



## **JERICO-DS DELIVERABLE**

Joint European Research Infrastructure of Coastal Observatories - Design Study

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## EXECUTIVE SUMMARY

Deliverable D1.3 represents the main outcome of WP1 of the JERICO-DS project whose general objective is the establishment of the long-term scientific plan. Important paths in this direction have been paved already in both Deliverables D1.1 and D1.2, namely by: i) identifying common societal needs based on their priority and implementation levels at the national scale; ii) formulating preliminary suggestions to consider the national scale in the JERICO strategy; iii) monitoring the national strategic long-term RI plans and considering the scientific synergies with other marine and environmental RIs at the national scale.

Deliverable D1.3 contributes to the WP1 general objective goal by:

1. completing and presenting the analysis of the geographical distribution of the implementation levels recognized by the National Representatives for each national societal need;
2. revising and proposing new versions for the JERICO Mission, Vision and Values statements;
3. solving the slight misalignment between the scientific frameworks of the two JERICO-S3 and JERICO-DS projects.

The analysis of the geographical distribution of the implementation levels shows that regional patterns for the implementation levels are most evident for needs associated with the Biodiversity and Eutrophication Topics and the Coastal Forecasting Theme. Regionality does not seem to affect much the needs related to the emergent Topic Coastal Carbon and the Ecosystem approach Theme. The evidence for regional patterns suggests that the national “perspective” is actually tightly linked with the regional “perspective”. In this respect, the regional implementation approach of JERICO-S3 seems to also work towards the direction indicated at the national level and may thus constitute the point of contact between the two levels for the bidirectional approach. As a result, PSSs and IRSs may serve as proofs of concept not only for regional integration, but also for addressing national needs.

The refinement of JERICO Mission, Vision and Values statements follows the indications obtained by the Bicocca University of Milan Course. It is suggested to disregard the Scope statement and the following new Mission, Vision and Values statements are proposed:

- Mission statement: *“The JERICO mission is to enable a sound understanding of the responses of coastal marine systems to natural and anthropogenic stressors. To do so, JERICO adopts a systematic approach to monitor, observe, explore and analyse coastal marine systems in order to reach reliable information of their structuration and functioning in the context of global change. JERICO encompasses the whole range of environmental sciences, technologies and data sciences. It achieves observations at global, regional and local scales, through the implementation and the harmonization of a set of complementary platforms and multidisciplinary observation systems. JERICO enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.”*

- Vision statement: *“JERICO will be the panEuropean integrated gateway to long-term scientific and harmonized observations and related services for coastal marine systems.”*
- Values:
  - *“JERICO cares about the marine environment*
  - *JERICO declines scientific excellence through a regional approach*
  - *JERICO implements multiplatform and multidisciplinary observation systems*
  - *JERICO seeks for collaboration and co-creation*
  - *JERICO removes barriers.”*

The solution of the slight misalignment between the two JERICO-S3 and JERICO-DS projects is based on arguments of simplicity and practicality in consideration that i) the JERICO implementation strategy is based on the regional JERICO-S3 approach; ii) national considerations show evidence for regional patterns; iii) the JERICO-S3 project lasts longer, is larger and more representative of the entire JERICO community. The semantics and general scientific framework structured and refined in the JERICO-S3 project are thus proposed as the official ones for the JERICO-RI also for the incoming new ESFRI application.

## 1. Introduction

### Scope and purpose of the deliverable

The general objective of the JERICO-DS WP1 is the establishment of the long-term scientific plan, including a description of socio-economic impacts at the national, European and global levels.

Important paths in this direction have been paved already in both Deliverables D1.1 and D1.2, namely by: i) identifying common societal needs based on their priority and implementation levels at the national scale; ii) formulating preliminary suggestions to consider the national scale in the JERICO strategy; iii) monitoring the national strategic long-term RI plans and considering the scientific synergies with other marine and environmental RIs at the national scale.

Deliverable D1.1 has already identified the common societal needs based on the WP1 survey taken by the National Representatives (NRs). These include non-indigenous species, aquaculture, climate change, localised measures/protection from marine litter, riverine inputs, impact/effects of storms and floods. Deliverable D1.1 has also provided an important review of the evolution of the JERICO scientific strategy along the different JERICO projects, starting with the two finished European projects JERICO-FP7 and JERICO-NEXT, and continuing with the on-going JERICO-S3 project (Grémare et al. 2021), without neglecting the effort put forth for the ESFRI application submitted in September 2020 (Puillat et al. 2020).

Deliverable D1.2 has already described the landscape of environmental Research Infrastructures at European scale and two national examples (France and Italy) of structuring interactions between national nodes of European marine research infrastructures.

Deliverable D1.3 main objective is to take additional steps forward for the JERICO-RI long-term scientific plan by addressing some of the unresolved issues related to its scientific strategy. To identify these issues, several meetings have been undertaken since the start of JERICO-DS project in the general WP1 framework. Noteworthy is the WP1 session during the General Assembly held in Delft in November 2022 where NRs, together with all other persons involved in the project and attending the General Assembly meeting, indicated three different sources for these issues, namely the recommendations from the ESFRI proposal review, the discussions from the JERICO-S3 and JERICO-DS WP1 joint efforts to comply with the two projects' DoAs and the suggestions from the JERICO-RI Strategic Development Programme Course held by the Bicocca University of Milan (see also Milestone MS1.3).

Deliverable D1.3 contribution to the WP1 general objective is then two-fold. On one hand, as announced in Deliverable D1.1, it completes and presents the analysis and the geographic distributions of the implementation levels resulting from the WP1 survey taken by the NRs. On the other hand, it tackles the following issues identified during the General Assembly held in Delft:

- refinement of Mission, Vision and Values;
- misalignment between Specific Scientific Challenges (SSCs) from J-S3, Topics and Themes from J-DS.

## **2. Potential regional pattern in the WP1 survey results**

As indicated in Deliverable D1.1, WP1 leaders and co-leaders put forth a WP1 survey to collect national scientific inputs, implementation levels, priorities and societal needs. The survey was constructed in order to get standardized and uniform feedback directly from the NRs. Deliverable D1.1 has already presented important results from the survey which indicated that nations shared different high-priority needs. These include non-indigenous species, aquaculture, climate change, localised measures/protection from marine litter, riverine inputs, impact/effects of storms and floods which were indicated at least by 13 out of 14 nations. The analysis carried out in Deliverable D1.1 has focused however mainly on the cumulative priority levels and their possible regional patterns. In this Deliverable D1.3, instead, the analysis and the geographic distributions of the implementation levels for the national societal needs are presented.

The cumulative implementation levels for the societal needs identified for the different Topics and Themes have been reported in Deliverable D1.1. The option "needs more implementation" is generally the most frequent for almost all societal needs, also including those related to MSFD descriptors and support. The only few exceptions are related to oil spill dynamics and oil spill forecast. Indeed, as also indicated in Deliverable D1.1, the most checked "High-priority" needs also "need more implementation", namely:

- Topic Biodiversity: a) biological indicators; b) MSFD support and c) non-indigenous species for at least 6 nations;
- Topic Hydrography and Transport: a) climate change and b) aquaculture for at least 9 nations;
- Topic Eutrophication: a) impacts on biodiversity and b) MSFD support for at least 6 nations;
- Topic Chemical contaminants and litter: a) localised measures for protection for 10 nations;
- Topic Land/Ocean continuum: a) riverine input for 12 nations;
- Topic Coastal Carbon: with all items that need more implementation for at least 9 nations;
- Theme Ecosystem approach: a) the support to national coordination for 11 nations;
- Theme Coastal forecasting: a) effects of climate change for 9 nations;
- Theme Impact of extreme events: a) impacts/effects of storm and floods for 5 nations.

