



**COASTAL**  
Collaborative Land-Sea  
Integration Platform

EXPLOITATION PLAN FOR COASTAL-RURAL COLLABORATION

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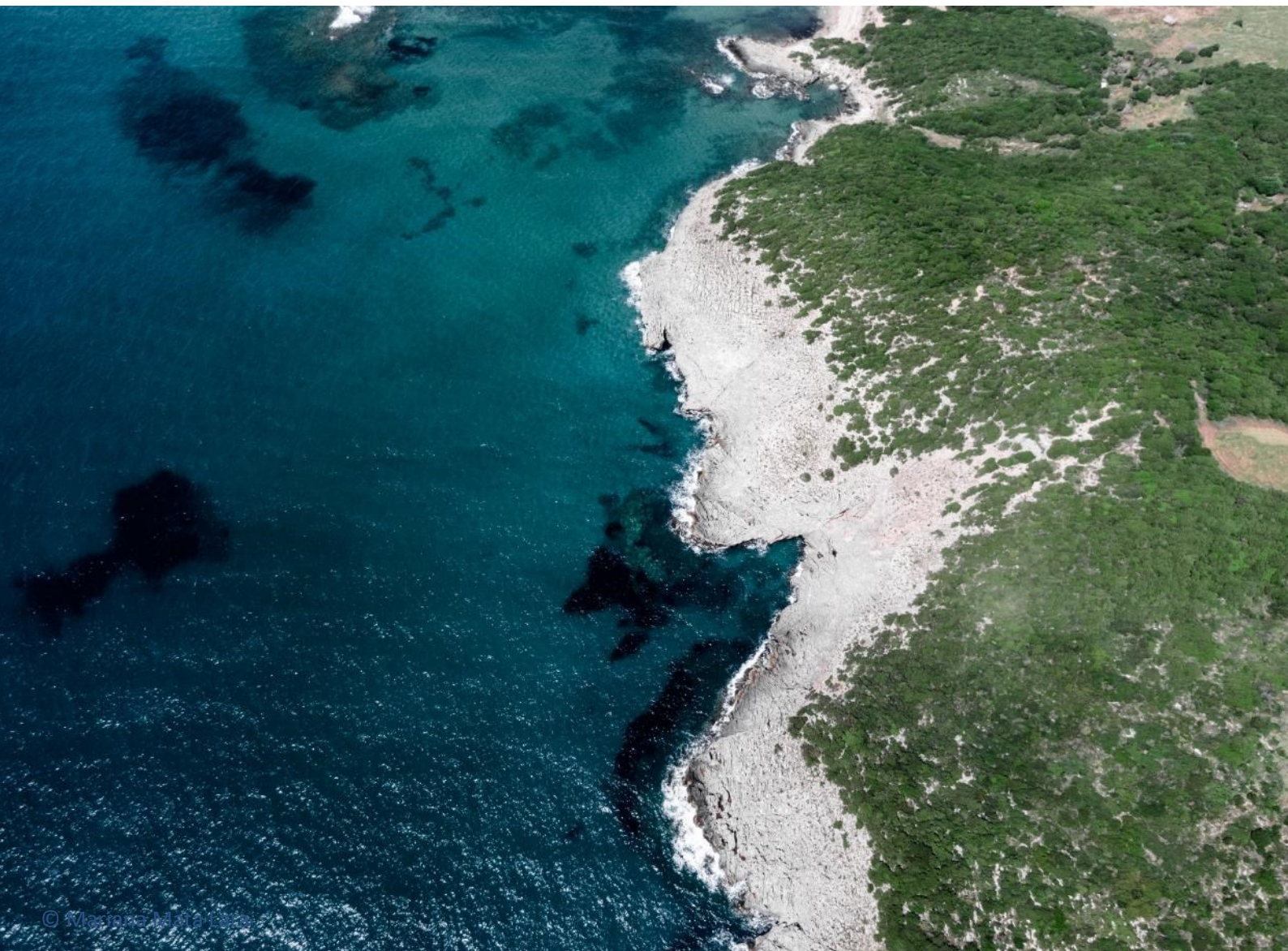


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# EXPLOITATION PLAN



# D24 - Exploitation Plan for Coastal-Rural Collaboration

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# INTRODUCTION

The exploitation of the project's results has a crucial role to determine the success of COASTAL. To this end, the Consortium carved out enough time to reflect on the exploitation goals, measures, actions and collaborations which would contribute to guarantee this accomplishment.

The exploitation strategy of the project is sought to contribute to the two main objectives of the project:

- Contribute to an integrated coastal-rural planning and coastal-rural synergy in the case study regions and the wider EU territory
- To develop a durable, online platform for knowledge exchange about coastal-rural synergy with concrete examples and tools for supporting land-sea collaboration.

Thus, the aim of this document is to design an **exploitation strategy** to help each partner **define the routes for making the results available for use** by other parties after the termination of the project.

For this purpose, it is worth highlighting the difference between disseminating and exploiting results:

**Dissemination** means **sharing** research results with potential users - peers in the research field, industry, other commercial players and policymakers. By sharing your research results with the rest of the scientific community, you are contributing to the progress of science in general.

**Exploitation** is the **use** of results which have been selected and prioritised due to its high potential to be used (in activities other than those covered by the action) and derive benefits- downstream the value chain of a product, process or solution, or act as an important input to policy, further research, or education. Results used for developing, creating, and marketing a product or process, or in creating and providing a service, or in standardisation activities.

*\*More detailed info can be found in [this document](#).*

## What makes a good Exploitation in H2020?

The strategy needs to be **precise about the impact** of the results\*\* on science, industry, society and governments mostly after its end.

*\*\* Results are any tangible or intangible output of the project, such as data, knowledge and information whatever their form or nature, whether or not they can be protected.*

**Stakeholders should be targeted** with specific results according to the desired impact the project aims to have. Example of this:

Stakeholder	Results	Impact
<b>Research community</b>	Publications (Papers, Books) Posters, Presentations, Data, Software.	Further research activities and publications containing new insightful results
<b>Industry</b>	Patenting, Pilot plants and prototypes, Transfer agreements, Joint venture/Start-ups, New products and services Development of standard tests and procedures, Codes of conduct.	Generate economic growth Development of a new product or service Improvements of production processes and competitiveness Improve product quality and consumer protection
<b>Civil society</b>	New products, services or technology, Trainings, presentations and visits, educational materials, Skills and knowledge.	Increase quality of life, improve living environment, Improve urban and rural services, Improve healthcare, Reduce energy consumption, Increase product quality control, Improve employability
<b>Policy makers</b>	Reports, Policy papers and recommendations, Roadmaps, Operational guidance.	Revision or creation of a new directive or regulation (EU Law)

*Table 1 Potential relevance for stakeholders (eufunds.me)*

Considering the information provided above, COASTAL Exploitation Plan provides a general strategy with concrete actions to make the diverse outcomes (see Table 2) available for further use. A distinction can be made between actions to be taken at a project level and those taken at an organizational level (meaning by each of COASTAL consortium members). These results will draw paths where the results need to be placed for future use, also known as **exploitation routes** (Figure 1). Example of these are:

- The use for further research
- Developing and selling new products/services
- Spin-off activities
- Cooperation agreement/Joint Ventures
- Selling IP rights/Selling IP-related business
- Licensing IP rights
- Standardization activities

