▪ The innovative technology of microalgae as a treatment method is highly appealing to the Greek network. ▪ The Greece stakeholder Network is already involved in other EU or nationally funded projects of EYDAP, showcasing their proactive engagement in relevant initiatives.	▪ Since the technology is new to the demo-site, the knowledge target group has to be built from scratch. ▪ The involvement of multiple legal entities in water management may lead to conflicts among stakeholders.
Opportunities	**Threats**
▪ High market shares due to low competition in Greece. ▪ High social acceptance and active engagement on social media platforms. ▪ Access to numerous potential stakeholders. ▪ The project offers appealing pollutant monitoring strategies for local wastewater treatment plant owners, who may seek improvements in monitoring practices.	▪ Some stakeholders may be reluctant to adopt new technologies as it could impact their established business trends. ▪ There might be some stakeholders who question the viability of adopting the technology due to its high initial investment costs. ▪ The potentially high research and development expenses required to enhance the service may deter certain stakeholders from adopting or investing in the technology.
Key strategies to be added to the demo-site stakeholder strategy	
▪ The strategy for the RHE-MEDiation project should focus on early identification of key stakeholders. ▪ A well-prepared and carefully managed database is crucial for effectively managing stakeholder information. ▪ Networking with previous projects in similar areas should be pursued to invite their networks to join the RHE-MEDiation project's networking list. ▪ Highlighting Greece's low competition and high market share will be appealing to certain stakeholder groups, especially financial business developers, private and public investors. This message should be communicated to these high-level stakeholders. ▪ Regular communications should be sent to the knowledge target group to raise awareness about the remediation technology and other supplementary technologies incorporated in the project.	

Supporting activities like lectures, tutorials, workshops, site visits, and collaborative research will further engage the knowledge target group. ▪ Clear and targeted communication about each technology introduced by the project is essential. This can be achieved through forwarding relevant information to stakeholders and organizing various engagement activities. ▪ Demo-site partners should have a strategy in place to identify, predict and diffuse any conflicts between stakeholders. ▪ Providing sufficient and periodic information, such as strength/weakness and advantage/disadvantage assessments, training manuals, and installation guides, is crucial for businesses or industries interested in adopting the technology (WT/WWTP). ▪ Co-designing measures to address the high cost of installation and improvement of the technology is vital for ensuring the technology's viability in the future.

Table 7 : SWOT analysis to evaluate the stakeholder engagement strategy for the Turkish's demo-site.

Strengths	**Weaknesses**
▪ The demo-site recognizes that the most efficient way to make decisions is through stakeholder engagement. ▪ The demo-site shows a high potential for collaboration with stakeholders. ▪ There are many active businesses in the area that can participate in the engagement group. ▪ The demo-site exhibits a strong willingness among stakeholders to address environmental problems, particularly concerning water resources and the marine ecosystem. ▪ The demo-site also benefits from the involvement of well-known local WT/WWT (Water Treatment/Wastewater Treatment) operators who can join the stakeholder group.	▪ Project duration may not be sufficient to prioritize needs, especially when stakeholders' interest is lower. ▪ Various public organizations hold responsibility for water issues and setting regulations in the site, potentially leading to conflicts among some stakeholders during engagement. ▪ The micro algae-based treatment is a relatively untested technology, which might require additional effort to convince and educate stakeholders about its benefits and encourage their participation in the project.
Opportunities	**Threats**
▪ The technology is expected to be of great interest to industries that produce effluent. ▪ Anticipate high participation from young, highly educated individuals with a keen interest in environmental issues. ▪ At the site, there is a strong interest in environmental topics across all levels of education. ▪ Explore the potential of media to draw attention to environmental issues.	▪ Economic conditions are worsening in the area, which may divert the focus of many stakeholders from being concerned about water quality deterioration. ▪ Marine mucilage is present on-site, which could potentially have a negative impact on project activities. This condition might discourage some stakeholders from getting involved.
Key strategies to be added to the demo-site stakeholder engagement strategy	
▪ To ensure a high level of stakeholder participation from capital and business target groups, priority should be given to identifying and contacting key stakeholders in these groups. ▪ There is significant interest in environmental concerns among both citizens and stakeholders of other groups at the site. Therefore, it is crucial to identify and establish contact with all relevant stakeholders. ▪ Leveraging the power of media to attract local stakeholders to the RHE-Mediation project is essential. The steering committee at the demo-site should give additional emphasis to this aspect.	

- Address the challenges posed by industries generating effluent, which may be hesitant to adopt industry-level technologies due to economic concerns. Additionally, weigh economic burdens on citizens and the negative influence it may pause on their concern for the environment. To overcome these hurdles, the demo-site partners should devise a plan that appeals to these high-level stakeholder groups.
- Investigating the feasibility of the project in relation to the existing marine mucilage on-site is crucial. Stakeholders need to be informed about the risk assessment we conducted to build their confidence in the project.
- To proactively manage potential sources of conflict among project stakeholders, demo-site partners should conduct a thorough investigation well in advance of any engagement activities at the demo-site. Moreover, we should have contingency plans readily available.
- A comprehensive high-level awareness campaign should be executed to inform stakeholders about the viability of the technology and its benefits. This will help garner support and enthusiasm for the project.

3.3.1 Strategy for citizen empowerment

Table 8, Table 9 and Table 10 showcase the results of SWOT analyses conducted by the steering committee at each demo-site to assess potential unforeseen scenarios that could affect the implementation of the citizen empowerment strategy outlined in Section 2 at each demo-site. Additionally, these tables will propose supplementary strategies based on the findings of the SWOT analysis.

Table 8 :SWOT analysis to evaluate the citizen empowerment strategy for the Italian demo-site.