The different panels of Figure A1 of this Deliverable D1.3 (see annexes) show the geographic distributions of the implementation levels for the societal needs for the different Topics/Themes. While in Deliverable D1.1 no regional patterns were evident in the geographic distributions of the priority levels (apart from trivialities like sea-ice forecast for high-latitude countries), the geographic distributions of the implementation levels show instead the effects of regionality. For the Topic Biodiversity some societal needs show different levels of implementation based on the regions. For example, for the case of the biological indicators (panel a of Figure A1) all NRs from the Scandinavian countries checked the option "already implemented but needs more implementation" (orange color in the panels) while almost all other nations checked the option "needs more implementation" (red color). The same trend can be observed in the same Topic for the national inventory, the



national legislation support and in the MSFD support. The latter is not relevant and not indicated by the Norwegian NR as MSFD does not apply in Norway. The importance of regionality is evident for almost all needs related to the Topic Eutrophication (panel c of Figure A1) and the Coastal Forecasting Theme (panel h of Figure A1), while it does not seem to affect much the emergent Topic Coastal Carbon and the Ecosystem approach Theme (panels f and g of Figure A1, respectively).

Summarizing, the geographic analysis provides some evidences for regional patterns for the implementation levels for the following societal needs:

- Topic Biodiversity: a) biological indicators; b) national inventory; c) MSFD support and d) national legislation support;
- Topic Hydrography and Transport: a) oil spill; b) navigation; c) fishery management and d) multinational networking;
- Topic Eutrophication: a) impacts on biodiversity; b) impacts on fisheries; c) impacts on tourism; d) MSFD support and e) national legislation support;
- Topic Chemical contaminants and litter: a) MSFD support; b) national and c) international legislation support;
- Topic Land/Ocean continuum: a) riverine input and b) fishery management;
- Topic Coastal Carbon: a) CO<sub>2</sub> sequestration;
- Theme Ecosystem approach: no evidence of regional patterns;
- Theme Coastal forecasting: a) marine offshore industry; b) oil spill spreading; c) sea-ice; d) port management; e) single MPA and f) MPA network management;
- Theme Impact of extreme events: a) navigation safety and b) impacts/effects of storm and floods.

Such strong evidence for regional patterns suggests that the national “perspective” (main focus of JERICO-DS) is actually tightly linked with the regional “perspective” (main focus of JERICO-S3) at least for the implementation strategy. It reinforces the idea of "structuring observation at the regional level" for the implementation of a network of regional observing systems (Grémare et al. 2021). In this respect, the JERICO-S3 scientific strategy, which is mainly constituted at the regional level by the implementation of Pilot Super Sites (PSSs) and Integrated Regional Sites (IRSSs), seems to also work towards the direction indicated at the national level and may thus constitute the point of contact between the two levels for the bidirectional approach, i.e. the continuous exchange and update of scientific strategies and needs, from the regional to the national scale and vice versa. As a result, PSSs and IRSSs may serve as proofs of concept not only for regional integration, but also at the national level as they provide sound inputs for the design of the future JERICO-RI addressing also national societal needs.

### **3. Refinement of Mission, Vision and Values**

As already underlined in the Milestone MS1.1, Vision and Mission are living statements which are going to be further elaborated within the lifetime of the JERICO-RI considering both the national interaction (JERICO-DS) and the regional inputs (JERICO-S3).

The JERICO-RI Strategic Development Programme Course held by the Bicocca University of Milan during the JERICO-DS project has provided important steps in this further elaboration underlining the link between strategy and organizational aspirations (see Table



1). The Mission is mainly related to the present time and to the current existence of the organization while the Vision concerns with the time ahead and with the ambition/will of shaping a better future and being an important part of it. The Values instead are based on the beliefs and principles that drive and motivate an organization. The different sessions of the Bicocca University of Milan Course have represented a nice occasion for all JERICO-DS partners and NRs to discuss and elaborate more on these forms of aspiration. Noteworthy is the Assignment for Day n.2 of the course where Bicocca trainers asked JERICO partners to create a mind map of the RI core values as single individuals or gathered in small teams. In the following paragraphs results of these discussions are drawn and refinements for each form of aspiration proposed.

<i>Form of Aspiration</i>	<i>Aspiration defining question</i>
Mission	Why do we exist?
Vision	What future do we want to create?
Values	What is important to us?

Table 1: Questions addressed by the different forms of aspirations according to the JERICO-RI Strategic Development Programme Course held by the Bicocca University of Milan.

### Mission statement

The following quote by Peter Drucker has been the base of the discussion for the Mission statement during the Bicocca University of Milan Course:

*"A business is not defined by its name, statutes, or articles of incorporation. It is defined by the business mission. Only a clear definition of the mission and purpose for the organization makes possible clear and realistic business objectives"*

A good Mission statement is thus a fundamental step for the definition of the strategy of a RI. The course has also clarified some characteristics of the Mission, namely:

- it is usually a set of goals that include both the purpose of the organization, its scope of operations, and the basis of its competitive advantage;
- it communicates the organization's reason for being, and how it aims to serve its key stakeholders;
- it may integrate a summation of the organization's values;
- it tends to be longer than the vision statement.

The current JERICO-RI Mission statement was presented, validated and agreed upon by the JERICO partners during the JERICO-DS kick-off meeting held in November 2020 (see Milestone MS1.1). The statement has been elaborated and established starting from JERICO-S3, through a series of several Nation Meetings for the preparation of the JERICO-DS project. It is exactly the one reported in the ESFRI application submitted in September 2020 (Puillat et al. 2020). The statement is made up of two paragraphs. A first

paragraph identifies the gap in the ESFRI landscape and links the existence of JERICO as a research infrastructure dedicated to the coastal marine environment. A second bulleted paragraph explicitly states the JERICO contributions. The current official JERICO-RI Mission statement reads as follows:

*“JERICO-RI is an integrated pan-European multidisciplinary and multiplatform research infrastructure dedicated to a holistic appraisal of coastal marine system changes. It is seamlessly bridging existing continental, atmospheric and open ocean RIs, thus filling a key gap in the ESFRI landscape. JERICO-RI establishes the framework upon which coastal marine systems are observed, analysed, understood and forecasted. JERICO-RI enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.*

- *JERICO-RI contributes to a better understanding of the functioning of coastal marine systems and thus to a better assessment of their changes caused by the combined effects of natural and anthropogenic changes*
- *By doing so it contributes to an efficient management of major ecosystem services and environmental risks, leading to an improved knowledge framework for sustainable development in coastal areas and the emergence of a dynamic coastal blue economy.”*

It is important to note that the JERICO-RI Mission statement has always been preceded by a shorter Purpose statement that has also been reported in the ESFRI application and agreed upon by the JERICO partners during the same JERICO-DS kick-off meeting. The current official JERICO-RI Purpose statement reads as follows:

*“The main purpose of JERICO-RI is to enable a sound understanding of the responses of coastal marine systems to natural and anthropogenic stressors. To do so, JERICO-RI adopts a systematic approach to monitor, observe, explore and analyse coastal marine systems in order to reach reliable information of their structuration and functioning in the context of global change. JERICO-RI encompasses the whole range of environmental sciences, technologies and data sciences. It achieves observations at global, regional and local scales, through the implementation of a set of complementary platforms and multidisciplinary observation systems.”*

Bicocca trainers provided some important criticisms to the JERICO Mission and Purpose statements, namely:

- JERICO Mission and Purpose statements seem to be redundant and express the same concepts and contents. In other words, the Purpose statement is almost totally overlapping with the Mission one;
- JERICO Purpose statement is more synthetic than the Mission statement;
- JERICO Purpose statement seems to be somehow more effective both in terms of communicating what is JERICO and why JERICO exists than the Mission statement;
- Contrarily to Mission statements, Purpose statements are usually never considered as elements and/or forms of aspiration. The three pillars to shape strategy are usually Vision, Mission and Values and do not include Purpose;

- Consider adding the harmonization concept in the Mission statement;
- The current JERICO Mission statement is very long. Indeed, in the proposal submitted through the ESFRI Monitoring System (ESFRI MOS), the bulleted paragraph was cut off and neglected maybe for a lack of space. It must be also noted that the same bulleted paragraph does not appear in the current official JERICO website (see Figure 1);

In general, Biccocca trainers felt that the current JERICO Mission statement may be fine but some polishing is still needed to address the above criticisms.