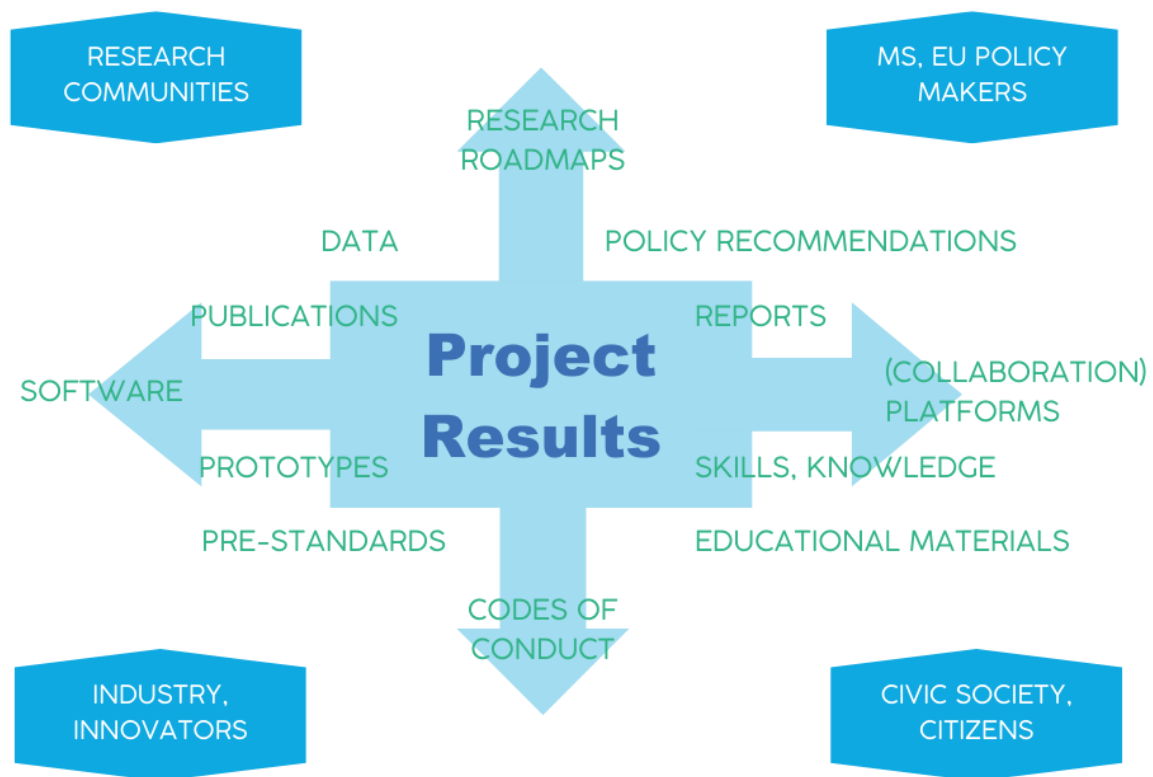
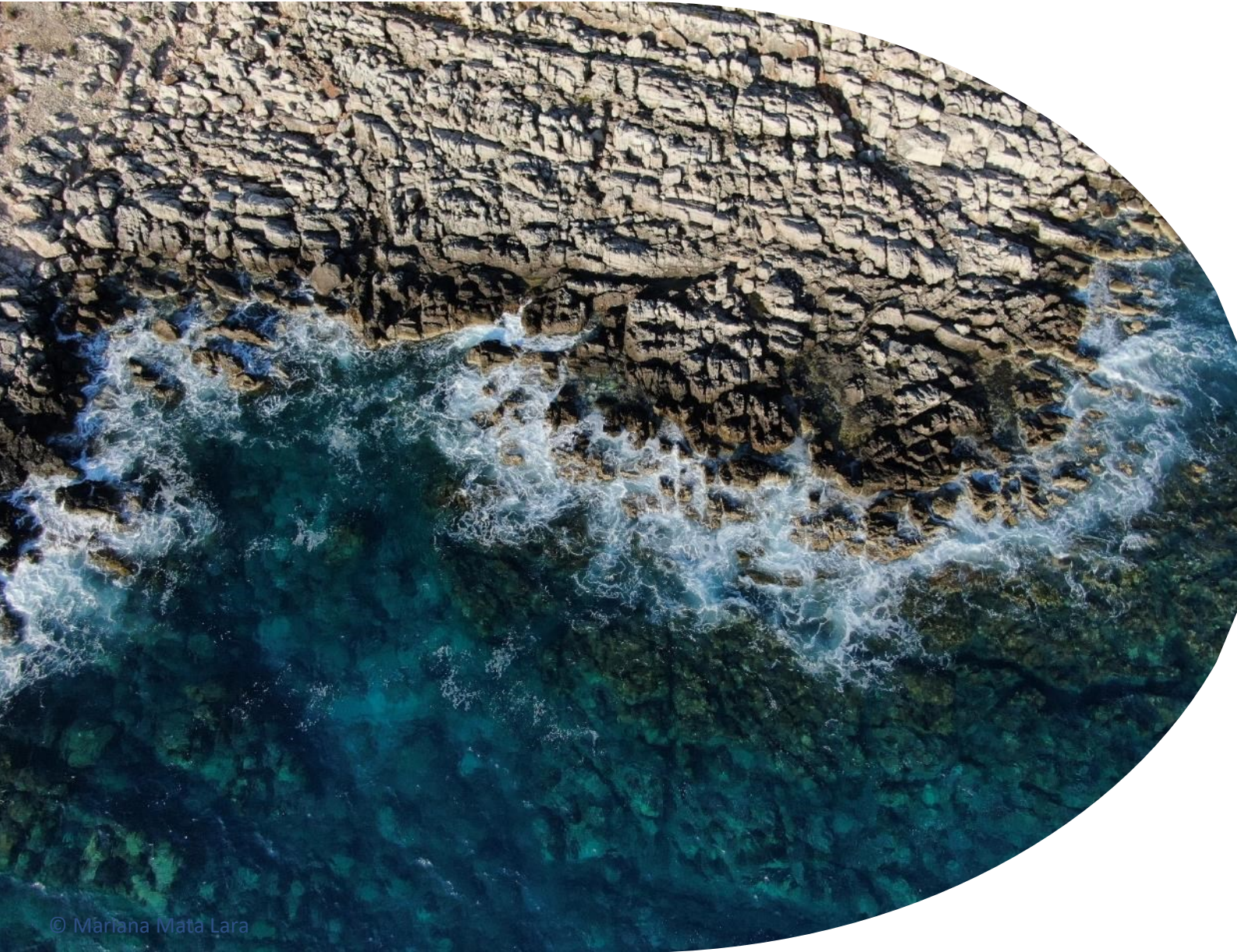


Figure 1 Exploitation of project results. Figure modified from the European Commission.

Furthermore, each result will highlight:

1. **Target groups and sector of application:** The audience to whom the results are being made available to, and the sector interested in such results.
2. **Quantitative targets and indicators:** These are measurable goals to be achieved from a partner level to manage the successful exploit
3. **Impact:** The economic, commercial, societal, environmental, technical, educational, or scientific effect each results will cause.
4. **IPR measures:** The specification of the ownership for each innovation, including after the end of the project. For example patents, copyright, or trademarks available in place, or non relevancy. [More information on this here.](#)
5. **Possible barriers to exploitation activities and mitigation measures:** These are foreseeable impediments for exploiting the results and the strategy in place to counterbalance them.

By defining all the relevant components for putting each result o use, we expect that COASTAL will have a successful exploitation both at a partner and project levels. Readers can expect to better understand possible ways of exploiting COASTAL results, the IPR restrictions of the partners' know-how and the results, the main points of strengths and weakness when implementing them.



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# 1. PROJECT LEVEL





## EXPLOITABLE RESULTS & SERVICES

A wide range of expertises, tools and results have been developed in the COASTAL project. At project level the following questions are relevant for the exploitation these outcomes by the project partners and third parties:

- a) Exploitable outcomes. Which project outcomes are exploitable?
- b) For whom and with what purpose?
- c) When will these outcomes be exploitable?
- d) How: what exploitation route should be followed to enable exploitation?

The answer to such questions goes as follows.

### A) EXPLOITABLE OUTCOMES (PROJECT LEVEL):

Table 2 shows a summary of the project outcomes considered exploitable at different levels, as well as their relation with MALs. These results will be integrated in the Knowledge Exchange Platform in different formats also mentioned here. Target groups are multiple and overlapping, and include local and regional stakeholders, the research community contributing to socio-environmental policy analysis, rural and coastal thinktanks, and the EU.

The central goal of COASTAL was to support the sustainable development of regions at the coastal-rural interface with **evidence-based** business road maps and policy guidelines. A multi-actor approach, based on participatory modelling and stakeholder engagement, was followed to design causal loop diagrams of land-sea systems, develop scenarios and System Dynamics (SD) models to analyze and compare the impacts of alternative management strategies, and formulate strategic policy and business recommendations. Systems Thinking and SD modelling are a core expertise which were further developed in the project. The methodological framework chosen distinguishes itself from alternative approaches for policy support by the unique combination of: (1) the active and strong engagement of stakeholder in gaining understanding of the structure of land-sea interactions, (2) the use of problem-driven models exploiting this understanding, and (3) the integration of qualitative and quantitative methodologies. Policy interventions are aimed at intervening in the system feedback structure (i.e. adding, removing or modifying the strength of system interactions) rather than the detailed level of processes. The in-depth understanding of the system behavior (response to scenarios and policy interventions) can be understand counter-intuitive impacts at different time scales and innovative solutions to existing and/or unanticipated problems which other approaches **fail to identify completely**. Even more important than the models and road maps developed in the project is the collaboration of a network of 29 partners and over 500 stakeholders during the project. This capacity building paves the way for further development and exploitation of project expertise and results, including services which can be provided to third parties who are interested in the project outcomes and systemic approach followed.

Key Project Outcome	Belgian Coastal Zone (MAL1)	South-West Messinia (MAL2)	Norrström – Baltic (MAL3)	Charente River Basin (MAL4)	Danube Mouth (MAL5)	Mar Menor Coastal Lagoon (MAL6)	EU Level or other	MAIN WP	Relevant Deliverables	Average TRL status*	Deposition Data Repository	Preferred Format	Priority for repository deposition	KEP Relevance
Blog or forum at MAL Level								WP1		TRL6	No	not applicable	Low	4 - High
Best Practices for coastal-rural synergy								WP3	D9	TRL8	Likely	pdf	High	4 - High
Business Road Maps Rural Development								WP3	D10, D11	TRL5	Likely	pdf	Low	4 - High
Business Road Maps for Blue Growth								WP3	D11	TRL4	Likely	pdf	Low	4 - High
Policy Briefs and Flipbooks								WP3	D10, D11		Likely	pdf	Moderate	4 - High
Stock-flow models for rural development issues								WP4	D13, D14	TRL6	Likely	VenSim mdl	Low	4 - High
Stock-flow models for blue growth and coastal development								WP4	D13, D14	TRL6	Likely	VenSim mdl	Low	4 - High
Stock-flow models for coastal-rural synergy								WP4	D13, D15	TRL6	Likely	VenSim mdl	Low	4 - High
Qualitative and Quantitative Scenarios								WP5	D19	TRL5	Likely	pdf	Low	4 - High
Methodological Guidelines								WP7/ Multiple	Final Report	Not relevant or applicable	Possibly	pdf	Low	4 - High
Causal Loop Diagrams								WP1	D3, D4	TRL6	Definitely	VenSim mdl	Low	3 - Moderate

Toolbox for participatory system conceptualization								WP1	D4	TRL7	Possibly	pdf	Low	3 - Moderate
Field samples coastal and marine water quality								WP2	D33	TRL5	Definitely	NetCDF or GeoTiff	High	3 - Moderate
Coastal and rural input data for stock-flow models								WP2	D6, D7	TRL5	Possibly	xlsx	Low	3 - Moderate
Generic Toolbox stock-flow modelling								WP4	D12, D15	TRL6	Likely	VenSim mdl	High	3 - Moderate
Tutorial applications stock-flow models								WP4	D12, D15	TRL6	Likely	VenSim mdl	High	3 - Moderate
Spatial-dynamic simulations								WP5	D19		Likely	pdf	Low	3 - Moderate
Selected Practice Abstracts								WP6	D30, D31	Not relevant or applicable	Likely	pdf	Low	3 - Moderate
Scientific Journal papers								WP6			Unlikely	pdf	Low	3 - Moderate
Fuzzy Cognitive Maps (weighted CLDs)								WP1	D3	TRL6	Definitely	VenSim mdl	Low	2 - Low
SD modeling pre- and postprocessing scripts								WP4	D13, D14	TRL4	Possibly	R or Matlab script	Low	2 - Low
Scientific Conference Papers & Abstracts								WP6			Likely	pdf	Low	2 - Low
General Lessons learned								WP7/ Multiple	Final Report	Not relevant or applicable	Unlikely	pdf	Low	1 - Not relevant or desirable

Table 2 Project outcomes considered relevant for exploitation.