Strengths	**Weaknesses**
▪ There is an excellent and continuous on-site relationship with citizens regarding environmental concerns. ▪ There is a general interest among local citizens in empowering themselves on environmental issues. ▪ There is a strong political interest in environmental issues. ▪ The University/Polytechnic and various governmental, regional, and local institutions have already collaborated synergistically, leading to greater awareness and extensive knowledge in the area, as well as offering potential solutions.	▪ Poor information or limited training to citizen scientists can potentially hinder the success of the citizen empowerment strategy. ▪ Maintaining the continuous attention of citizens can be challenging. ▪ Difficulties may arise in complying with environmental management standards.
Opportunities	**Threats**
▪ Citizen science provides an excellent opportunity to achieve high-quality scientific outcomes by actively involving people, facilitating the sharing and exchange of knowledge between researchers, institutions, and the public. ▪ Engaged citizen scientists can play a vital role in advocating for evidence-based policies and actions, influencing decision-makers.	• Data privacy, consent, and ethical considerations must be carefully managed in citizen science initiatives.
Key strategies to be added to the demo-site citizen empowerment strategy	
▪ Identify and establish connections with existing networks focused on citizen empowerment. Contact the relevant authorities or individuals responsible for these networks.	

▪ Organize a well-structured steering committee at the demo-sites to effectively manage and engage the potentially large number of citizens involved in this initiative. ▪ Design training and engagement sessions for citizen scientists that are not only informative but also enjoyable and interactive. Implement periodic sessions to maintain interest and involvement. Leverage the project's social media accounts effectively to gain a competitive edge. ▪ Prioritize GDPR compliance in all engagement activities related to citizen empowerment. Ensure that data protection and privacy are at the forefront of our interactions with citizens throughout the project.

Table 9: SWOT analysis to evaluate the citizen empowerment strategy for Greece demo-site.

Strengths	**Weaknesses**
▪ The conceived empowerment strategy will create and foster an excellent relationship with citizens.	▪ Citizen scientists may lack professional training and expertise, leading to potential errors or limitations in data interpretation. ▪ Sustainability: Maintaining long-term engagement and commitment from citizen scientists can be difficult.
Opportunities	**Threats**
▪ Citizen sciences provide opportunities for collaboration between researchers, institutions, and the public, facilitating knowledge sharing and exchange. ▪ Engaged citizen scientists can advocate for evidence-based policies and actions, influencing decision-makers.	• Data privacy, consent, and ethical considerations must be carefully managed in citizen science initiatives.
Key strategies to be added to the demo-site citizen empowerment strategy	
▪ Give significant weight to the perspectives of citizens throughout the empowerment procedure and in all research solutions. ▪ Explore points of collaboration among stakeholders involved in the project is crucial to harness these opportunities and enhance the knowledge capacity of citizens. ▪ Ensure sufficient mentorship is provided to enable all participants of the empowerment plan to reach equal levels. Support each focus group and the implementation of effective teaching strategies will foster mutual assistance among different groups. ▪ Create a truly engaging, enjoyable and inclusive engagement activity, that is easy to participate in, and regularly scheduled. Citizen scientists must feel a sense of ownership and contribution to the change they are driving. Leveraging social media extensively will be instrumental in attracting and increasing citizen participation. ▪ As the project progresses, the performance of different focus groups will be continuously assessed. This assessment will aid the steering committee at the demo-site to identify the most engaging focus groups that align with the interests of the citizen scientists. While participation in these activities remains voluntary, greater attention will be directed towards those focus groups that are functioning effectively. Members of underperforming focus groups may be repositioned among active groups to bolster their enthusiasm and commitment. ▪ Upon request, demo-site partners will receive training on GDPR, and relevant materials for this purpose will be provided at the project's outset.	

Table 10: SWOT analysis to evaluate the citizen empowerment strategy for Turkish demo-site.

Strengths	Weaknesses
▪ Citizen empowerment concerning current water quality issues can foster unity among citizens, driving them towards a common purpose. ▪ The available political interest in the environmental issues at the demo site could significantly influence the community's empowerment. ▪ Involving university students in the citizen empowerment plan will enhance the success of the approach.	▪ Insufficient awareness of existing environmental issues can reduce stakeholder engagement in the program. ▪ Failure to implement and adhere to environmental regulations may hinder citizen empowerment efforts, making it difficult to collaborate with the government on matters concerning water quality.
Opportunities	**Threats**
▪ Enhancing the water quality of Izmit Bay will lead to improved economic, social, and cultural benefits for the local population. ▪ Tapping into the growing interest in social media can be instrumental in attracting community participation. ▪ Informing the local community about the diverse remediation technologies successfully implemented in Europe and other regions will raise their awareness.	▪ Different social factors in the demo-site may distract the community from actively engaging in the program.
Key strategies to be added to the demo-site citizen empowerment strategy	
▪ The first step for the steering committee at the demo site is to identify the social factors negatively affecting the citizen empowerment procedure and investigate the reasons behind the formation of the HOT SPOTS. This understanding will enable citizen empowerment efforts to focus on addressing the primary reasons for pollution. ▪ Active involvement of the local administration at each level of the citizen empowerment procedure is crucial. Their participation plays a vital role in bridging the gap between the public and policymakers, especially during the stage of empowerment where citizens collaborate with local administrators to advocate for better funding and stricter laws to improve water quality in their localities. Additionally, utilizing available funds within the jurisdiction of the local authority to provide cash incentives to citizen scientists can further enhance participation. ▪ Encouraging students at various education levels, particularly at universities, to join the project is essential. Liaising with the administrators of educational institutions can facilitate their engagement in the initiative. ▪ Ensuring that local citizens understand the benefits of having a remediated Izmit's Bay is crucial. Effective communication strategies should be employed to raise awareness and gain support from the community. ▪ Leveraging social media platforms is of utmost importance. The steering committee at the demo site will collaborate closely with the communication and dissemination team to ensure increased coverage and outreach, thereby maximizing the project's impact and engagement.	