## Purpose

The main purpose of JERICO-RI is to enable a sound understanding of the responses of coastal marine systems to natural and anthropogenic stressors. To do so, JERICO-RI adopts a systematic approach to monitor, observe, explore and analyse coastal marine systems in order to reach reliable information of their structure and functioning in the context of global change. JERICO-RI encompasses the whole range of environmental sciences, technologies, and data sciences. It achieves observations at global, regional and local scales, through the implementation of a set of complementary platforms and multidisciplinary observation systems.



## Mission

JERICO-RI is an integrated pan-European multidisciplinary and multiplatform research infrastructure dedicated to a holistic appraisal of coastal marine system changes. It is seamlessly bridging existing continental, atmospheric and open ocean RIs, thus filling a key gap in European marine observations. JERICO-RI establishes a framework upon which coastal marine systems are observed, analysed, understood, and forecasted. JERICO-RI enables open access to state-of-the-art and innovative facilities, resources, FAIR data, and fit-for-purpose services, fostering international science collaboration.

Figure 1: Purpose and Mission statements as reported in the JERICO official website (<https://www.jerico-ri.eu>) at least until September 8, 2023. The Mission statement is different from the one reported in the ESFRI application as it does not include the bulleted paragraph.

In this Deliverable D1.3 the following different propositions are made in order to start the refinement process for the Mission:

- have only a Mission Statement and not a redundant Purpose statement as the latter is not considered in the strategic development of a RI;
- neglect the bulleted paragraph as it is not considered even in the JERICO webpage;
- base the refined Mission statement on the Purpose statement as it is equivalent, it expresses the same content, it is shorter and more concise, and it is more effective in communicating the reason behind the current existence of JERICO;
- substitute the word JERICO-RI with the simpler and more effective brand word JERICO;
- start the new statement simply with "the JERICO mission is..."
- underline the role of harmonization in the JERICO mission;

- keep the essential sentence related to FAIRness in the old Mission also in the new statement.

Summarizing, the following new Mission statement is here proposed (no Purpose statement anymore):

***“The JERICO mission is to enable a sound understanding of the responses of coastal marine systems to natural and anthropogenic stressors. To do so, JERICO adopts a systematic approach to monitor, observe, explore and analyse coastal marine systems in order to reach reliable information of their structuration and functioning in the context of global change. JERICO encompasses the whole range of environmental sciences, technologies and data sciences. It achieves observations at global, regional and local scales, through the implementation and the harmonization of a set of complementary platforms and multidisciplinary observation systems. JERICO enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.”***

### Vision statement

The Bicocca course has also clarified some characteristics for the Vision, namely:

- It is a goal that is massively inspiring, overarching, and long-term;
- It represents a destination that is driven by and evokes passion;
- It is a future-oriented declaration of the organization's purpose and aspirations;
- It addresses what an organization wants to become;
- it tends to be relatively brief.

As for the Mission, the current JERICO-RI Vision statement was also presented, validated and agreed upon by the JERICO partners during the JERICO-DS kick-off meeting held in November 2020 (see Milestone MS1.1). Once again it is exactly the one reported in the ESFRI application submitted in September 2020 (Puillat et al. 2020). The current official JERICO-RI Vision statement reads as follows:

*“By 2030, the JERICO-RI will be the European gateway to long-term scientific observations and related services for European coastal marine systems at the convergence between the land, open ocean and atmosphere; empowering European research excellence and expertise for the benefit of society.”*

The discussion during the Bicocca University of Milan Course among trainers and JERICO partners has raised the following important concerns related to the current Vision statement:

- The "at the convergence between the land, open ocean and atmosphere" sentence is not enough clear while attempting to express the JERICO collaborative value of cooperating and interacting with other environmental RIs;
- Integration should be highlighted in the statement;
- Harmonization should be highlighted also in the vision mainly related to the scientific part and not much related with the services;

- The reference to 2030 seems outdated with respect to the next ESFRI application deadline;
- The word panEuropean should appear instead of European as in the Mission.

In this Deliverable D1.3 the following different propositions are made in order to start the refinement process for the Vision statement:

- shorten the statement. As someone once put it, Vision statements should fit on a t-shirt;
- remove the unclear "at the convergence between the land, open ocean and atmosphere" sentence;
- remove the 2030 time reference and rely on the long-term adjective as new reference;
- substitute the word JERICO-RI with the simpler and more effective brand word JERICO;
- use panEuropean instead of European and use it only once;
- underline the role of harmonization and integration in the statement.

Summarizing, the following new and shorter Vision statement is here proposed:

***“JERICO will be the panEuropean integrated gateway to long-term scientific and harmonized observations and related services for coastal marine systems.”***

### Values

JERICO Values have not been considered in the Milestone MS1.1 as its focus was limited to Vision and Mission statements. Indeed, contrary to the Mission and Vision, JERICO Values have not been so recognized and shared by the community due to the lack of dedicated sessions/tasks in the previous different meetings and projects. At the moment, no Values are reported in the official JERICO website. The very first version of the JERICO Values has been elaborated by a dedicated task team for the ESFRI application submitted in September 2020 (Puillat et al. 2020). In this direction, the Bicocca Course represented the very first occasion for a proper discussion and for a collection of several propositions of the RI core values. The official JERICO-RI Values reported in the ESFRI application sum up to nine and are:

1. *“Scientific Excellence: Scientifically sound multidisciplinary observations of physical, chemical and biological parameters, and in the innovation in key areas of biogeochemical observing technologies, are needed to meet the complex scientific challenges in the coastal seas.*
2. *Harmonization: Reliability, compatibility and reusability of the pan-European coastal observation data may be obtained only through a strong joint effort at EU level to harmonise observations, from the sensors to the data analysis.*
3. *Co-creation: Synergy and collaboration enhance efficiency and power of the coastal community.*



4. Collaboration: *Effective collaboration with all environmental RIs is important to take a holistic approach to the ocean environment, from the coastline to the open sea, as a global ecosystem.*
5. Openness: *Provision of FAIR data and free access to systems are the measures of RI effectiveness.*
6. Prospectivity: *Clear foresight and an understanding of the need for changes are needed to keep the RI at the state of the art.*
7. User-driven: *RIs need to be service-oriented to support stakeholders and users.*
8. Equality of opportunities: *RIs are for everyone.*
9. Common future: *Our joint marine environment must be protected, and coastal RIs have a big role to play."*

The discussion during the Bicocca University of Milan Course has started from the Values declared above. Bicocca trainers have asked JERICO partners to create mind maps of the RI core values as single individuals or gathered in small teams. The different mind maps have been then discussed in a plenary meeting raising the following comments:

- Values are fundamental as they describe the common ground of the JERICO community that is very diverse. They are linked to Mission and Vision;
- Value prioritization in a first important key process as it recognizes that some values are more important than others even for a very diverse community. Prioritization also recognizes which values are specific to JERICO in terms of better motivating its community;
- Value aggregation/grouping is a second important key process as it recognizes that some values are neighbouring and that they belong to the same group of values. Sometimes a word for a value is really describing another value which is close in the group. The aggregation process is evident when constructing mind maps;
- Values cost something at least as a commitment or as an effort for their implementation. As Patrick Lencioni put it in an article in Harvard Business Review: "If you're not willing to accept the pain real values incur, do not bother going to the trouble of formulating a values statement."
- It is not sure whether or not long-term sustainability of the observations is a JERICO value. Could it be more a mean than a value? Does this hide a fear, a threat of not being successful? The concept of time, of this long-lasting duration of the observations is very important and indeed enters the vision more than being elaborated for a value.
- It is not sure whether or not harmonization is a JERICO value. It is important for the JERICO community but it could be more part of the vision than a value as it is a characteristic of the future that the JERICO community wants to shape.
- The original "Equality of opportunities" value should be rephrased. If the link with the social relevance is clear, what is equality for the people working inside JERICO remains unclear. It is also unclear what is equality in terms of accessibility for the stakeholders involved in the JERICO-RI.
- FAIR is a very important concept and can be for sure a value. It is common to all RIs however and not specific to JERICO.
- Offering services is not a value, rather a value justifies the reason an organization may offer services. For example, protection of forests is the value that justifies a service dedicated to the forecast and prevention of wildfires.