## B) EXPLOITATION FOR WHOM AND WITH WHAT PURPOSE?

A general conclusion of the project is that stakeholders and target groups relevant for exploitation are easier engaged in the qualitative than quantitative actions. Quantitative modelling can contribute to policy support by identifying inconsistencies in proposed solutions and storylines, examine the sensitivity of the system to interventions and provide forecasts of key policy indicators at different time scales. However, the design, testing and implementation of quantified SD models call for a long-term commitment and effort with a complexity of models which does not permit than application for communication purposes, despited of the graphical design of SD models. The combined portfolio of scenarios, causal diagrams, models, best practices, road maps and data can be considered as as a toolbox for policy analysis. The majority of the end users are primarily interested in the tools in the toolbox as long they have confidence in the validity of the policy solutions. Given the contents of this toolbox and capacity developed by the consortium the purpose for exploitation (essentially the use) should centre around solutions addressing socio-environmental **policy problems with a high degree of systemic complexity and of dynamic nature**. The ultimate purpose is to address problems by interventions in the system structure. Fortunately, many current-day problems in environmental management and regional development meet this condition which creates ample room for exploitation provided the appropriate target groups and applications can be identified and the potential of the toolbox demonstrated. While process-oriented problems and solutions call for different approaches and tools the COASTAL toolbox can fulfill a niche in this respect. Target groups for exploitation can be divided into four types with overlapping interests:

- I. Services and administrations supporting decision makers facing multi-faceted problems with a systemic scope, usually related to the integration of multiple themes (climate, water, energy, land use, ...) as well as socio-environmental interactions;
- II. Business operators, economic actors and organisations looking for solutions to problems involving a need for stakeholder analysis, failure of existing tools or expertise, systemic complexity and human behavior, logistic problems, or a combination of these elements;
- III. Research and academic organisations working on socio-environmental policy analysis and interested in making storylines evidence-based, application or further development of SD modelling skills, or systemic problem solving;
- IV. Educational organisations looking for training material and tutorial examples to address problems with systemic tools. This type of use is considered less marketable or exploitable with the large number of text books, guidelines and examples available, often free of costs.

## C) WHEN WILL OUTCOMES BECOME EXPLOITABLE?

Exploitation is a continuous effort. However, the appropriate timing for exploitation depends on the type of outcome or service, the quality of the product as well as the purpose of this exploitation. For example, the polished Causal Loop Diagrams (CLDs) developed for the six Multi-Actor Labs are among the first outcomes being made available as open data through the Zenodo platform. These CLDs are mental models of the complex interactions between problems, solutions and obstacles for regional development and could be adapted in case there is an interest to broaden or deepen the scope of the diagrams, or develop a similar diagram with a different focus. Such an exercise could also be a stepping stone for application of other COASTAL tools and expertise. Obviously, the timing will also differ for the MALs. Table 2 shows a summary of

the project outcomes considered exploitable at different levels, as well as their relation with MALs. These results will be integrated in the Knowledge Exchange Platform in different formats also mentioned here. For reference, the TRL refers to the Technology Readiness Level and it uses the following scale, including their replicas in COASTAL, using milestones related to model development as anchor points (Figure 2).

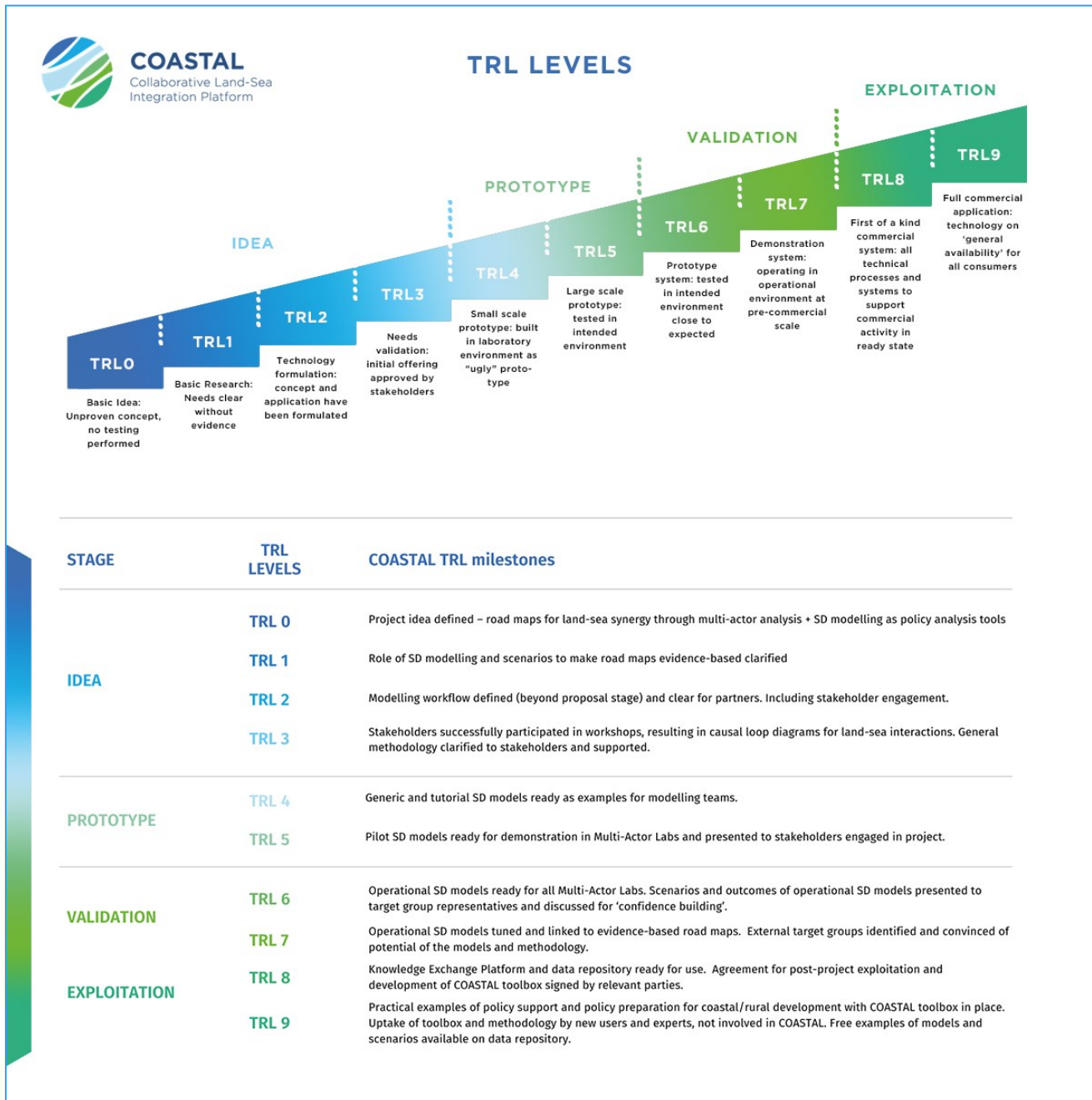


Figure 2 Technology Readiness Level definitions applied to COASTAL milestones achieved – preceding exploitation. A project-level overview of the outcome-specific timing for exploitation after the project ending is provided in Table 3.

Project outcome or expertise	Actions recommended to improve exploitability	Proposed timing of exploitation after project conclusion (months)
<b>Causal Loop Diagrams and Fuzzy Cognitive Maps</b>	Polishing graphics, documentation, SCI papers. Conference presentation.	6-12
<b>Best Practices (EU level)</b>	Final confirmation with stakeholders and Task 5.1 lead partner, documentation, translation into English/local language	12
<b>Business Road Maps</b>	Final confirmation with stakeholders and WP3 lead partner, documentation, translation into English/local language	12-36
<b>Scenarios (storylines)</b>	Final confirmation with WP5 lead partner, Depositing on repository, translation into English/local language. Integration with business road maps.	12
<b>Generic model structures</b>	Short description, SCI paper, deposition on repository	1-3
<b>Applied stock-flow models</b>	Elaboration of model structure, if needed. Additional testing and documentation with examples, short description of use, depositing on repository.	6-36

Table 3 Recommended actions and expected timing for exploitation.

#### D) HOW: EXPLOITATION TRAJECTORY

All MALs can follow a similar route for exploitation though possibly at a different pace. A concrete strategy and supportive guidelines are to be provided at project level. The following aspects should be taken into consideration:

- The **Knowledge Exchange Platform (KEP)** will serve as supportive platform for communication, exchanging and managing products, sharing ideas and promoting the COASTAL tools. Any data made available as open data will be made available through the Zenodo platform;
- An essential precondition for successful exploitation is the creation of a growing community of experts and users, typically a **forum**. This forum will include persons and organisations with different roles related to communication, promotion activities, IT development and maintenance, policy support and coordination of the KEP and Forum. Regular meetings will be needed to plan the exploitation, monitor the role of the KEP and ensure the Forum serves its purpose;
- As specified in the new Grant Agreement (January, 2022) the partners interested in participation in the Forum will sign an agreement for collaboration **with a long-term commitment** prior to the end of the project. Similar to the consortium agreement this will be a legal contract describing the conditions and obligations for participants and users or clients, knowledge sharing, decision structure,

operational procedures and provisions made for the management of the KEP and functioning of the Forum;

- **The project final event**, and in particular the conference on the second day, will be aimed at showcasing COASTAL with interesting examples. Participants with a high potential for exploitation or contribution to the forum will be given priority. This is a starting point for identifying target groups, and their feedback will be useful for exploring the market potential;
- **Alignment with existing activities, networks and projects of the MALs** is obvious and this should be exploited by the Forum. During the project all MALs familiarized themselves with the COASTAL methodology and contributed to the toolbox.
- As said communication and promotion activities should focus on the applications rather than methodology and techniques of the **toolbox**. A portfolio of well chosen examples (road maps and scenarios) with a appropriate interpretation and documentation is more selling than the models and data used to derive or adjust these. This also implies more effort is to be made to document and polish the project outcomes as time and resources were lacking during the project;
- **A service-oriented model** (Figure 3) has been proposed to for the exploitation management. Services can include policy analysis, model design, adjustment and maintenance and facilitation of stakeholder exchanges.