4 CONCLUSIONS

The demo-sites' network strategy developed in this report for the RHE-MEDiation project provides a practical guide for stakeholder engagement and citizen empowerment during implementation. This document plays a crucial role in identifying the actors involved, ensuring that they receive appropriate information about the project, and addressing their interests and needs throughout the project, thereby contributing to the successful achievement of the project's main objectives.

The networking strategy adopts a state-of-the-art life cycle approach that adheres to private data protection policies. It encompasses the key components of stakeholder identification, categorization, and the development of a stakeholder engagement and citizen empowerment plan. It also evaluates and adjusts the networking strategy based on stakeholder feedback as the project progresses.

To facilitate effective engagement, five target groups were selected following the penta-helix model, leading to the identification of 18 high-level stakeholder groups representing these targets.

For the citizen empowerment plan, a comprehensive approach was adopted, aiming to enhance local citizens' decision-making abilities, develop influential relationships, and build capacities to engage with government officials and stakeholders for improved funding, laws, and policies related to water quality. This approach consists of four fundamental elements: empowering local citizens with data and mapping sheets, educating citizen scientists about Environmental Quality Standards (EQS) and contaminant impacts, organizing the local citizens, and integrating the EU mission to Restore Our Oceans and Seas by 2030 at every level of the empowerment.

The stakeholder engagement and citizen empowerment plans encompass four levels of engagement: inform, consult, collaborate, and empower, with each level linked to specific WPs in the RHE-Mediation project whose focus is the demo-sites. A breakdown of expected task by task engagement levels was provided.

Standardized rules for initial stakeholder contact, communication strategies, and stakeholder network management were also discussed to promote consistency and efficiency across the RHE-MEDiation project.

To properly manage stakeholder data, relevant information pertaining to stakeholders will be saved appropriately, and their inputs and feedback during engagement activities will be recorded in the database. The consortium will only share non-private data with stakeholders, ensuring data privacy compliance.

The level of interest and influence of key stakeholders joining the RHE-MEDiation project will be determined through an online survey, which will help determine the required level of liaising for each stakeholder.

To address potential hurdles during implementation of the stakeholder engagement and citizen empowerment plans, SWOT analyses were conducted by demo-site partners, leading to the identification of site-specific key strategies. Commonalities found among demo-sites include that there is high interest among business owners, effective utilization of social media is needed for stakeholder identification, existing networks should be leveraged for stakeholder identification, the fear to adopt new technologies, economic concerns, level of training for citizen scientists, managing possible conflicts among stakeholders, high investment and research costs, and issues related to data privacy.

Overall, the demo-sites' networking strategies presented in this report sets the foundation for successful stakeholder engagement and citizen empowerment, fostering a strong collaborative environment for the RHE-MEDiation project demo-sites. By adhering to the principles and recommendations outlined here, the project will achieve its goals and contribute positively to water quality improvement and environmental conservation.

REFERENCES

[1] R. Von Schomberg, "A vision of responsible research and innovation," *Responsible innovation: Managing the responsible emergence of science and innovation in society,* pp. 51-74, 2013.

[2] Hollmann S., Regierer B., Bechi J., Tobin L. and D'Elia D., "Ten simple rules on how to develop a stakeholder engagement plan," *PLoS Computational Biology,* 2022.

[3] M. A., "Stakeholder Mapping," in *Proceedings of the 2nd International Conference on Information Systems*, Cambridge, 1991.

[4] C. Garcia-Soto, G. I. van der Meeren, B. J. A. J. Delany, D. C. K. Dubsky, G. Fauville, G. Gorsky, K. von Juterzenka, F. Malfatti, M. G. P. McHugh, P. Monestiez, J. Seys, J. Węsławski and Z. O., Advancing Citizen Science for Coastal and Ocean Research, Position Paper 23 of the European Marine Board, Ostend, Belgium: French, V., Kellett, P., Delany, J., McDonough, N., 2017.

[5] linkedin, "https://www.linkedin.com/advice/1/what-main-challenges-risks-stakeholder-analysis," [Online].

[6] Tractivity, "https://www.tractivity.co.uk/blog/levels-of-stakeholder-engagement#:~:text=There%20are%20essentially%20four%20levels,at%20pace%20and%20with%20volume," [Online].

[7] Y. Tri, T. Darmi and S. Sulandari, "Model pentahelik dalam pengembangan pariwisata di Kota Semarang," *Journal of Public Sector Innovations,* pp. 84-93, 2019.

[8] E. Engkus, "Penta Helix perspective: The pollution control of the River Watershed (DAS) Citarum Indonesia," *Sciendo ,* pp. 194-200, 2022.

[9] Fryanti, Y. Een and H. Apriliansyah, "Implementation of the Penta Helix Concept in The Waste Management of Social and Economic Value in Kota Bengkulu," in *The 4th International Conference on University Community Engagement*, 2022.

[10] P. Hartuti, B. Prabawani and I. M. Yusuf, "Penta Helix Model for Sustainable Coastal Area Management in Bangka Islands," in *6th International Conference on Social and Political Sciences*, 2020.

[11] A. V. Hill, "https://medium.com/@adrianvhill/penta-helix-stakeholder-management-for-complex-projects-5bfea8d43be9," 2016. [Online].

[12] C. Gibson, "Citizens at the Center: A new approach to civic engagement," no. The Case Foundation., 2006.