- The original "Common future" value should be rephrased. It seems to express the JERICO value of protecting the marine environment by contributing with a better understanding of the dynamics related to the coastal environment. This understanding must be scientifically-driven and based on collaborations with other scientists and RIs.
- Three main pillars seem to emerge from the different mind maps and from the discussion afterwards: a first pillar is related to Scientific excellence; a second pillar is related to collaboration/co-creation and may include the FAIR value which, even if it is common to all RIs, could go inside collaboration through accessibility; a third pillar is related to the marine protection.
- The different mind maps also underline the need to update/rephrase/revise the official JERICO values and share them with the whole JERICO community for acceptance.

In this Deliverable D1.3 the following different propositions are made in order to start the refinement process for the JERICO values:

- get fewer values to also ease their communication;
- keep JERICO values unique;
- use some concepts on the regional approach and expressed in the Key Scientific Challenges;
- better express the JERICO multiplatform and multidisciplinary approach in the strive for scientific excellence;
- better express the equality concepts in the old JERICO value;
- better express the collaboration pillar;
- substitute the word JERICO-RI with the simpler and more effective brand word JERICO;

Summarizing, the following five new JERICO Values are here proposed:

1. ***"JERICO cares about the marine environment: it contributes to the understanding and monitoring of the changes of coastal marine systems; it provides data-driven information for the protection and the sustainable management of coastal resources.***
2. ***JERICO declines scientific excellence through a regional approach: it identifies scientific marine coastal challenges common to regional sites, gathering all major coastal observing systems throughout Europe; it has a strong scientific community and leadership developed and demonstrated during several previous EU-funded projects.***
3. ***JERICO implements multiplatform and multidisciplinary observation systems: it uses scientifically sound observations of physical, chemical and biological parameters and innovative biogeochemical observing technologies; it recognizes that scientific excellence in coastal areas can be achieved only through multisystems as these areas are characterized by many high-variable scales, both in time and in space.***
4. ***JERICO seeks for collaboration and co-creation: it interacts with many other environmental RIs to take a holistic approach to the marine environment, from the coastline to the open sea, as a global ecosystem; it***



***listens to its stakeholder and users to include their desiderata in its future development.***

- 5. JERICO removes barriers: it enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services; it encourages transparent policies for the access, recruitment procurement and its governance; it promotes equal opportunities for its members considering gender equality and under-represented communities."***

#### **4. Misalignment between SSCs, Topics and Themes**

The perspectives considered for the scientific strategy in the JERICO-S3 and JERICO-DS projects are different. JERICO-S3 considers the regional perspective, i.e. the common challenges that are shared in both PSSs and IRSs. JERICO-DS introduces the national perspective to co-construct and fund the JERICO-RI. These two viewpoints introduced some natural recognized misalignments in the projects' strategies that need a correction. The following paragraphs introduce both Scientific Challenges and Topics/Themes identified respectively in the JERICO-S3 and JERICO-DS projects, and propose a simple way for this correction.

##### **The Specific Scientific Challenges identified in the JERICO-S3 project**

The identification of common scientific questions in the JERICO-S3 project was tackled through the assessments and the coordination of the actions achieved by PSSs and IRSs (Grémare et al. 2021). This resulted in the elaboration of a common general scientific framework structured in Key Scientific Challenges (KSCs), Specific Scientific Challenges (SSCs), and Research Axes (RAs). Members of the different JERICO sites were asked during the project to list the main scientific questions they address in PSSs and IRSs. The exercise led to the identification of 40 scientific items (i.e., questions/objectives) mostly shared by several PSSs/IRSs, which allowed for their further grouping in 16 Specific Scientific Challenges (SSCs, Figure 2). SSCs were further grouped based on their nature, which resulted in the identification of three JERICO Key Scientific Challenges (KSCs).

KSCs	Specific Scientific Challenges	Pilote Super Sites					Integrated Regional Sites				
		North S	EC	NWM	CS	BS/GF	BOB	NAS	IAM	K/S	Nor S
Assessing and predicting changes under the combined influence of global and local drivers	Land-Ocean Continuum										
	Sea-atmosphere interface										
	Connectivity and transport										
	Biodiversity										
	Primary productivity										
	Ecosystem functioning										
Assessing the impacts of extreme events	Carbon budget and carbonate system										
	Extreme events: impacts on ecosystems										
	Extreme events: coastal hazards										
Unravelling the impacts of natural and anthropogenic changes	Harmful Algal Blooms										
	Climate change impacts										
	Eutrophication										
	Impact of big cities										
	Litter and plastic										
	Contamination										
	Unravelling impacts										

Figure 2: The Specific Scientific Challenges addressed by the Pilot Super Sites and the Integrated Research Sites as identified during the JERICO-S3 project and their further grouping in three Key Scientific Challenges (KSC). North S: North Sea, EC: English Channel, NWM: Northwestern Mediterranean, CS: Cretan Sea, BS/GF: Baltic Sea: Gulf of Finland, BOB: Bay of Biscay, NAS: Northern Adriatic Sea, IAM: Iberian Atlantic Margin, K/S: Kattegat/Skagerrak, Nor S: Norwegian Sea. Source: Grémare et al (2021).

Subsequent iterations during the JERICO-S3 project led to improvements (see Figure 3) which decreased the number of SSCs to 10, solved some ambiguity in the formulation of KSC#1 and KSC#3 and expanded the new list of SSCs in different Research Axes (RAs). During the iterations it was also decided to freeze the lists of KSCs and SSCs while keeping the list of RAs "alive", i.e. subjected to continuous updates through regular consultations of the JERICO-RI consortium.

### The Scientific Topics and Integrated Themes identified in the JERICO-DS project

The identification of national societal needs in the JERICO-DS project was performed using the bidirectional approach, i.e. the continuous exchange and update of scientific questions from the global to the national scale and vice versa (Magaldi et al., 2022). Such an approach allowed NRs to express national priorities beyond the previous scientific topics identified in the JERICO-S3 project. It was also decided to structure the JERICO-DS scientific framework in different Topics and Themes that could have explored the links with the EU Marine Strategy Framework Directive and UN Sustainable Development Goals keeping a direct relation to the JERICO KSCs. As a result six Scientific Topics and three Integrated Themes were identified together with their different societal needs, scales (multinational/regional, national and local) and relations to KSCs and MSFD descriptors (see Figure 4).

Keys Scientific Challenges	Specific Scientific Challenges	Research Axes
Assessing changes under the combined influence of global and local drivers	Land Sea Ocean continuum. Impacts of land-derived discharges and exchanges with open ocean	Nutrients, particles and organic matter, inorganic carbon, litter and contaminants
	Sea-atmosphere interface. Quantification of inputs	Particles, nutrients, contaminants
	Connectivity and transport. Pathways of water masses and materials	Water masses (including vertical mixing), nutrients, contaminants, particles, organisms (connectivity)
	Biodiversity trends	Phytoplankton, zooplankton, benthos
	Ecosystem biogeochemical processes and interactions	Biophysical interactions, Biogeochemical functioning, Pelagic, benthic, pelagic/benthic coupling
	Carbon budget and carbonate system	Carbon fluxes and budget, carbonate system trends, effects of acidification
Unravelling and predicting the impacts of natural and anthropogenic changes	Impacts of rare and extreme events	Floods, storms/large waves, heat/cold waves, landslides/sudden erosion, tsunamis, volcanic eruptions, harmful algae / jelly fish blooms, accidental pollution, Interactions between events
	Resolving climate change impacts	Temperature, salinity, currents, sea level rise, waves, biological productions, species distribution ranges (biogeography), nutrients
	Resolving anthropogenic impacts	Eutrophication, habitat and biodiversity loss, contamination, coastal engineering, use of marine space (including windfarming), use of marine nonliving resources, use/cultivation of living resources, invasive species, maritime traffic, (micro) plastics, acoustic and electromagnetic noises
	Disentangling impacts/scales	Meta analysis , coupled modelling

Figure 3: Current formulations for the JERICO Key Scientific Challenges, Specific Scientific Challenges and Research Axes. Changes relative to different consultation processes are in red and blue. Source: Grémare et al (2021).