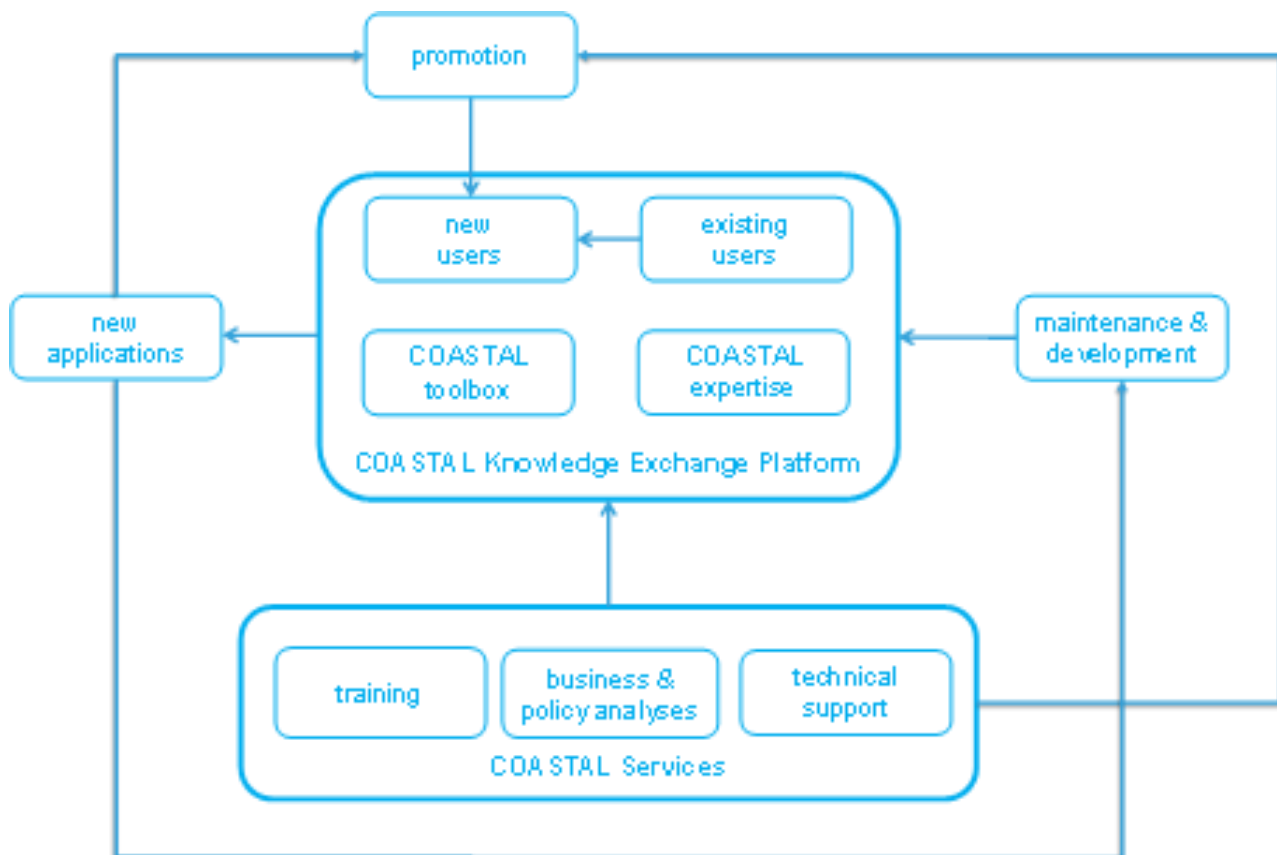


Figure 3 Service oriented model for COASTAL exploitation with main activities.

## KNOWLEDGE EXCHANGE PLATFORM

The underlying idea of the model is to provide public access to key outcomes and showcase products, based on registration to the KEP. These should raise an interest in development of paid products, either directly by service requests to one or more partners, or indirectly through invitations for participation in projects with a scope fitting the expertise and tools provided by the Forum.

Alignment of both the KEP and Forum with existing initiatives and platforms has been recommended and will depend from continuous effort of all partners involved as well as the users of the platform in identifying opportunities for collaboration and interacting with these platforms to create a mutual benefit.

Finally, these are general guidelines at the level of the project. At this level the main actions will be to arrange the conditions and facilities for the KEP and Forum, and to prepare the agreement for collaboration. Specific and concrete actions aimed at exploitation by the MALs, including their timing, are specified in Sections 3-7 of this document.

**The outputs mentioned in Table 1 will be made available in the reformed Knowledge Exchange Platform (Figure 4).** Here the navigation will depend on the type of result the user is interested in, rather than the type of target group it belongs to. In this way, they can easily find the output of interest, and later on target it to their sector.

The KEP will target all type of stakeholder groups as it will make the results available in an easy way and language, to whichever sector is interested.



## KNOWLEDGE EXCHANGE PLATFORM

This platform for land-sea synergy gives coastal and rural operators and planning agencies access to knowledge, solutions, and experiences of other regions and operators facing similar problems.

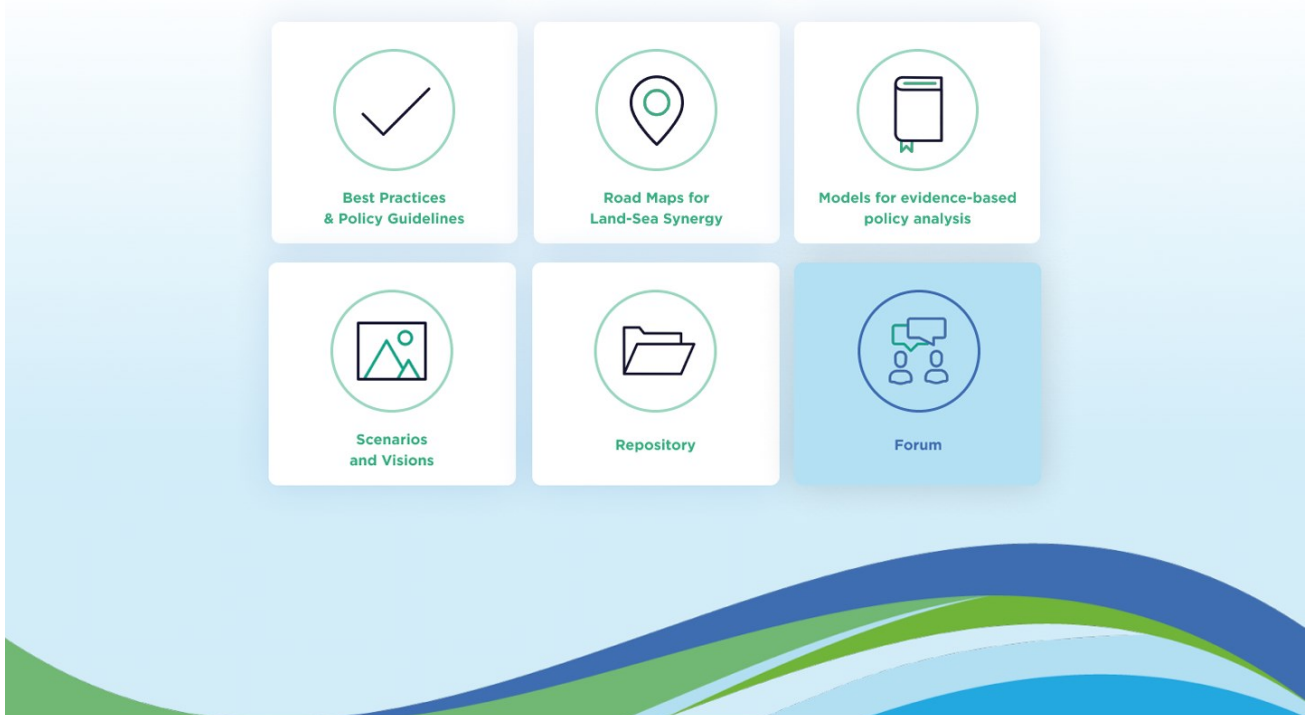


Figure 4 Prototype of the new Knowledge Exchange Platform.

## ZENODO

COASTAL will deposit its scientific and policy results in **ZENODO** (Figure 5), a platform built for open access and open data movements, core values of COASTAL project. Given the profile of the platform, it is meant to target the scientific community mainly with available papers following the **FAIR** principle: Findable, Accessible, Interoperable, and Reusable digital assets. During the General Assembly in Rochefort (October 2021) the important decision was made to use the **Zenodo** open data repository<sup>1</sup> for making the COASTAL data available online. The main reasons for selecting the Zenodo are the user-friendliness of the platform, the wide use for research data generated in EU projects, the support for a wide range of data types, including qualitative and quantitative data, and the general holistic focus of the platform. In addition Zenodo is free of charge. Files up to a size of 50 GB can be deposited<sup>2</sup>. If necessary, restricted access conditions can be added when uploading data. Data sets are deposited with a record containing metadata such as a reference to the project, description and contact persons. A trial run was carried out with positive outcome.