[13] E. Barrenetxea, X. Gorritxategi, E. Iturbe, P. Kamenjuk, R. Ahas, P. Rathje, H. Bielefeldt, P. Hernández, T. Eelma, M. Cepeda and M. Tatar, "Deliverable 2.6 : Citizen Engagement Strategy and deployment plan, V1.0," SmartEnCity - GA No. 691883, 2016.

[14] Gómez-Hernández, José-Antonio and T. Saorín, "Trends in information literacy programmes to empower people and communities: Social technologies supporting new citizen needs.," *Handbook of Research on Comparative Approaches to the Digital Age Revolution in Europe and the Americas,* pp. 315-331, 2016.

[15] Durham E., Baker H., Smith M., Moore E. and Morgan V., The BiodivERsA Stakeholder Engagement Handbook, paris, 2014, p. 188.

[16] kirklees, “https://www.kirklees.gov.uk/Involve/document/CollaboratingEmpowering.pdf,” [Online].

[17] nurturedevelopment,“https://www.nurturedevelopment.org/asset-based-community-development/,” [Online].

[18] S. Manoochehri and M. Schluep, Stakeholder Engagement Strategy, World Resources Forum, 2020.

[19] L. NOLAN, Deliverable 4.1 Stakeholder engagement action plan, CICERONE: European Horizon 2020 programme, 2019.

[20] C. F., C. Vitone, F. Sollecito, M. Mali, R. D. Miccoli, D. M. Petti, G. Ruggieri, O. Bottiglieri, F. Santaloia, P. D. Bellis, F. Cafaro, M. Notarnicola, F. Todaro, F. Adamo, A. D. Nisio, A. M. L. Lanzolla, M. Spadavecchia, M. Moretti and G. Agro, “A geo-chemo-mechanical study of a highly polluted marine system (Taranto, Italy) for the enhancement of the conceptual site model,” *Nature Scintific Reports* , vol. 11, no. 1, 2021.

[21] Osmos, “https://osmosnetwork.com/pentahelix/,” [Online].

[22] Tractivity, “https://www.tractivity.co.uk/blog/stakeholder-analysis,” [Online].

[23] Bangthetable, “http://www.bangthetable.com/what-is-community-engagement/#2,” [Online].

ANNEX A

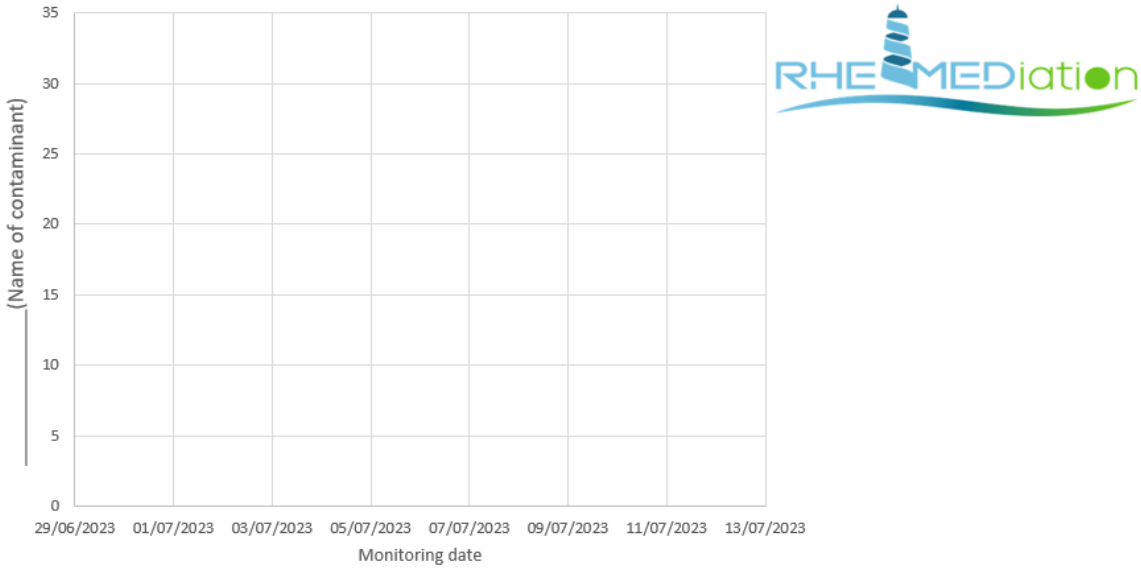


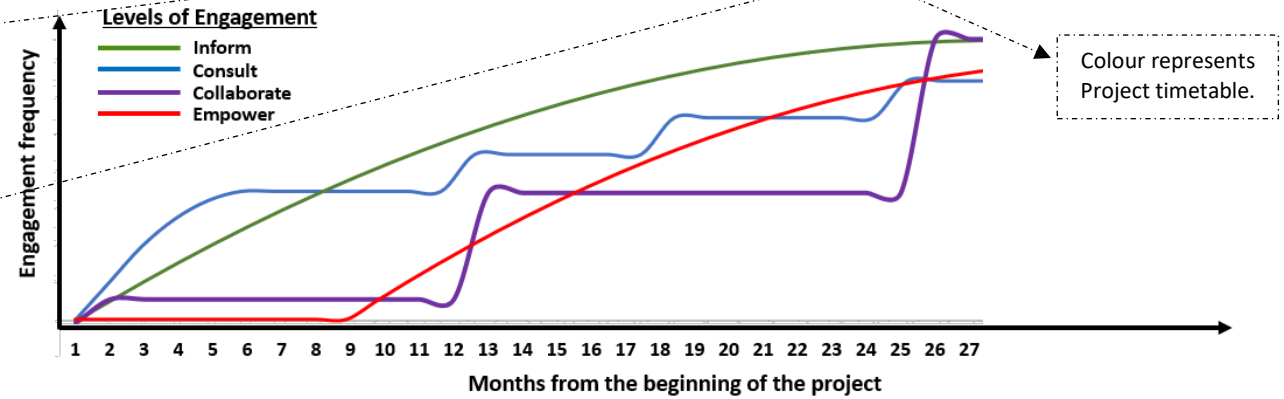
Figure 14 : A template for mapping monitored pollutant concentrations in the RHE-MEDiation project.