### Solving the slight misalignment between the two projects

The different decisions taken in the two projects and their timing resulted in some slight misalignments. For example the reference KSCs for the JERICO-DS project have always been the original JERICO-S3 ones, also used in the ESFRI application submitted in September 2020 (Puillat et al. 2020) while the final improvements in the KSC formulations proposed in Grémare et al. (2021) have been ignored. In other cases a relative and more important role is played by some topics at the national level with respect to the regional one due to the tight link with the different descriptors of the Marine Strategy Framework Directive. For example "Eutrophication" is only at the Research Axes level for JERICO-S3 but reaches the Scientific Topic level for JERICO-DS due to the link with the MSFD descriptor number 5. The same explanation holds for marine litter topic for the links with the MSFD descriptors number 8 and 10.

Specific/Individual Scientific Topics			
	Topic	Scale of the societal needs	Relation to KSCs
#1	Biodiversity trends	<ul style="list-style-type: none"> <li>Multinational: latitudinal migration, non-indigenous species</li> <li>National: networking, legislative support, contribution/support to MSFD implementation (Descr#1) creation of national inventory, biological indicators</li> <li>Local: impact of local disturbances</li> </ul>	KSC#1
#2	Hydrology and transport	<ul style="list-style-type: none"> <li>Multinational: climate change scenarios</li> <li>National: networking, legislative support, contribution/support to MSFD implementation (Descr#7) Maritime Spatial Planning, oil spills, fishery management</li> <li>Local: navigation, aquaculture</li> </ul>	KSC#1
#3	Eutrophication	<ul style="list-style-type: none"> <li>Multinational: trans-national management of regional seas (Baltic and Adriatic seas)</li> <li>National: networking, legislative support, contribution/support to MSFD implementation (Descr#5)</li> <li>Local: impacts on fisheries, biodiversity, tourism, amenity</li> </ul>	KSC#3
#4	Chemical contaminants and marine litter	<ul style="list-style-type: none"> <li>Multinational: support to international conventions/agreements</li> <li>National: networking, legislative support, contribution/support to MSFD implementation (Descr#8, #10)</li> <li>Local: localized impacts, localized measures for protection</li> </ul>	KSC#3
#5	Land/ocean continuum (only from the marine point of view)	<ul style="list-style-type: none"> <li>Multinational: mass fluxes in the marine environment</li> <li>National:</li> <li>Local: riverine input (particles, nutrients, contaminants) in the marine environment, fishery management, influence of transport of nutrients and metals</li> </ul>	KSC#1
#6	Coastal carbon	<ul style="list-style-type: none"> <li>Multinational: coastal zone CO<sub>2</sub> sequestration (carbon budget) for climatic reasons</li> <li>National: national carbon budget CO<sub>2</sub> sequestration</li> <li>Local:</li> </ul>	KSC#1

Integrated Scientific Themes			
	Theme	Scale of the societal needs	Relation to KSCs
#1	Ecosystem approach: integration of physics chemistry and biology observation as a system	<ul style="list-style-type: none"> <li>Multinational: support/contribution to coordination, management of trans-national ecosystem approach</li> <li>National: networking on management</li> <li>Local: local management</li> </ul>	KSC#1
#2	Coastal forecasting	<ul style="list-style-type: none"> <li>Multinational: coordination of oil spill spreading forecasting</li> <li>National: effects of climate changes, oil spill spreading, sea-ice forecast</li> <li>Local: localized effects of climate changes, Port management, MPA management, marine offshore industry</li> </ul>	KSC#1 KSC#2 KSC#3
#3	Impact of extreme events	<ul style="list-style-type: none"> <li>Multinational: contribution to understanding effects of extreme events on large and long scales</li> <li>National: contribution to disaster readiness/remediation, navigation safety, sea-state</li> <li>Local: data on local probability, return time estimates, maritime engineering works, impact/effects of storms and floodings on coastal infrastructures and ecosystems</li> </ul>	KSC#2

Figure 4: List of the societal needs, their scales and relations to KSCs for each Topic and Themes identified during the JERICO-DS project. Source: Magaldi et al (2022).

Specific meetings between the two WP1s have been held to increase the alignment of the scientific strategy between the two projects by a joint analysis of KSCs, SCs, Topics/Themes and RAs. A practical approach is here proposed in consideration that:

- the JERICO community weighs more the regional than the national approach, especially in light of its implementation strategy;
- the national considerations show evidence for regional patterns as in the case of the implementation levels indicated by the National Representatives (see above);
- the JERICO-S3 project is larger and more representative of the will of all JERICO partners;
- the JERICO-S3 project lasts longer and is able to receive the feedback and the advancements made in JERICO-DS especially within its D1.5 deliverable entitled "JERICO-RI Scientific Strategy and implementation plan".

In this Deliverable D1.3 it is suggested that the general scientific framework structured and refined in the JERICO-S3 project is the official scientific framework of the JERICO-RI. Both

projects should converge towards building common recommendations and actions using the JERICO-S3 scientific semantics also for the incoming new ESFRI application.

## **5. Outreach, dissemination and communication activities**

This Deliverable D1.3 is a document of internal use, whose objective is to summarize the steps taken in the JERICO-DS project to shape the JERICO scientific strategy. Deliverable D1.3 presents the analysis and the geographic distributions of the implementation levels and tackles some issues identified during the General Assemblies of the project. D1.3 analysis and propositions will be presented both at the JERICO-S3 Steering Committee meeting in Paris on September 26-28, 2023 and at the JERICO-DS General Assembly in Tallin on November 21-23, 2023. This deliverable is thus not expected to be widely disseminated outside the JERICO consortium or to a wider audience at present.

D1.3 can be seen as a provider of inputs to the specific following WPs:

- JERICO-S3 WP1: for the general implementation plan of the scientific strategy (see also the Conclusions and next steps section). In this respect specific joint WP1 sessions between the two on-going projects will be held in JERICO-S3 Steering Committee meeting in Paris and at the JERICO-DS General Assembly in Tallin;
- JERICO-DS WP2: for the new scientific vision shaping the JERICO-RI technology outlook and its harmonisation strategy;
- JERICO-DS WP3: for the new scientific vision underlining the gap analysis and the JERICO-RI integration strategy;
- JERICO-DS WP5: for the scientific and technical design to the business plan and governance strategy;
- JERICO-DS WP6: for the creation of new communication material reporting the new propositions of Mission, Vision and Values also in the JERICO official website.

## **6. Conclusion and next steps**

Deliverable D1.3 represents the main outcome of the whole WP1 of the JERICO-DS project to shape the JERICO scientific strategy. It collects all recommendations from previous WP1 deliverables and milestones and offers original contributions both in terms of geographic distributions of the implementation levels and of propositions to tackle some issues related to the JERICO scientific strategy.

The WP1 of the JERICO-DS project has first approved a first version of the general scientific mission and vision (see Milestone MS1.1) to then count the interactions with institutions and funding bodies at the national level (see Milestone MS1.2) as well as with the Group of Senior Officials on global Research Infrastructures (see Milestone MS1.4). KPIs instrumental to the assessment of the scientific performance of JERICO-RI were also identified (see Milestone MS1.5) together with unresolved issues related to the general and scientific approach (see Milestone MS1.3).



The Deliverable D1.1 has i) listed societal needs within specific Scientific Topics and Integrated Themes; ii) identified common societal needs based on their priority and implementation levels at the national level; iii) formulated suggestions to consider the national scale in the JERICO strategy. More specifically, a list of six Scientific Topics and three Integrated Themes was put forth considering the important connections with the MSFD descriptors and the UN Sustainable Development Goals. The common national societal needs selected by NRs in the WP1 survey include non-indigenous species, aquaculture, climate change, localised measures/protection from marine litter, riverine inputs, impact/effects of storms and floods. The same national feedback suggested the development of services spawning from the Data-to-Products Thematic Services (D2PTS) of the JERICO-S3 project. For example the estimation of the heat content in specific water masses types by the glider D2PTS could be a specific service for storms and floods while Lagrangian dispersion tools based on the HF-Radar D2PTS could serve for addressing specific needs related to aquaculture (dispersion of pollutants, antibiotics, feasibility of increasing the number of net-pens) and localised measures/protection from contaminants and marine litter.