For accessing COASTAL's ZENODO page please visit:

<https://zenodo.org/communities/773782-coastal/?page=1&size=20>

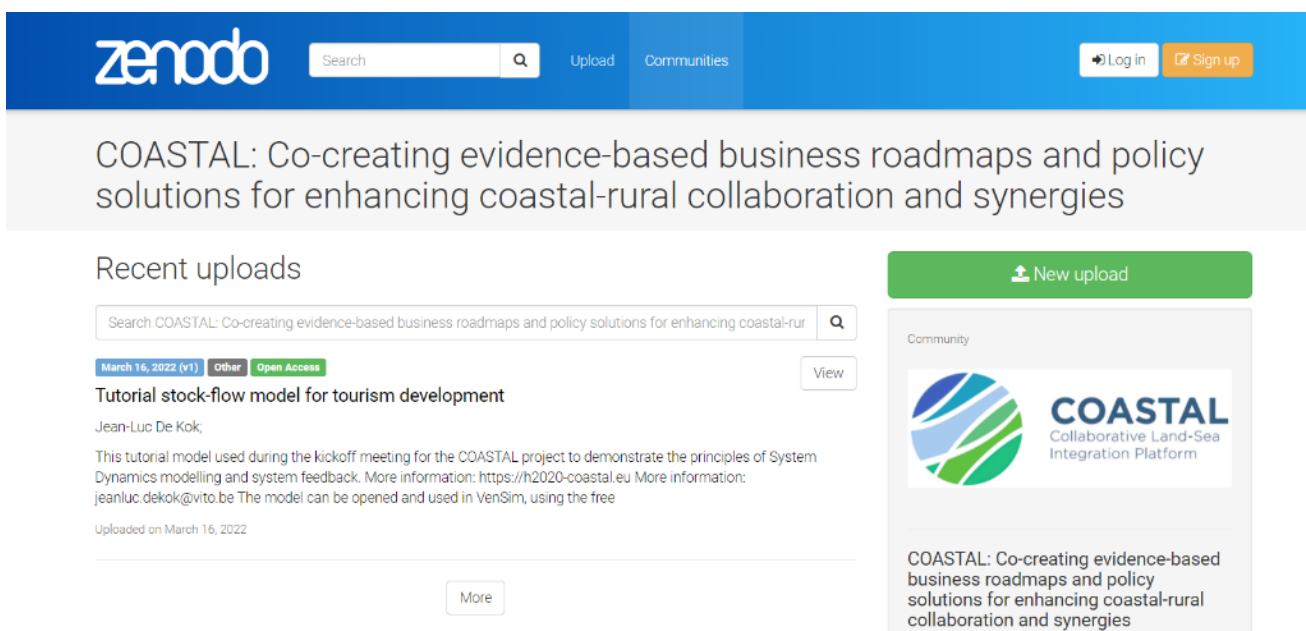


Figure 5 A screenshot of COASTAL community in Zenodo.

<sup>1</sup> <https://zenodo.org/>

<sup>2</sup> <https://about.zenodo.org/policies/>





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## 2. BELGIAN COASTAL ZONE



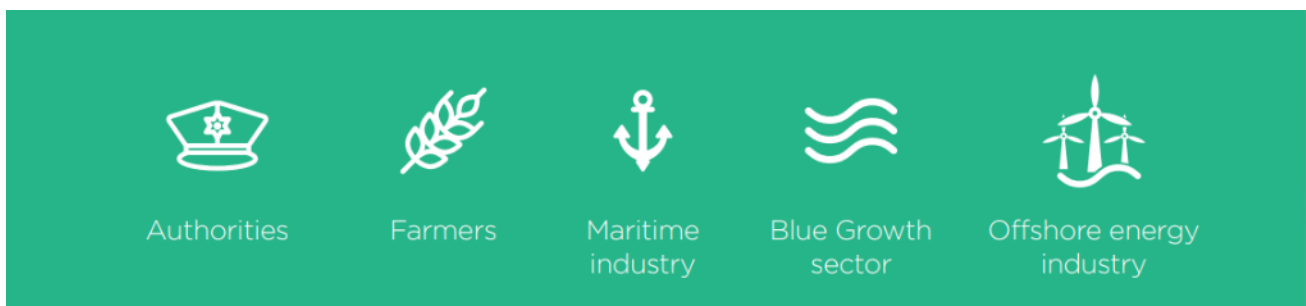
## LOCATION AND CHARACTERISTICS

The Belgian Coastal Zone Multi-Actor Lab focusses specifically on providing business and policy opportunities for a region suffering from intensive use of space and competition for resources, combined with a fragmented governmental context. Along the Belgian coast (67 km length) and its hinterland rural, coastal and sea-based activities such as agriculture, fisheries, agro-food industry, transport, energy production, and recreation are closely interwoven and compete for space, resources and infrastructure.

COASTAL had the ambition to connect and reinforce the different policies for a sustainable use of marine space and to create an integrated approach for a vital coastal area with a thriving hinterland. New development opportunities are created by the emerging blue economy, harnessed in the so-called Blue Growth-strategy. Offshore energy production entails new jobs and strategic specialisation of port activities. Belgium is one of the leading countries in know-how related to offshore energy production including multi-purpose use of wind farms – for example - by combination with shellfish aquaculture, and wave energy convertors.

Based on the expertise and infrastructure of coastal tourism, developing sustainable rural and/or agro-tourism can provide additional income for the hinterland. Economic and environmental opportunities are found, for example, in sectoral restructuring and modernization, improved integration in the rural food chain with diversification, changes in farming practices and new business opportunities.

## ACTORS



## COASTAL PARTNERS INVOLVED

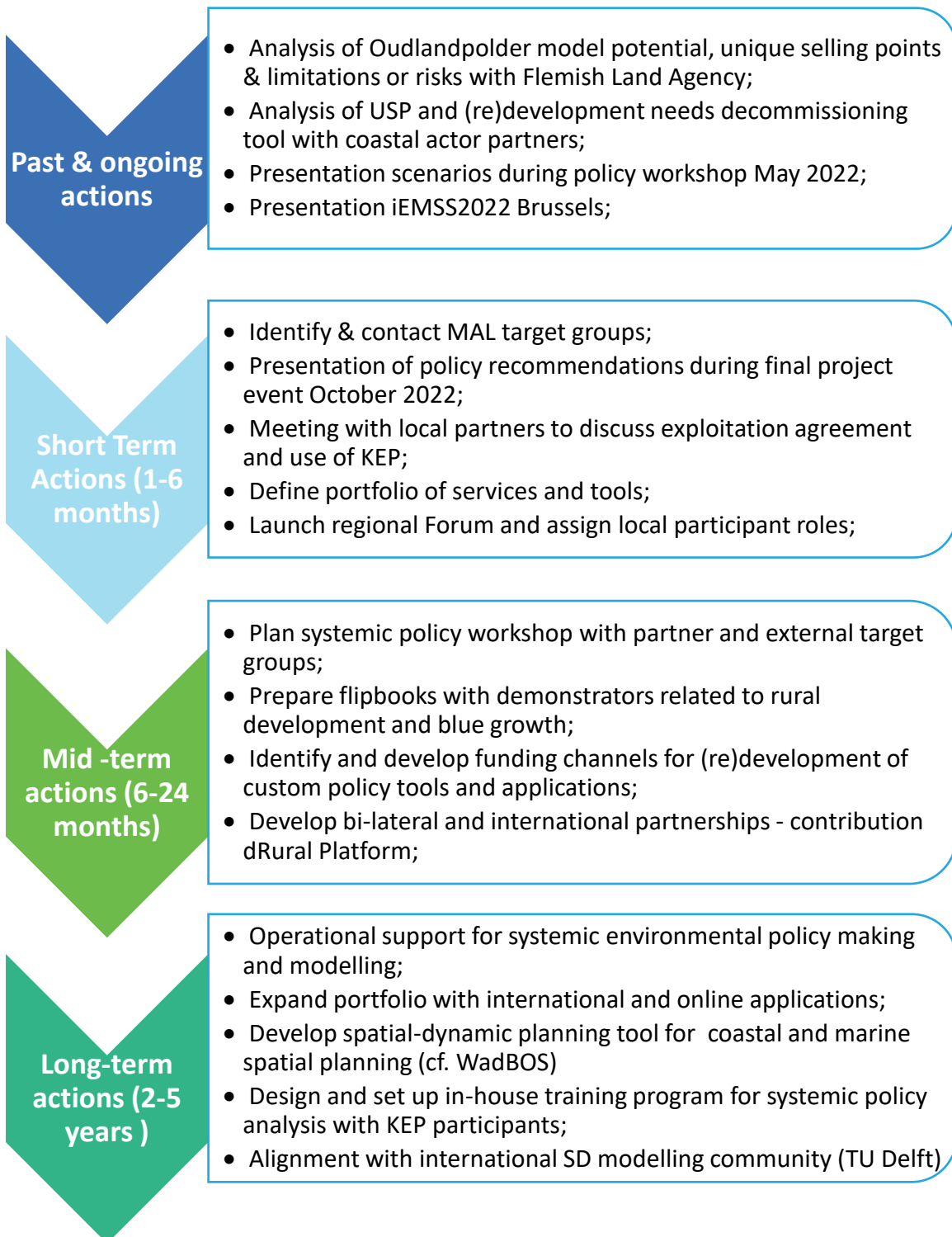


## EXPLOITABLE RESULTS

### RESULT 1: METHODOLOGICAL TOOLBOX FOR STAKEHOLDERS' INTEGRATION

RESULT 1: METHODOLOGICAL TOOLBOX FOR STAKEHOLDERS' INTEGRATION	
<b>Description of result</b>	Descriptions of the methodology applied for participatory modelling and co-development of the business road map (BRM) and policy guidelines for sustainable development in the different case studies.
<b>Exploitation route</b>	The methodology will be available through the COASTAL website and an open online repository (ZENODO) from which it can be used to support policy development or for further research, and it will be published in open access scientific articles.
<b>Quantitative targets and indicators</b>	1 stakeholder meetings every year
<b>Target groups</b>	Policy makers, companies, local population and other stakeholders. This on local, regional, national and international, depending the focus).
<b>Sector of application</b>	Blue economy
<b>Impact</b>	The methodology should increase the level of participation, interaction and conclusion off future stakeholder gatherings.
<b>IPR measures</b>	Non as methodologies will be available on the COASTAL platform
<b>Possible barriers to exploitation activities and mitigation measures</b>	Barrier: Some stakeholders will maybe not be open to this kind of interaction Mitigation: Openness to adapt methodology slightly to include these stakeholders.