WP/ Task	Description of WP/Task	2023							2024												2025												2026				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
WP1	**RHE-Mediation Hub Ecosystem development**																																				
Task 1.1	Setting up of demo-sites network strategy.																																				
Task 1.2	Development collaborative actions with local stakeholders to design the demo-site evaluation																																				
Task 1.3	Up-scaling process of liaison with authorities and policy makers of the demo-sites member state from local to national levels																																				
WP3	**RHE-Mediation piloting: implementation and setting up**																																				
Task 3.1	Italian demo-site characterisation, procurement, and installation of technologies																																				
Task 3.2	Greece demo-site characterisation, procurement, and installation of technologies																																				
Task 3.3	Turkish demo-site characterisation, procurement, and installation of technologies																																				
WP4	**RHE-MEDiation piloting: validation, demonstration and data monitoring follow-up**																																				
Task 4.1	Italian demo-site testing, performance evaluation and endurance																																				
Task 4.2	Greece demo-site testing, performance evaluation and endurance																																				
Task 4.3	Turkish demo-site testing, performance evaluation and endurance																																				

Workshop 1
- Held at each demo-site.
- Introduce the project and model to local stakeholders.

Workshop 2
- Held at each demo-site.
- Inform stakeholders about tasks to be carried out in WP4.

Workshop 3
- Held at each demo-site.
- To report to stakeholders the results of the piloting activity in WP4.



Colour represents Project timetable.

Inform:
It is expected that most of the invitations to identified stakeholders will be sent in the first few months. Afterwards, mainly periodic communication and invitations to attend workshops will be sent.

Consult:
In general, the 1st first few months are when most of the surveys will be sent to stakeholders who join the RHE-MEDiation project. In addition, before and after workshops, consultations might be carried out with stakeholders. Also, whenever stakeholders' perspectives are needed, selected stakeholders may be consulted on as-needed basis.

Collaborate:
This is anticipated to have less frequency than consultation. Major co-design and co-implementation activities are expected during workshops, as can be seen in the figure; these are represented by sudden spikes. Also, whenever stakeholders' contribution is needed, selected stakeholders may be contacted for that purpose.

Empower:
A steady increase in engagement activities for citizen empowerment is anticipated in the project monitoring phase. Similarly, in the last months leading up to this phase, various engagement activities will be launched on the demo-site to create and organize focus groups and train citizen scientists. In the first few months after the start of the project, the focus will be to attract participants.

Figure 15 : Schematization for engagement frequency across Work Packages (see Table 3 for the detailed planning)

ANNEX B

Table 11 : Identified key-stakeholders in the Greek demo-site.

Target Group	High-Level stakeholder group		Key-stakeholders		
	No.	**Name**	**No.**	**Name**	**Description of tasks**
Capital	A, B	Water and Wastewater utilities	1	EYATH (Thessaloniki Water Supply Company)	water supply and sewerage services
			2	Municipal Water Supply and Sewerage of Alexandroupoli	water supply and sewerage services
			3	Municipal Water Supply and Sewerage of Thiva	water supply and sewerage services
			4	Municipal Water Supply and Sewerage of Chalkida	water supply and sewerage services
			5	Municipal Water Supply and Sewerage of Rhodos	water supply and sewerage services
			6	Municipal Water Supply and Sewerage of Komotini	water supply and sewerage services
			7	Municipal Water Supply and Sewerage of Syros	water supply and sewerage services
			8	Municipal Water Supply and Sewerage of Heraklion	water supply and sewerage services
			9	Municipal Water Supply and Sewerage of Larissa	water supply and sewerage services
			10	Municipal Water Supply and Sewerage of Chania	water supply and sewerage services
Businesses	E	Other businesses	1	Polyeco Ltd	Polyeco is the first and sole integrated and fully licensed waste management and valorization industry in Greece.

			2	Envireco ltd	Envireco SA, are combining science with implementation, matching knowledge with innovative solutions, merging experience with new eco-services that serve both private entities and public stakeholders.
Administration	A	Authorities	1	Hellenic Association of Municipal Water and Sewerage Utilities	1. representation of DEYAs, coordination of their activities and the promotion of their claims to the government, regarding issues of Water Supply and Sewerage 2. provision of information and support to DEYAs to improve their operation and consequently the services that they offer to their customers
			2	Ministry of Environment and Energy	"Special Secretariat for Water"
	B	Policy Makers	1	Prefecture of Attica	Coordination of the Region for taking preventive and repressive measures against the climate change and its consequences and the environmental protection always in cooperation with competent bodies of the government and the European Union
			2	Prefecture of Boeotia	Accelerating the development of the region by utilizing its available resources and promoting growth and progress.
Civic Society	A	Citizens	1	ECOELEFSIS	Tourism and outreach activities
	B	Civil society organizations	1	Mediterranean Action Plan of the United Nations Environment Programme (UNEP/MAP)	The UNEP/MAP–Barcelona Convention system is the comprehensive institutional, legal and implementation framework that the Contracting Parties have adopted for concerted action to fulfill the vision of a healthy Mediterranean Sea and Coast that underpin sustainable development in the region.
			2	Global Water Partnership-Mediterranean	The company aims to promote action and exchange knowledge on Integrated Water Resources Management (IWRM) with the aim to help Mediterranean countries to connect water resources planning and operations at different scales.