The Deliverable D1.2 has i) described the landscape of environmental Research Infrastructures at European level; ii) provided two national examples (France and Italy) of structuring interactions between national nodes of European marine research infrastructures; iii) formulated preliminary suggestions for the implementation of a collaborative framework at European level based on the prioritised societal needs expressed by the nations.

The original achievements of this Deliverable D1.3 are mainly three-fold and in the following directions:

- analysis of the geographical distribution of the implementation levels recognized by the National Representatives for each national societal need. Regional patterns for the implementation levels are most evident for needs associated with the Biodiversity and Eutrophication Topics and the Coastal Forecasting Theme. Regionality does not seem to affect much the needs related to the emergent Topic Coastal Carbon and the Ecosystem approach Theme.
- refinement of JERICO Mission, Vision and Values. Especially following the indications obtained by the Bicocca University of Milan Course, the Scope statement is disregarded and the following new Mission, Vision and Values statements are proposed for JERICO-RI:
  - Mission statement: *“The JERICO mission is to enable a sound understanding of the responses of coastal marine systems to natural and anthropogenic stressors. To do so, JERICO adopts a systematic approach to monitor, observe, explore and analyse coastal marine systems in order to reach reliable information of their structuration and functioning in the context of global change. JERICO encompasses the whole range of environmental sciences, technologies and data sciences. It achieves observations at global, regional and local scales, through the implementation and the harmonization of a set of complementary platforms and multidisciplinary observation systems. JERICO enables open-access to state-of-the-art and innovative*

*facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.”*

- Vision statement: *“JERICO will be the panEuropean integrated gateway to long-term scientific and harmonized observations and related services for coastal marine systems.”*
- Values:
  - *“JERICO cares about the marine environment*
  - *JERICO declines scientific excellence through a regional approach*
  - *JERICO implements multiplatform and multidisciplinary observation systems*
  - *JERICO seeks for collaboration and co-creation*
  - *JERICO removes barriers.”*
- solution of the slight misalignment between the two JERICO-S3 and JERICO-DS projects. The semantics and general scientific framework structured and refined in the JERICO-S3 project are proposed as the official ones for the JERICO-RI also for the incoming new ESFRI application. This follows arguments of simplicity and practicality in consideration that i) the JERICO implementation strategy is based on the regional J-S3 approach; ii) national considerations show evidence for regional patterns; iii) the JERICO-S3 project lasts longer, is larger and more representative of the entire JERICO community.

An important next step can be foreseen during the different incoming meetings in relation to the approval and consolidation process of the newly proposed Mission, Vision and Values statements. It is indeed common practice to revise the forms of aspiration addressing the question of whether Mission, Vision and Values statements are still relevant for the direction a research infrastructure wants to follow. Revisiting JERICO forms of aspiration is a practice that its community should perform regularly to ensure that they accurately reflect JERICO identity. This is particularly important for the JERICO Values which are at a lower level of maturity for not having been shared and discussed by the community as much as the Mission and Vision statements. As a result, also the JERICO strategic planning will need a regular revision as it is intricately intertwined with the Mission, Vision and Values statements. The strategic plan is indeed the road map to achieve the goals and plans laid forth in these JERICO statements.

The results of these consultations and revisions, together with the strategic plan will pair the continuous updates of the list of RAs and be included in the next WP1 Deliverables of the JERICO-S3 project.

## **7. References**

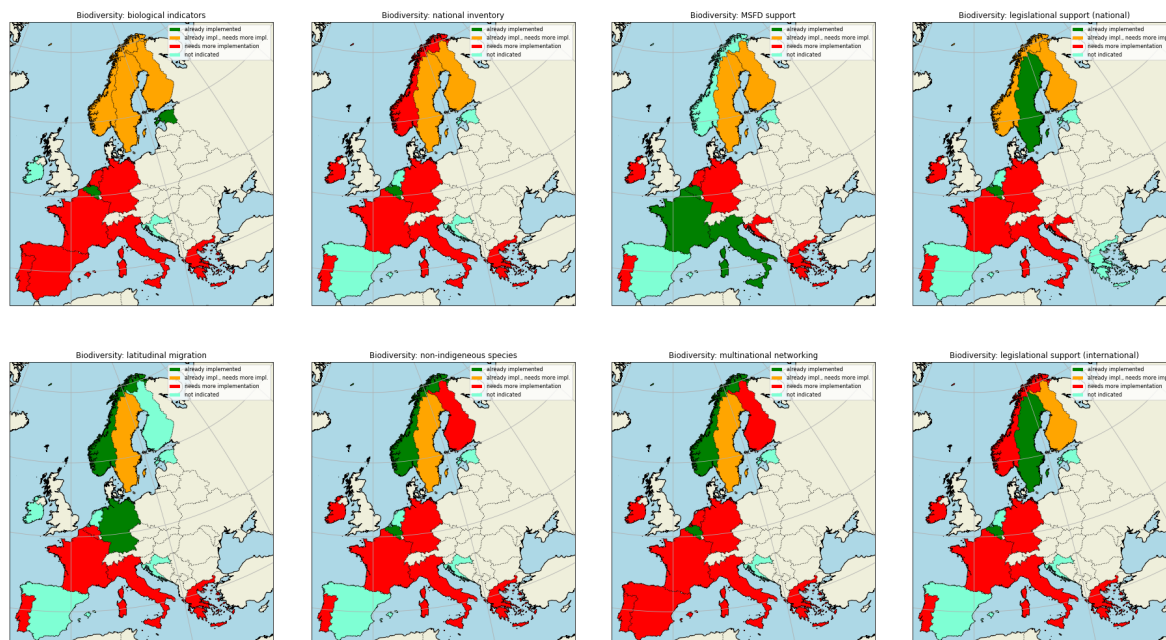
- Grémare A., Rubio A., Durand D., Coppola L., Delauney L., Puillat I. (2021) - FIRST ANALYSIS OF THE JERICO-S3 SCIENTIFIC MONITORING AND REGIONAL APPROACHES. EARLY INPUTS TOWARD SUSTAINABILITY. JERICO-S3 D1.1



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- Magaldi M.G., Cocquempot L., Grémare A., Brix H., Griffa A., Rubio A. (2022) - PRELIMINARY REPORT FOR LONG-TERM SCIENTIFIC PLAN. JERICO-DS D1.1