## PAST AND PLANNED ACTIONS AND TIMELINE





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## 3. NORRSTRÖM / BALTIC



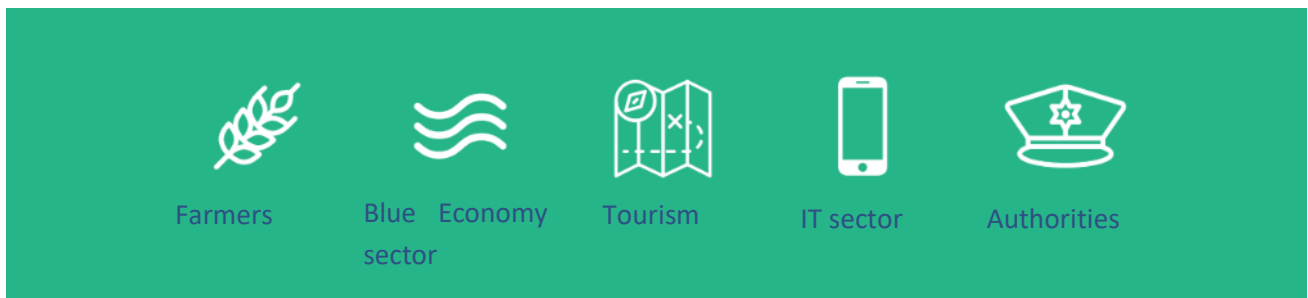


## LOCATION AND CHARACTERISTICS

The Norrström drainage basin (22 000 km<sup>2</sup>) comprises the major part of the Swedish water management district Northern Baltic Proper. For the case study economic and environmental issues will be considered at the scale of the Baltic Sea and local scale, including environmental and physical interactions between the two scales. The basin is part of the fertile Swedish belt, characterised by extensive agriculture, and includes the Swedish capital Stockholm. An unresolved and well recognised problem for the coastal environment and its sustainable development is the human-driven eutrophication and associated hypoxia with recurring harmful algae blooms, caused by the combined nutrient emissions from households, agriculture, and industry. These impacts occur on the local/regional scale of the Swedish Norrström case and the macro-regional/cross-boundary scale of the whole-Baltic case.

Sustainable development solutions must consider the agricultural, urban, and industrial activities in the hinterland, the high and increasing population density, tourism development in the coastal zone, ongoing and future climate change, and their combined effects on the nutrient loads transported to the coast. The overarching problem and possibilities for addressing the problem are recognized in strategic planning and development plans at the local and regional scale. The ambition for COASTAL was to **connect and support policies and strategies for sustainable rural, urban and coastal development** and to **create an integrated approach to mitigation of coastal-marine eutrophication and pollution**.

## ACTORS



## COASTAL PARTNERS INVOLVED



Stockholm University



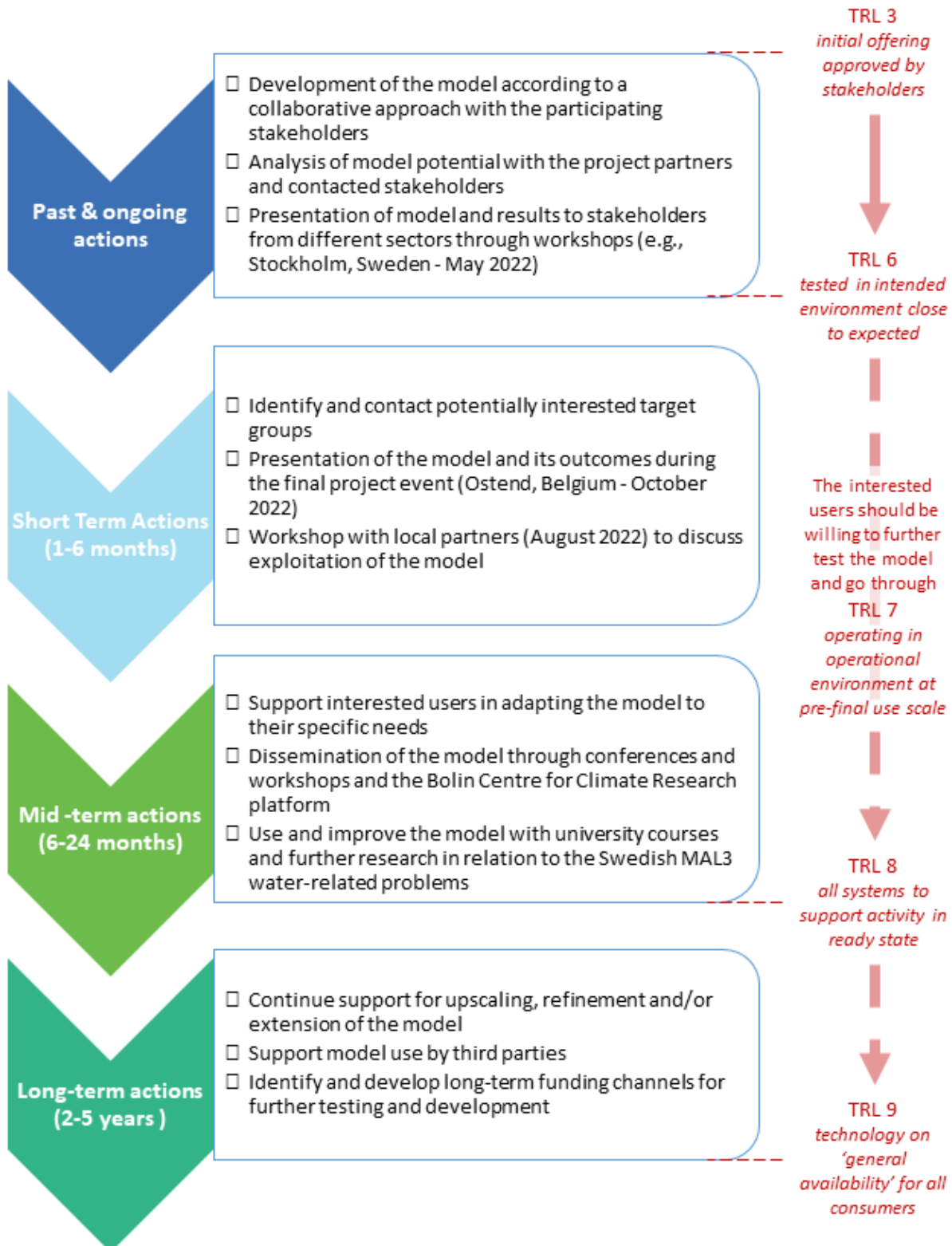
## EXPLOITABLE RESULTS

### RESULT 1: SD MODEL STRUCTURE

RESULT 1: SD MODEL STRUCTURE	
<b>Description of result</b>	Documented system dynamics (SD) model structures with an easy-to-use dashboard view
<b>Exploitation route</b>	The model structures are expected to be further used in other relevant research and educational programs for master and PhD courses at Stockholm University and also by the Swedish MAL3 local partners. They are expected to also be used in scientific presentations and publications to conceptualize the addressed problems and management topics. These structures are also expected to be included in the COASTAL open database for the identified target groups at regional and European level.
<b>Quantitative targets and indicators</b>	15 downloads and 3 citations per year for relevant publications as well as for COASTAL database
<b>Target groups</b>	Scientists, university students, and model developers working on coastal regions and associated water quantity and quality issues
<b>Sector of application</b>	Local water and wastewater management authorities, Municipalities, Inland and coastal tourism sectors, Spatial/urban planners, Green industry (agriculture, forestry and natural ecosystem), Governmental agencies, Academia
<b>Impact</b>	Technical, scientific and educational impacts as the model structures will support university courses and further research, testing and assessments by model developers in relation to the Swedish MAL3 water-related problems.
<b>IPR measures</b>	None foreseen. The COASTAL open database will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon the model structures non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial. Relevant publications will also be open-access and freely available.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<p><b>Barrier:</b> The level of modelling knowledge and background of the identified target groups and the Swedish MAL3 local partners to use the model structures.</p> <p><b>Mitigation measure:</b> For university students and the COASTAL open database, additional materials will be included on the concept of system dynamics (SD) modelling. For scientific presentations, model structures</p>

will be simplified and only land-coast-sea interactions included/addressed in the model structures will be explained.