			3	Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE)	MIO-ECSDE act as a technical and political platform for the intervention of NGOs in the Euro-Mediterranean scene on resources and waste, nature, biodiversity, cultural diversity, climate change, health, and environment as well as on horizontal and cross-cutting issues.
Knowledge	A	Universities	1	National and Kapodistrian University of Athens (NKUA)	Teaching, research, community services
			2	National Technical University of Athens (NTUA)	Teaching, research, community services
	B	Research and development centres, including national and local laboratories	1	NCSR Demokritos	Teaching, research, community services
			2	INTERGEO Environmental technology ltd	Consulting services for quality management of waste and recycling-products
	C	Professional experts, consulting companies, Professional associations	1	Envirometrics LTD	Consulting services for environmental management

Table 12 : Identified key-stakeholders in the Italian demo-site.

Target Group	High-Level stakeholder group		Key-stakeholders		
	No.	**Name**	**No.**	**Name**	**Description of tasks**
Capital	A,B	Water and Wastewater utilities	1	Mar Piccolo Regional Nature Park	The Mar Piccolo regional natural park has a vocation for the protection of landscapes and biodiversity, for the reduction of pollution and waste of resources, for the improvement of the well-being of the local community, and these principles blend well with the project objectives.
	C	Public Investors	1	Port System Authority of the Ionian Sea	The Port System Authority of the Ionian Sea has always paid the utmost attention to environmental issues, trying to carry out all infrastructural interventions in full respect of the environment and they may be interested in the use of technologies for the improvement of environmental quality.
	D	Private Investors	1	Shipyards SGM s.r.l.	SGM srl being suppliers of cutting-edge shipbuilding technologies, they could be interested in the use of technologies for the improvement of environmental quality, structuring a network of action for the improvement of the environment in which they operate, helping to present itself as a company with low environmental impact.
	E	Financial opportunity developers	1	Mussel farmers associations	Resolution of the mussel marketing prohibition.
Administration	A	Authorities	1	Extraordinary commissioner for the urgent participations of reclamation, environmental requalification of Taranto	In 2012 with the legislative decree 129 of 2012, when the city of Taranto was recognized as an area in a situation of complex industrial crisis, the appointment of an extraordinary commissioner was decreed for urgent reclamation, environmental and redevelopment interventions for Taranto city.
	B	Policy Makers	1	Municipality of Taranto	Land management

Civic Society	A	Citizens	1	ECOELEFSIS	Tourism and outreach activities
	B	Civil society organizations	1	Jonian Dolphin	The purpose of the association is to preserve the well-being of the territory and they can be of support, with their involvement.
			2	Enjoy your dive	Tourism and outreach activities
			3	Legambiente	Tourism and outreach activities
			4	WWF APS of Taranto	The purpose of the association is to preserve the well-being of the territory and they can be of support, with their involvement.
Knowledge	A	Universities	1	Politecnico di Bari	Teaching, research, community services
			2	Università degli Studi di Bari	Teaching, research, community services
		Research and development centres, including national and local laboratories	1	Science and technology pole “Magna Grecia” of the Bari University	Science and technology pole "Magna Grecia" operates in the environmental sector and addresses the serious and serious problems affecting the city of Taranto. In particular, the Pole in collaboration with the CNR and the Polytechnic of Bari, it deals with studies and research on the degradation of the environmental matrices of the water, soil and air of the city of Taranto and its province which represent the essential priorities.

Table 13 : Identified key-stakeholders in the Turkish demo-site.

Target Group	High-Level stakeholder group		Key-stakeholders		
	ID.	Name	No.	Name	Description of tasks
Capital	A	Water utilities	1	Kocaeli Metropolitan Municipality	Kocaeli Metropolitan Municipality operates in a total of 11 service areas under the headings of urban, social and institutional transformation. These services include transportation, sustainable environment, urban planning, disaster management, health, urban and social order, culture and tourism, youth, sports and education, corporate governance, smart city services and social, rural and agricultural services.
			2	Yalova Municipality	Yalova Municipality provides services in transportation, environment, water, sewerage, infrastructure, health, culture, tourism, education, social services and many other areas.
			3	Istanbul Metropolitan Municipality	Istanbul Metropolitan Municipality is the local government responsible for the administration and services of Istanbul. The Municipality manages the city's infrastructure, landscaping, transportation, parks, social facilities, culture and arts activities, tourism activities, health services, education services, youth and sports services, urban transformation projects and many other services.
	B	Wastewater utilities	1	ISU	ISU provides water and sewerage services to all district and first level municipalities and all villages within Kocaeli provincial borders.
			2	YASKI	The duties of YASKİ are to act jointly in the operation of wastewater treatment plants and sewerage collector lines that the municipalities forming the union are responsible for, and to remove and treat wastewater effectively in line with the relevant legislation based on the environment and

					human health, to operate the related facilities and to carry out all kinds of services.
			3	ISKI	Istanbul General Directorate of Water and Sewerage Services Utility provides water and sewerage services in Istanbul. ISKI performs many tasks such as protecting water resources in Istanbul, operating water treatment plants, ensuring water distribution, managing sewage systems, treating wastewater, managing stormwater drainage and taking measures against floods.
	C	Public Investors	1	General Directorate of State Hydraulic Works (DSİ)	The General Directorate of State Hydraulic Works is a special budgeted investor organization subject to the Central Government Budget, responsible for the planning, management, development and operation of all water resources in Türkiye.
			2	East Marmara Development Agency (MARKA)	MARKA prepares regional development strategies by providing cooperation and coordination between the public sector, private sector and non-governmental organizations in the provinces of Kocaeli, Sakarya, Bolu, Düzce, Yalova, for which it is responsible, and accelerates the development of the region by using the resources and potentials of the region in place and effectively.
			3	İstanbul Development Agency (ISTKA)	Accelerate regional development in line with the principles and policies envisaged in the national development plan and programs, ensure sustainability, by improving the cooperation between the public sector, private sector and non-governmental organizations, ensuring the appropriate and effective use of resources, and activating local potential in İstanbul.
			4	İLBANK Incorporated (İLBANK)	İLBANK meets the financing needs of Special Provincial Administrations and Municipalities. It acts as an intermediary in all kinds of resource transfers of the central government to