## 8. Annexes: Figures for the implementation levels

### a) BIODIVERSITY



### b) HYDROGRAPHY AND TRANSPORT

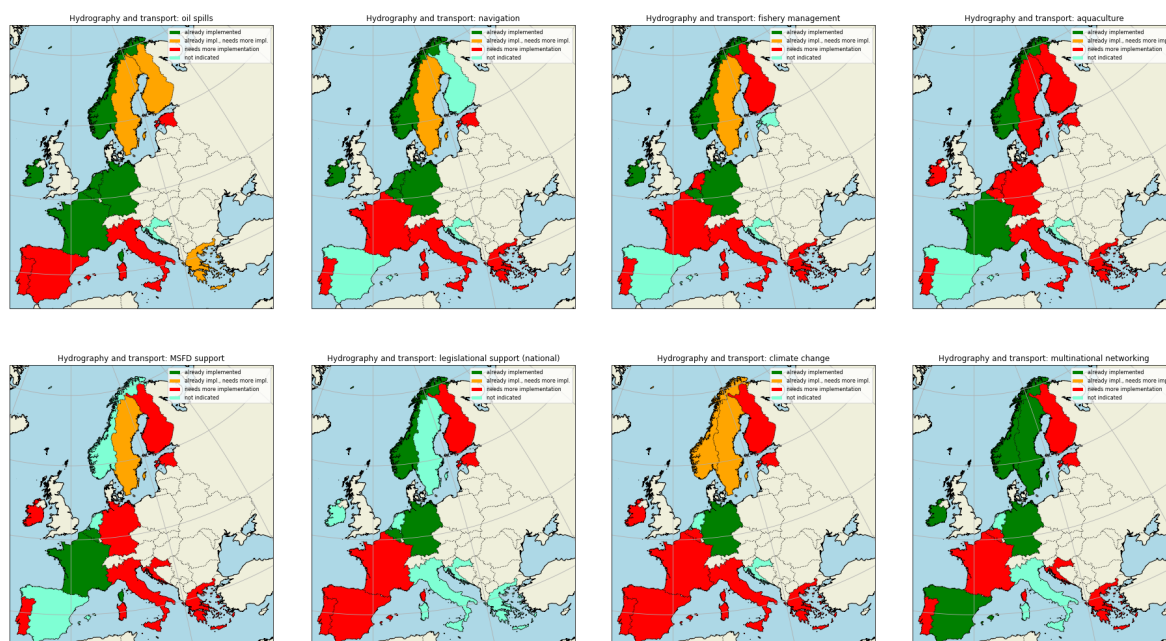
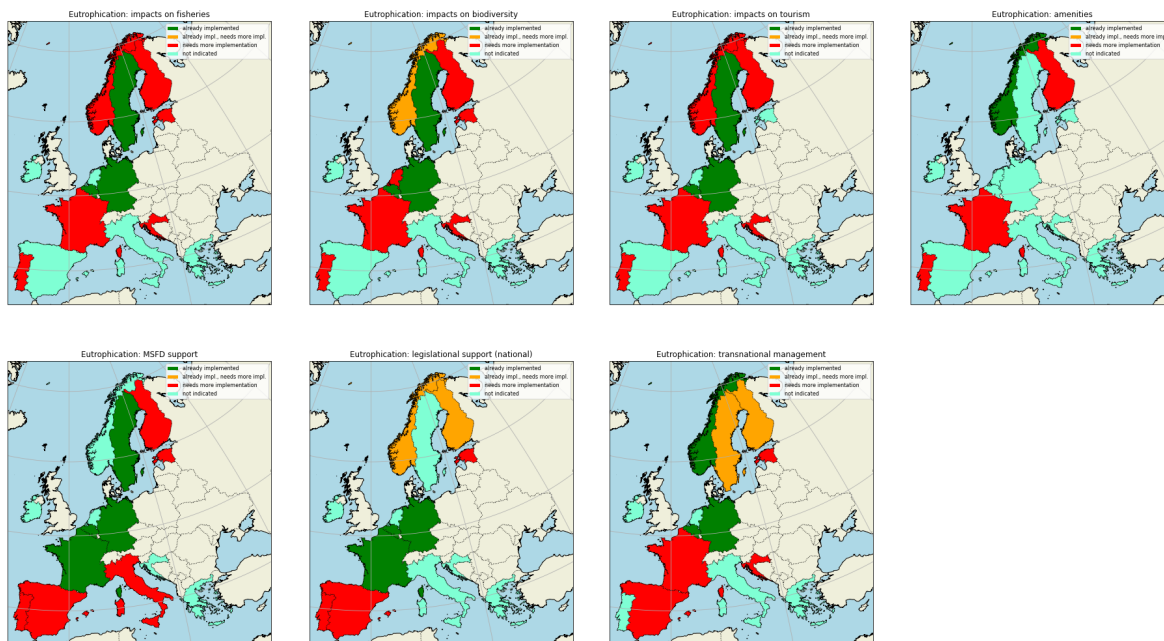


Figure A1: Geographic distribution of the implementation levels for the societal needs for the Scientific Topics: a) Biodiversity and b) Hydrography and transport.

### c) EUTROPHICATION



### d) CHEMICAL CONTAMINANTS AND MARINE LITTER

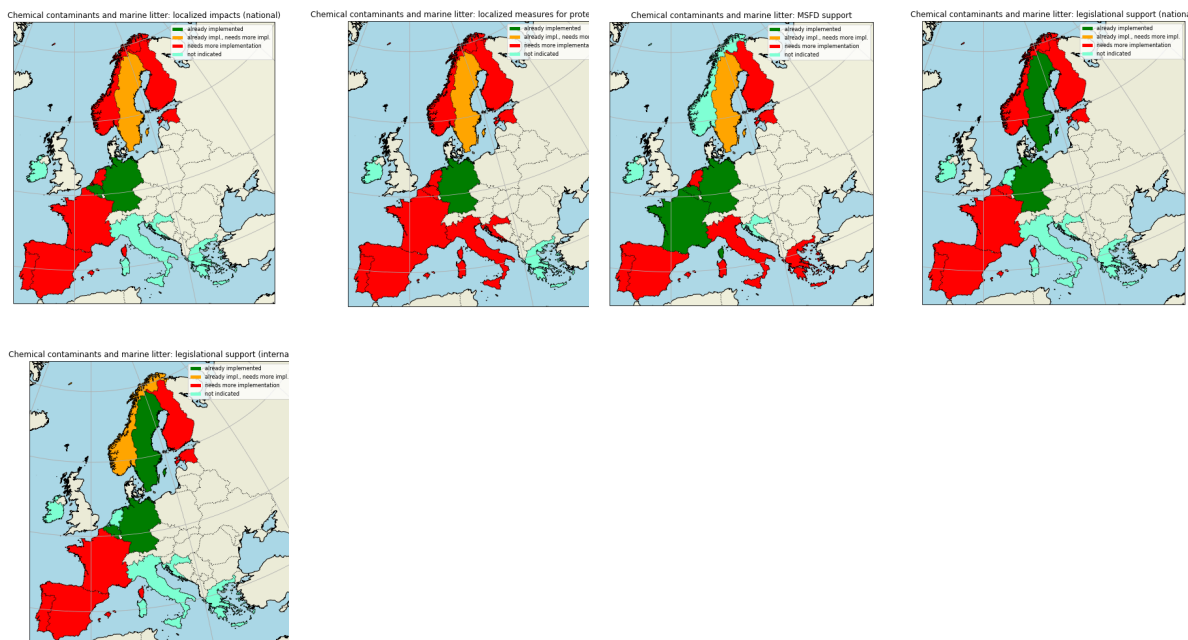
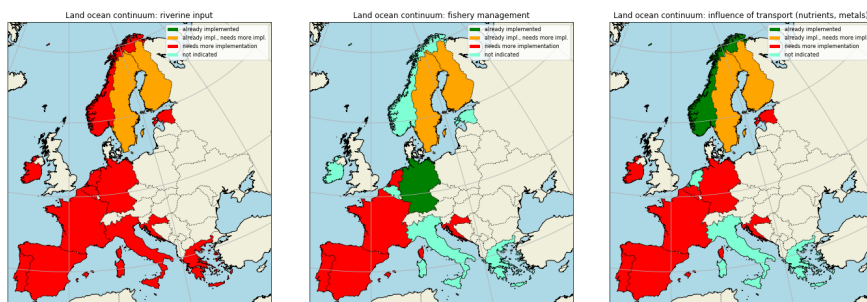


Figure A1: Continue. Geographic distribution of the implementation levels for the societal needs for the Scientific Topics: c) Eutrophication and d) Chemical contaminants and marine litter.