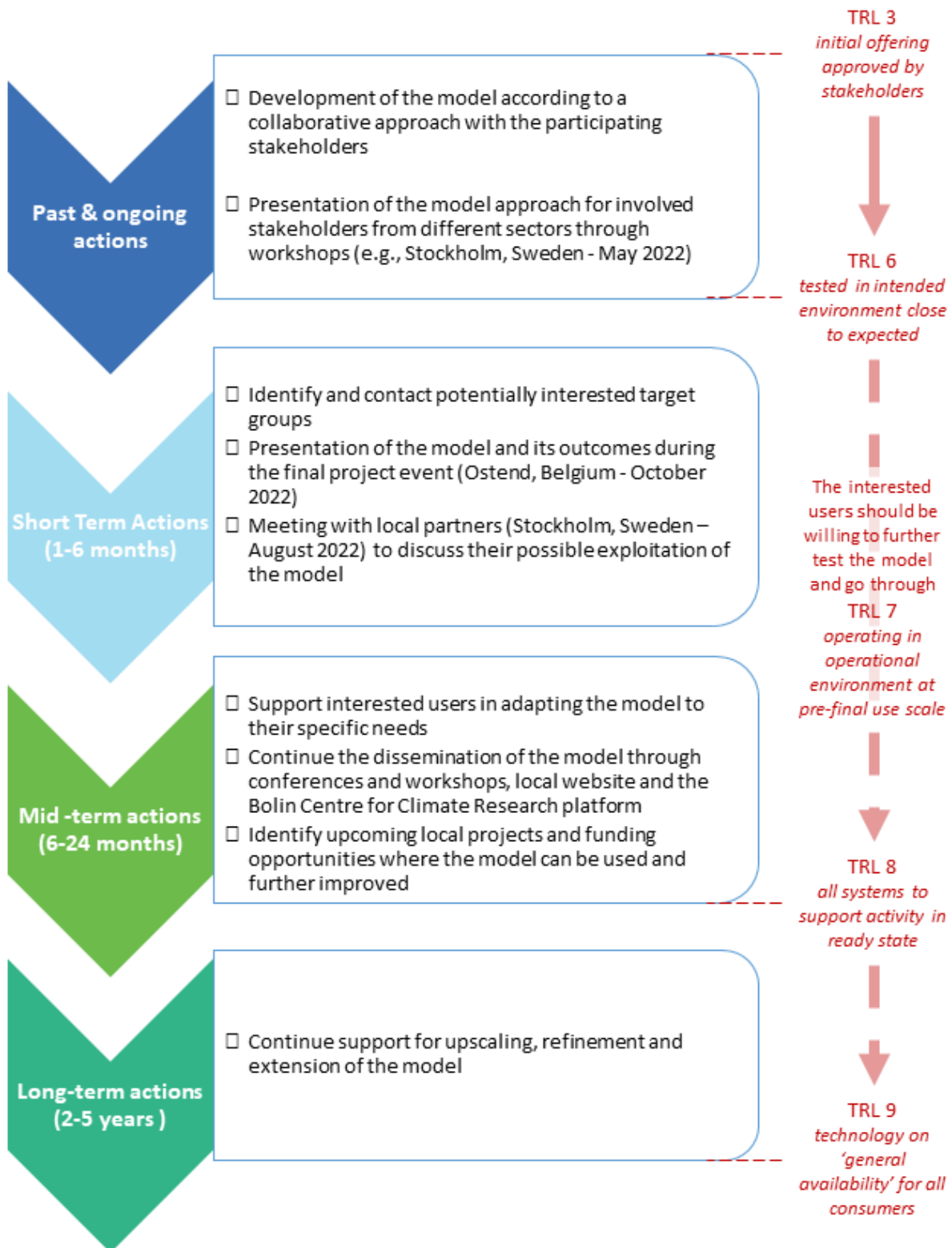
## PAST AND PLANNED ACTIONS



## RESULT 2: DATA-MODELLING APPROACHES INVENTORY

RESULT 2: DATA/MODELLING APPROACHES INVENTORY	
<b>Description of result</b>	Broad inventory of physical, environmental and socio-economic data and modelling approaches/results developed for system dynamics (SD) model quantification
<b>Exploitation route</b>	Most of the data and modelling approaches used in the Swedish MAL3 case are currently available in open-access publications and national reports included in various COASTAL deliverables. This information together with the newly developed data and modelling approaches as part of COASTAL will be uploaded to open online repositories (e.g., ZENODO and Open Aire) for their reuse by end-users.
<b>Quantitative targets and indicators</b>	30 number of downloads and 5 citations per year for relevant publications including the used data and modelling approaches as well as for COASTAL database
<b>Target groups</b>	Scientists, university students, and model developers working on coastal regions and associated water quantity and quality issues
<b>Sector of application</b>	Academia, Water management authorities, Green industry (agriculture, forestry and natural ecosystem), Spatial/urban planners
<b>Impact</b>	Technical, scientific and educational impacts as the COASTAL open database will be open-access following the Findable, Accessible, Interoperable, Reusable (FAIR) principle, allowing other researchers, university students and model developers to use it, tweak it, build on it and further produce science-based evidences.
<b>IPR measures</b>	None foreseen. Relevant publications are open-access. The COASTAL open database will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon the model structures non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<p><b>Barrier:</b> None foreseen.</p> <p><b>Mitigation measure:</b> None foreseen.</p>

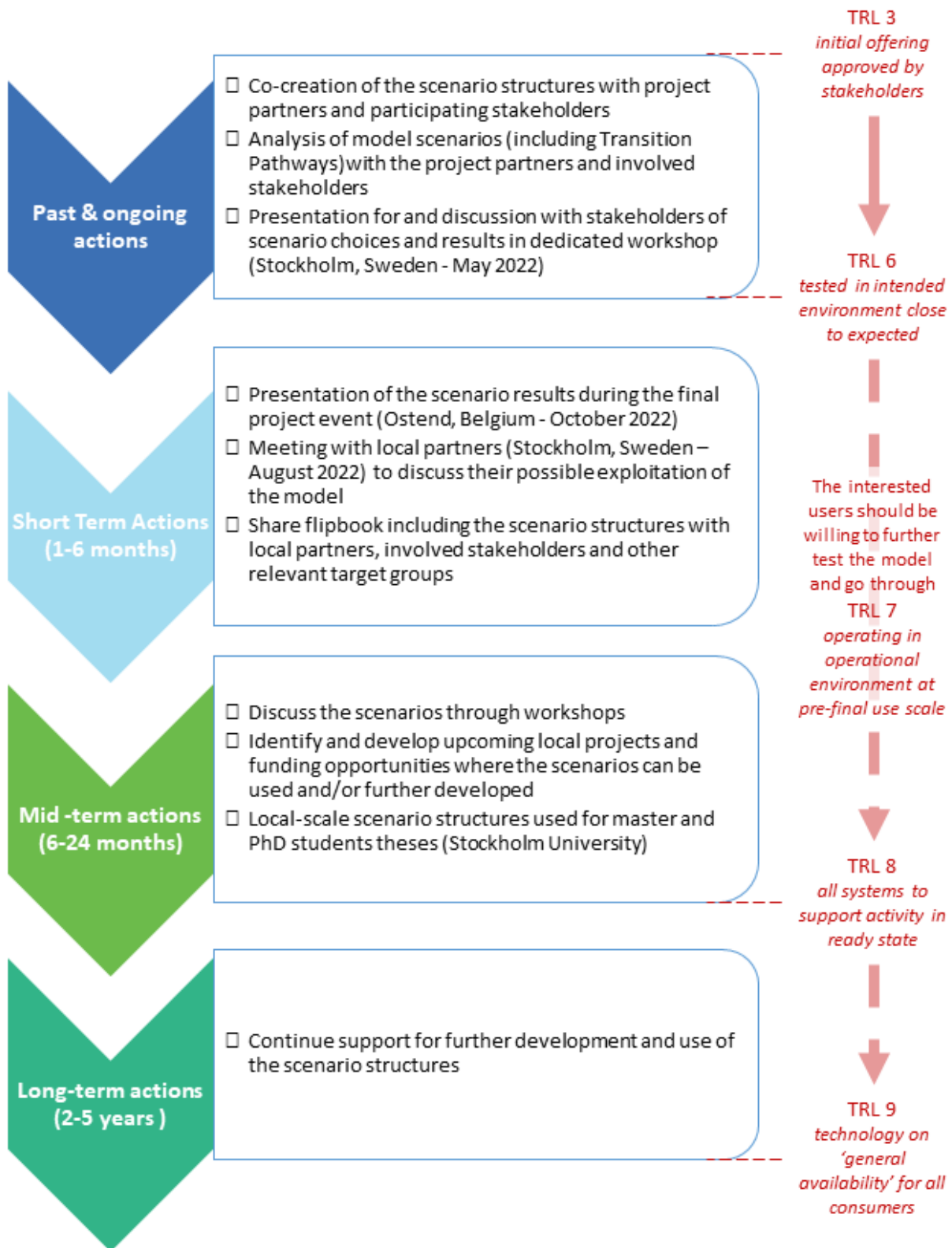
## PAST AND PLANNED ACTIONS



## RESULT 3: SCENARIO STRUCTURES

RESULT 3: SCENARIO STRUCTURES	
<b>Description of result</b>	Scenario structures developed based on the representative concentration pathways (RCPs) and the shared socioeconomic pathways (SSPs) and downscaled on the local/regional scale of the Swedish MAL3 coastal area
<b>Exploitation route</b>	Local-scale scenario structures will be included in the COASTAL Knowledge Exchange Platform and are expected to be published in a digital flipbook to be made available to relevant target groups and the Swedish MAL3 local partners and stakeholders. The scenario structures will also be published in open-access publications for a broader range of scientific audiences. They will also be used by master and PhD students at Stockholm University in their thesis.
<b>Quantitative targets and indicators</b>	30 local partners and stakeholders to receive the flipbook including the scenario structures, and 20 downloads and 3 citations per year for relevant publications including the local-scale scenario structures
<b>Target groups</b>	Scientists, university students, and model developers, regional decision and policy makers focusing on sustainability and development of inland and coastal regions
<b>Sector of application</b>	Spatial/urban planners, Green industry (agriculture, forestry and natural ecosystem), Administrations and local authorities, Governmental agencies and authorities, Academia
<b>Impact</b>	Technical, scientific and educational impacts as the COASTAL open database will be open-access following the Findable, Accessible, Interoperable, Reusable (FAIR) principle, allowing other researchers, university students and model developers to use it, tweak it, build on it and further produce science-based evidence.
<b>IPR measures</b>	None foreseen. The COASTAL Knowledge Exchange Platform, the digital flipbook and publications will also be open-access and freely available.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<p><b>Barrier:</b> The level of knowledge and understanding of global SSPs and RCPs and how they may relate to local and regional changes and development possibilities among the Swedish MAL3 local partners and stakeholders.</p> <p><b>Mitigation measure:</b> Additional descriptive materials and documents will be included in the COASTAL Knowledge Exchange Platform and the digital flipbook in relation to SSPs, RCPs and their hydro-climatic, social, economic and environmental aspects.</p>