					local administrations. It fulfills all kinds of development and investment banking functions.
			5	Presidency of Strategy and Budget (SBB)	The Directorate of Strategy and Budget is in charge of managing the resource allocation process, such as the preparation and implementation of the central government budget on behalf of the President of Türkiye.
			6	UNDP-Turkey	UNDP works in nearly 170 countries and territories, helping to eradicate poverty, reduce inequalities and exclusion, and build resilience so that countries can sustain progress. As the UN's development agency, UNDP plays a critical role in helping countries achieve the Sustainable Development Goals.
	D	Private Investors	1	Organized Industrial Areas	Organized Industrial Zones contribute to the development of the industrial sector in Turkey, creating efficient and sustainable industrial areas.
			2	Kuzu Grup	Kuzu Group is a pioneer in environmental technologies, building and operating wastewater treatment plants. The Group participates in internationally financed environmental projects in Turkey and abroad. Kuzu Group is primarily active in the residential sector and has realized many luxurious and modern residential projects in major cities such as Istanbul and Ankara.
			3	Remondis	The REMONDIS Group operates in many fields of business: it recovers raw materials from waste, develops innovative recycled products, offers alternative fuels and plays an important role in the water management sector supplying water and treating wastewater.
Businesses	A	3rd party contractors that may be involved in the project	1	TÜPRAŞ	TÜPRAŞ provides services in petroleum refining and energy production. TÜPRAŞ is currently using some portion of treated municipal ww.

			2	HABAS	HABAŞ is a group of industrial enterprises engaged in the production of industrial and medical gases, steel, electrical energy, heavy machinery, cylinders and cryogenic tanks, as well as the distribution of liquefied natural gas (LNG), compressed natural gas (CNG) and liquefied petroleum gas (LPG), and the provision of port and maritime transportation services. HABAŞ is currently using some portion of treated municipal ww.
			3	Kroman Çelik	Kroman Celik Sanayii A.S. manufactures and trades iron and steel products. Kroman Celik Sanayii A.S. is currently using some portion of treated municipal ww.
	E	Other businesses	1	MASS	MASS Treatment provides services in the fields of design and installation of wastewater and drinking water treatment plants, provision of package and custom designed plants and equipment for industrial, commercial and domestic uses, production of equipment for water and wastewater treatment plants, waste management consultancy, hazardous waste transportation, wastewater treatment and waste disposal.
			2	ASM	A.S.M. Treatment Systems is among the companies that produce solutions to environmental problems. In this context, it operates in areas including turnkey projects, design, construction, mechanical equipment production, electrical manufacturing and automation branches.
			3	ARBİOGAZ	ARBİOGAZ works in the environmental technologies sector and provides turnkey plant solutions to public and private sector customers in the fields of domestic and industrial wastewater treatment, wastewater recycling, drinking water treatment and desalination, sludge drying and solid waste

					processing, odour removal and renewable energy generation using biogas.
Administration	A	Authorities	1	Kocaeli Governorate	Kocaeli Governorship provides various services to ensure the welfare and safety of citizens living in Kocaeli.
			2	Yalova Governorate	Yalova Governorship provides various services to ensure the welfare and safety of citizens living in Yalova.
			3	Istanbul Governorate	The Governorship of Istanbul provides various services to ensure the welfare and safety of citizens living in Istanbul.
	B	Policy Makers	1	Ministry of Environment, Urbanization and Climate Change	The Ministry of Environment, Urbanization and Climate Change regulates and supervises all services related to planning, transformation, safe construction, real estate management, housing sector and environment.
			2	Ministry of Agriculture and Forestry	The mission of the Ministry of Agriculture and Forestry is to mobilize Turkey's ecological resources in an effective, efficient and sustainable manner.
			3	Ministries' Province Departments	Ministries' Province Departments operate in different provinces of Turkey under a ministry and are tasked with implementing and coordinating the policies and objectives of the ministry at the local level.
			4	Turkish Water Institute (SUEN)	SUEN was established to develop national water policies, provide consultation to decision makers, coordinate between organizations & institutions and enhance scientific research and strategic ideas with a focus on creating a common platform for water management.
Civic Society	A	Citizens	1	Kocaeli City Council	It is to create awareness of urbanity, to develop sensitivity by considering future generations, to increase belonging to the city, to protect the rights and laws of the city, to prioritize active public participation and the functionality of local governments.