## e) LAND/OCEAN CONTINUUM



## f) COASTAL CARBON

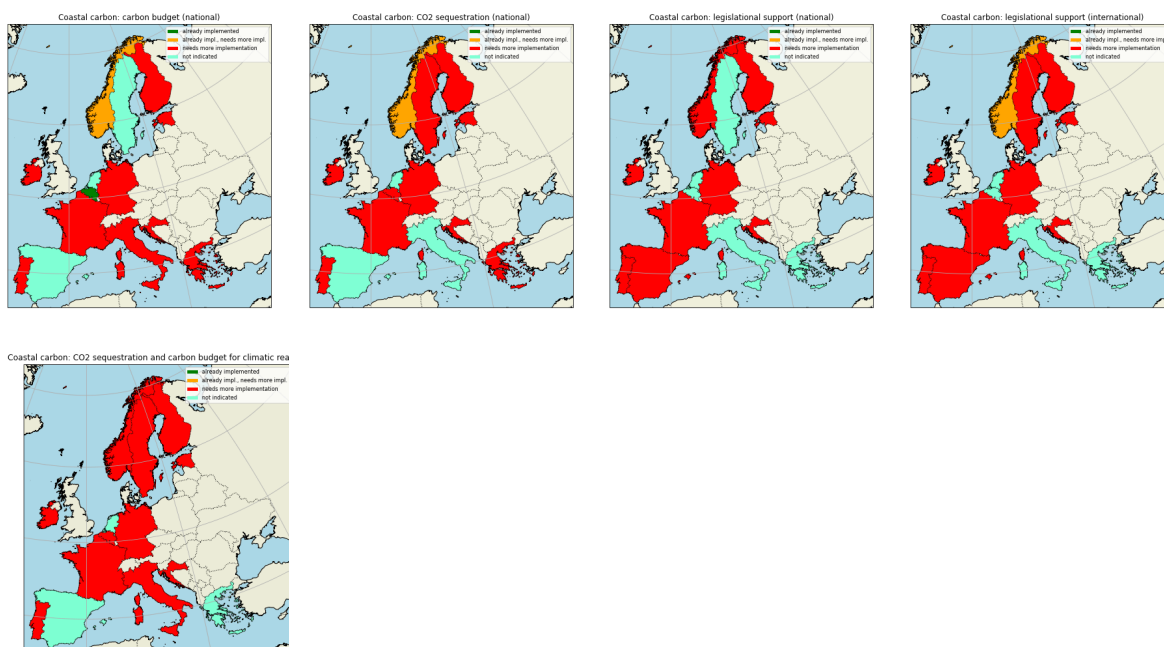
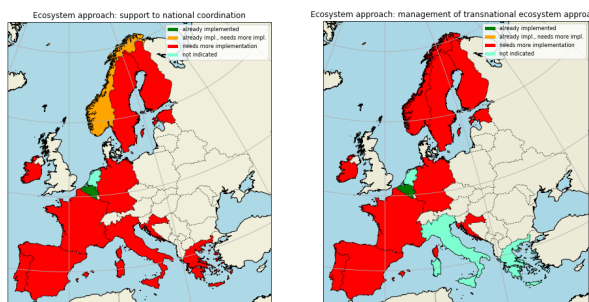


Figure A1: Continue. Geographic distribution of the implementation levels for the societal needs for the Scientific Topics: e) Land/Ocean continuum and f) Coastal carbon.

## g) ECOSYSTEM APPROACH



## h) COASTAL FORECASTING

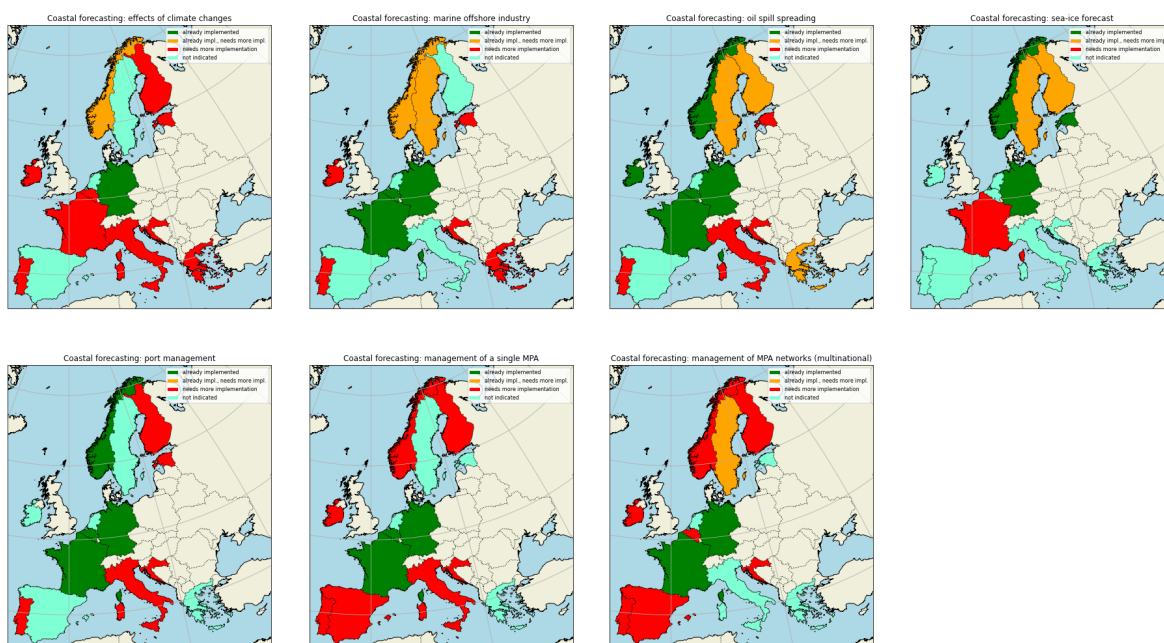


Figure A1: Continue. Geographic distribution of the implementation levels for the societal needs for the Integrated Themes: g) Ecosystem approach: integration of physics chemistry and biology observation as a system and h) Coastal forecasting.

## i) IMPACT OF EXTREME EVENTS

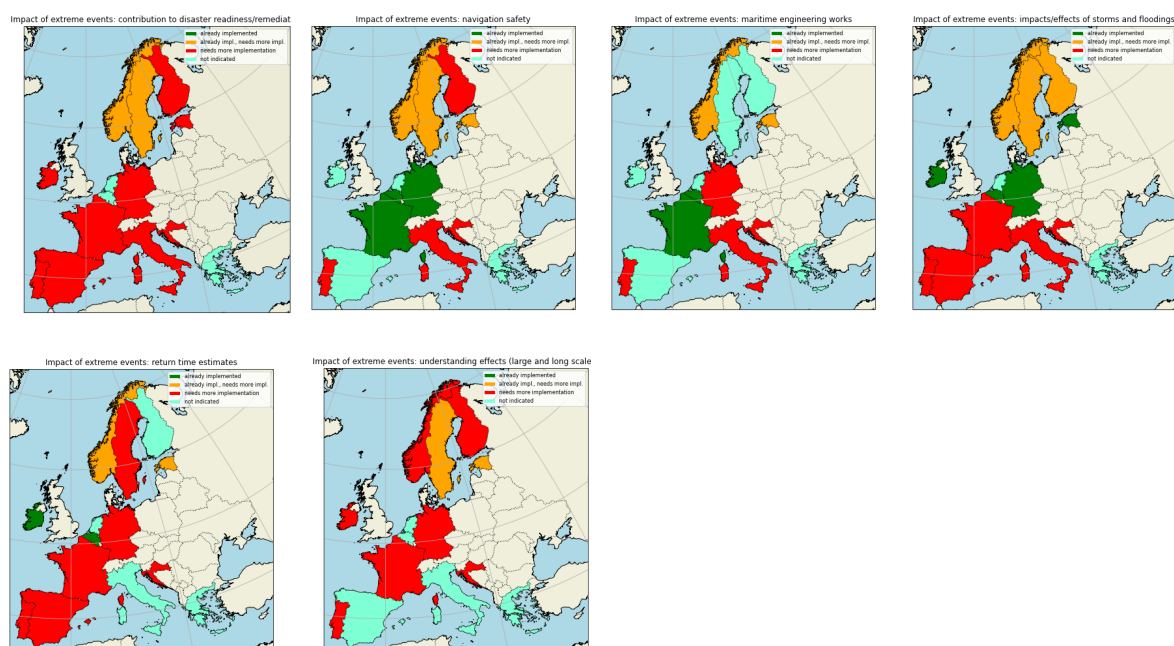


Figure A1: Continue. Geographic distribution of the implementation levels for the societal needs for the Integrated Themes: i) Impact of extreme events.