	B	Civil society organizations	1	Deniz Temiz (TURMEPA)	Turkish Marine Environment Protection Association (TURMEPA) is active in protecting the sea on national and international platforms. In this context, it provides various trainings to raise marine awareness and organizes projects and campaigns to reduce and prevent marine pollution. In addition, it raises public awareness by encouraging the fight against pollution.
			2	Deniz Yaşamını Koruma Derneği	The Association for the Protection of Marine Life (Deniz Yaşamını Koruma Derneği) is a non-governmental organization operating in the fields of transplantation and conservation of corals endemic from the Marmara Sea to the Mediterranean Sea, cleaning ghost nets from the seabed, biodiversity monitoring, protection of species and habitats, protection of underwater culture and heritage, art, and sustainable design.
			3	Su Ürünleri Derneği	The Aquaculture Association (Su Ürünleri Derneği) provides services in the fields of revealing the current situation of the aquaculture sector, reflecting the modern technological developments all over the world to the sector, and developing solutions to the problems of the sector. In addition, it establishes communication by ensuring coordination between all stakeholders in the sector and ensures that they work in cooperation.
			4	Doğa Koruma Merkezi (DKM)	Nature Conservation Center (Doğa Koruma Merkezi) is a non-governmental organization active in the field of nature conservation since 2004. The organization works on the effective conservation of biodiversity and sustainable management of natural resources with the support of national and international partners.
			5	Yeşil Adımlar Çevre Eğitim Derneği	Green Steps Environmental Education Association (Yeşil Adımlar Çevre Eğitim Derneği) provides all segments of

					society with the knowledge to live without disrupting the integrity of natural systems, raises awareness and stimulates public action against threats to the balance of the whole.
			6	Doğa Derneği	Doga is a non-governmental organization that carries out various activities for the protection of birds, biodiversity, important nature areas, ecosystems, and nature culture. These activities include nature conservation and restoration projects, education and awareness programs, campaigns and lobbies, scientific research, reports, and volunteering programs.
			7	Worldwide Fund for Nature (WWF-TR)	WWF-Turkey (World Wildlife Fund) works for a future where humanity lives in harmony with nature. To this end, WWF-Turkey carries out its activities under six main headings: Wildlife, Freshwater, Seas, Food, Climate and Energy and Forests in order to protect Turkey's biological diversity, promote the reduction of pollution and overconsumption, and ensure the sustainability of natural resources. It cooperates with public, private sector and non-governmental organizations in these areas in order to transfer Turkey's natural wealth to future generations.
			8	Su Vakfı	The Water Foundation (Su Vakfı) and their partners advance lasting solutions to secure safe water for people, restore and sustain freshwater ecosystems, and build climate resilience. As a public foundation, they do this through direct grant making, field building, and campaign strategy development.
			9	IPC-Istanbul Policy Center	Istanbul Policy Center (IPC) is a global policy research institution that specializes in key social and political issues ranging from democratization to climate change, transatlantic relations to conflict resolution and mediation.
			10	REGIONAL ENVIRONMENTAL CENTER (REC-Turkey)	The Resource, Environment and Climate Association (REC) aims to strengthen Turkey's legal, institutional, technical and

					investment capacity in the field of environment, thereby supporting the protection of Turkey's environment and works to strengthen cooperation, information sharing and joint decision-making processes among public administration, non-governmental organizations, private sector, and all other stakeholders by using different financial resources for this purpose.
			11	Kocaeli Chamber of Industry	Besides the services demanded by law such as, but not limited to national and international projects, training events and consultancies, trade fairs, exhibitions, associates, match making programs etc, the Kocaeli Chamber of Industry also develops and supports many social and cultural activities.
			12	Marmara Municipalities Union	Marmara Municipalities Union (MMU) is the first and the largest regional Local Government Association in Türkiye with 188 members from the Marmara Region which is the center of scientific, cultural, and high-value-added activities as well as of commerce, finance and industry.
			13	Central Union of Fisheries Cooperatives	The Central Union of Fisheries Cooperatives protects the common interests of fisheries cooperatives in fishing, production, processing and marketing of fisheries products, coordinates the activities of unions and cooperatives, provides representation and cooperation in national and international platforms, organizes and develops unions and cooperatives relations, supervises unions and cooperatives, carries out training and education activities of unions and cooperatives and develops cooperatives.
			14	Chamber of Environmental Engineers	Chamber of Environmental Engineers is active in the field of environmental engineering. The services provided by the Chamber include environmental consultancy, environmental studies, environmental management, waste management, water management, air pollution control, noise control,

					environmental permits, environmental education. In addition, the duties of the chamber include supporting the professional development of members, protecting professional ethical rules, ensuring solidarity among colleagues and informing the public on environmental issues.
			15	The Union of Municipalities of Türkiye (TBB)	The Union of Municipalities of Türkiye (UMT) was established in 1945 as a public benefit association to operate in the field of municipalism and continued its activities in municipalism as an association for 57 years in order to protect the rights and interests of municipalities under the umbrella of the association.
			16	Greenpeace-TR	Greenpeace is an independent campaigning organization that uses nonviolent and creative solutions to expose global environmental problems and provide solutions for a green and peaceful future. By taking peaceful action against systems that threaten the environment, Greenpeace contributes to the goal of a greener and more liveable world.
Knowledge	A	Universities	1	Kocaeli University	Kocaeli University makes significant contributions to regional and cultural developments by conducting education and R&D studies in all fields of education, architecture, engineering, arts, social, sports, medicine and basic sciences.
			2	Gebze Technical University	The mission of Gebze Technical University is to continue its existence as a university that is committed to scientific, ethical and social values, providing quality education and training for the benefit of society, industry and the region, conducting scientific research, and producing applied solutions for the problems of society and industry by using its faculty members of high education and research quality, well-equipped laboratories and research centers, and its location in the center of Turkey's industry.

			3	Yalova University	Yalova University raises entrepreneurial individuals who have scientific and technological equipment, adhere to ethical values and contribute to social development while prioritizing quality in teaching, education, research and social activities.
	B	Research and development centres, including national and local laboratories	1	Turkish Marine Research Foundation	Turkish Marine Research Foundation carries out studies on current issues such as marine conservation, sustainable fisheries, marine biodiversity, marine protected areas and maritime law. The foundation, which also carries out important work in the field of education, organizes educational activities on marine conservation through summer schools and seminars.