## PAST AND PLANNED ACTIONS



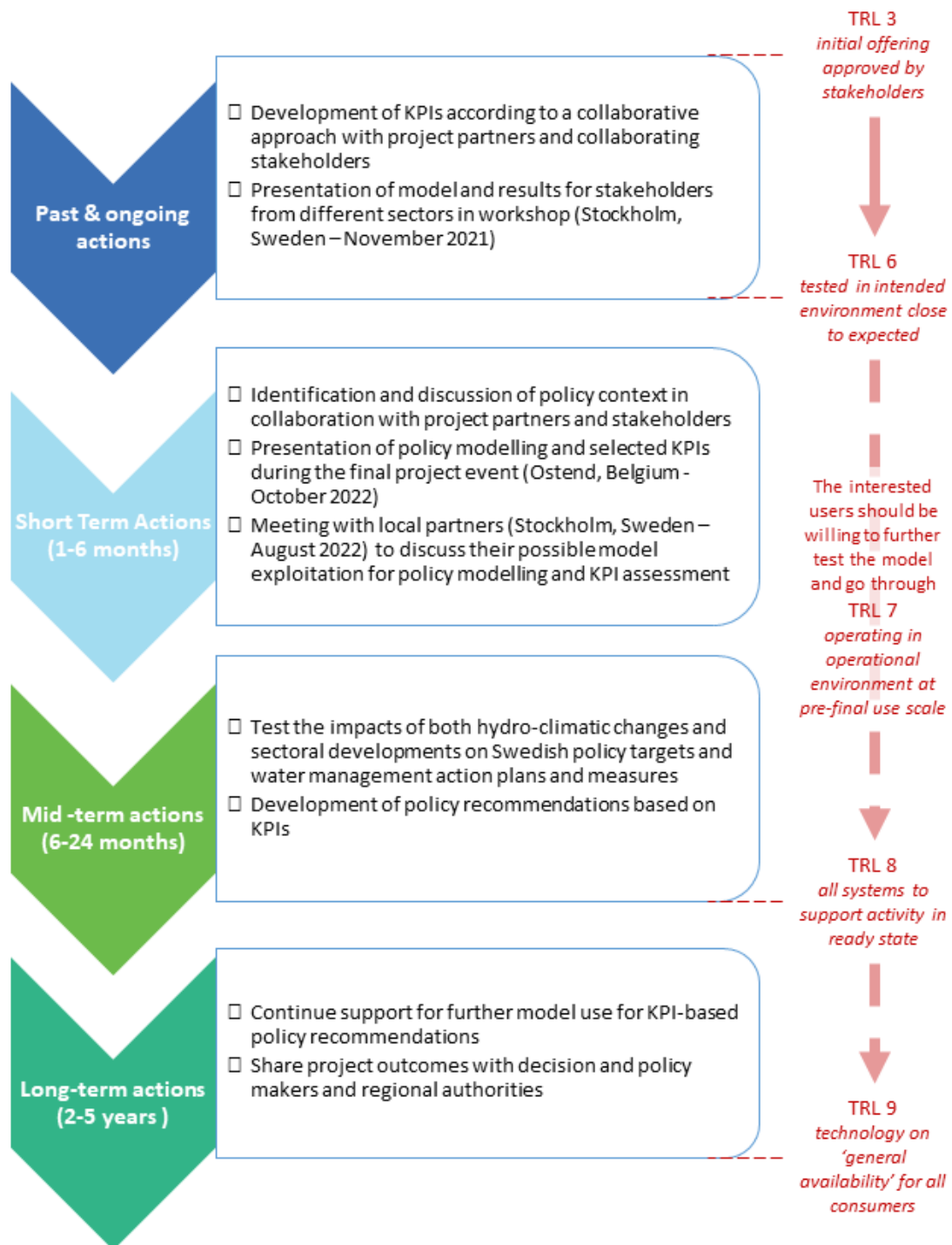
## RESULT 4: POLICTY AND ENVIRONMENTAL KEY PERFORMANCE INDICATORS

RESULT 4: POLICTY AND ENVIRONMENTAL KEY PERFORMANCE INDICATORS	
<b>Description of result</b>	Quantitative key performance indicators developed for the Swedish MAL3 coastal region and reflecting the achievement of regional policy targets, seawater intrusion risks into fresh coastal groundwater, and sectoral water availability and quality
<b>Exploitation route</b>	The developed indicators will be used to test and explain the impacts of hydro-climate changes and sectoral development on regional policy targets and water management action/measure plans in the Swedish MAL3 region through COASTAL-related and other research at Stockholm University. The results of such analysis will also be published in open-access publications for a broader range of scientific audiences. The indicators will be included in the COASTAL Knowledge Exchange Platform and are also expected to be used by the Stockholm University team, the MAL3 local partners and the identified target groups to further communicate the project outcomes with decision and policy makers and regional authorities (e.g., in the final project seminar).
<b>Quantitative targets and indicators</b>	15 number of downloads and 3 citations per year for relevant publications on the application of the developed key performance indicators
<b>Target groups</b>	Scientists and model developers, regional decision and policy makers focusing on sustainability and development of inland and coastal regions
<b>Sector of application</b>	Local water management authorities, Municipalities, Spatial/urban planners, Green industry (agriculture, forestry and natural ecosystem), Governmental agencies, Academia
<b>Impact</b>	Scientific, educational, and policy- and management-related impacts as the indicators will be used by other researcher and university students for further analysis of the Swedish MAL3 water-related problems and potential solutions, and also can guid the development of mitigation measures and action plans to address these problems on local and regional scales.
<b>IPR measures</b>	None foreseen. The COASTAL Knowledge Exchange Platform and publications will also be open-access and freely available.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<b>Barrier:</b> The level of knowledge and understanding of regional policy guidelines and targets as well as physical processes involved in environmental conditions among the Swedish MAL3 local partners and stakeholders, as they are considered as a basis for the development and interpretation of the associated key performance indicators.



**Mitigation measure:** Additional descriptive materials and documents will be included in the COASTAL Knowledge Exchange Platform and presented to local partners and stakeholders when communicating the developed indicators with them.

## PAST AND PLANNED ACTIONS

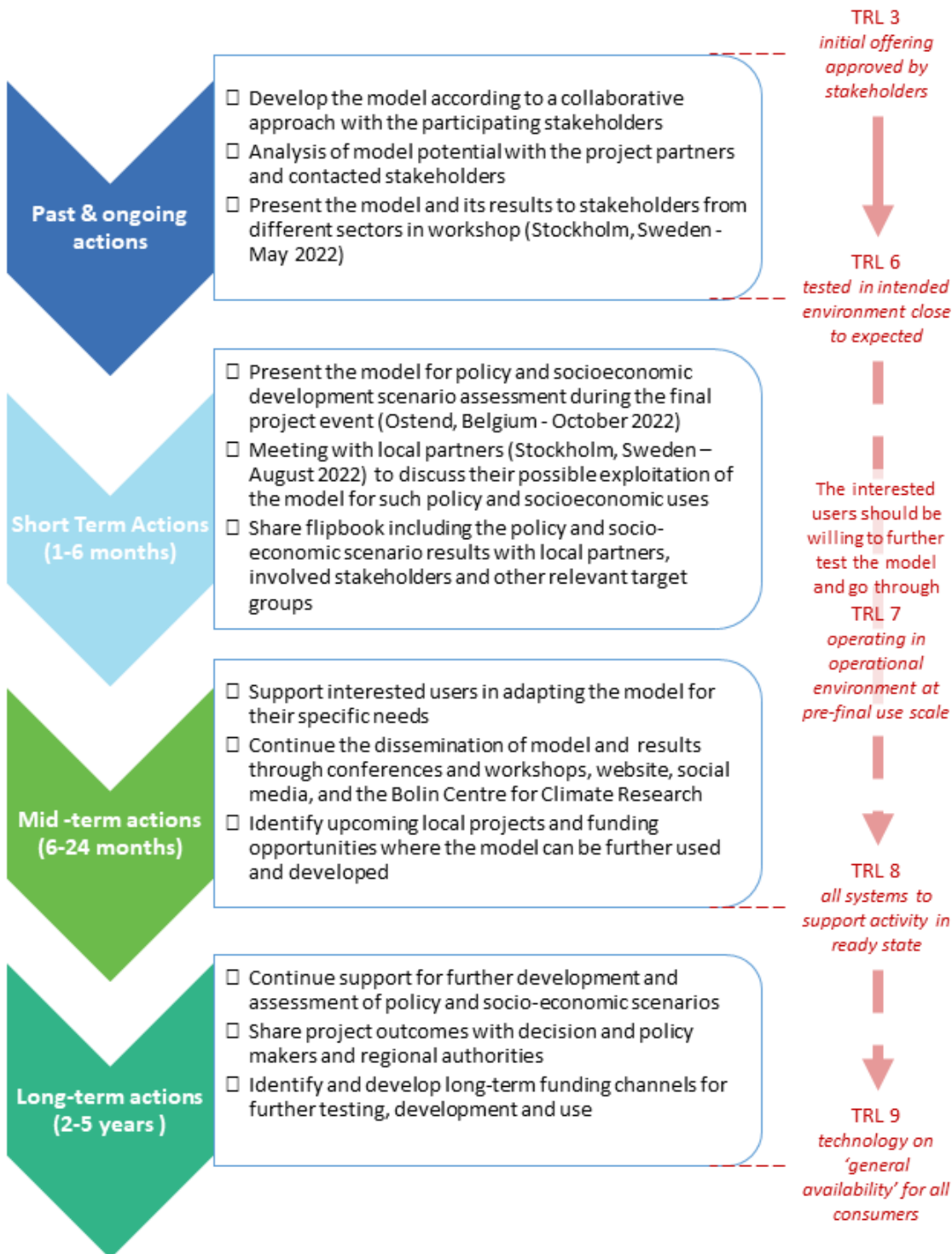


## RESULT 5: POLICY AND SOCIOECONOMIC SCENARIO RESULTS

RESULT 5: POLICY AND SOCIOECONOMIC SCENARIO RESULTS	
<b>Description of result</b>	Scenario result analysis and interpretation of implications driven by hydro-climate changes and sectoral development for achieving the policy targets and implementing environmental regulations in the Swedish MAL3 coastal region
<b>Exploitation route</b>	Scenario results will be included in the COASTAL Knowledge Exchange Platform and are expected to be published in a digital flipbook together with scenario structures to be made available to relevant target groups and the Swedish MAL3 local partners and stakeholders. These results will also be published in open-access publications for a broader range of scientific audiences.
<b>Quantitative targets and indicators</b>	30 local partners and stakeholders to receive the flipbook including the scenario results, and 15 number of downloads and 3 citations per year for relevant publications including the scenario results
<b>Target groups</b>	Water resource managers/engineers and decision makers focusing on water resources use, availability and sustainability on land catchments affecting the development of corresponding inland and coastal regions, and regional policy makers working on cross-sectoral and cross-scale collaboration
<b>Sector of application</b>	Local water and wastewater management authorities, Municipalities, Spatial/urban planners, Green industry (agriculture, forestry and natural ecosystem), Governmental agencies
<b>Impact</b>	Scientific, environmental, and policy- and management-related impacts, as the scenario results will be made published for scientific audiences, and can guide the development of mitigation measures and action plans to address water-related and environmental problems on local and regional scales within the Swedish MAL3 region.
<b>IPR measures</b>	None foreseen. The publications will also be open-access and freely available.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<b>Barrier:</b> The level of knowledge and understanding of regional policy guidelines and targets, future hydro-climate changes, and possible socioeconomic developments in the Swedish MAL3 region based on SSPs and RCPs among local partners and stakeholders.

**Mitigation measure:** Additional descriptive materials and documents will be included in the COASTAL Knowledge Exchange Platform and the digital flipbook in relation to SSPs, RCPs and their hydro-climatic, social, economic and environmental aspects, and their relevance to the Swedish MAL3 condition.

## PAST AND PLANNED ACTIONS

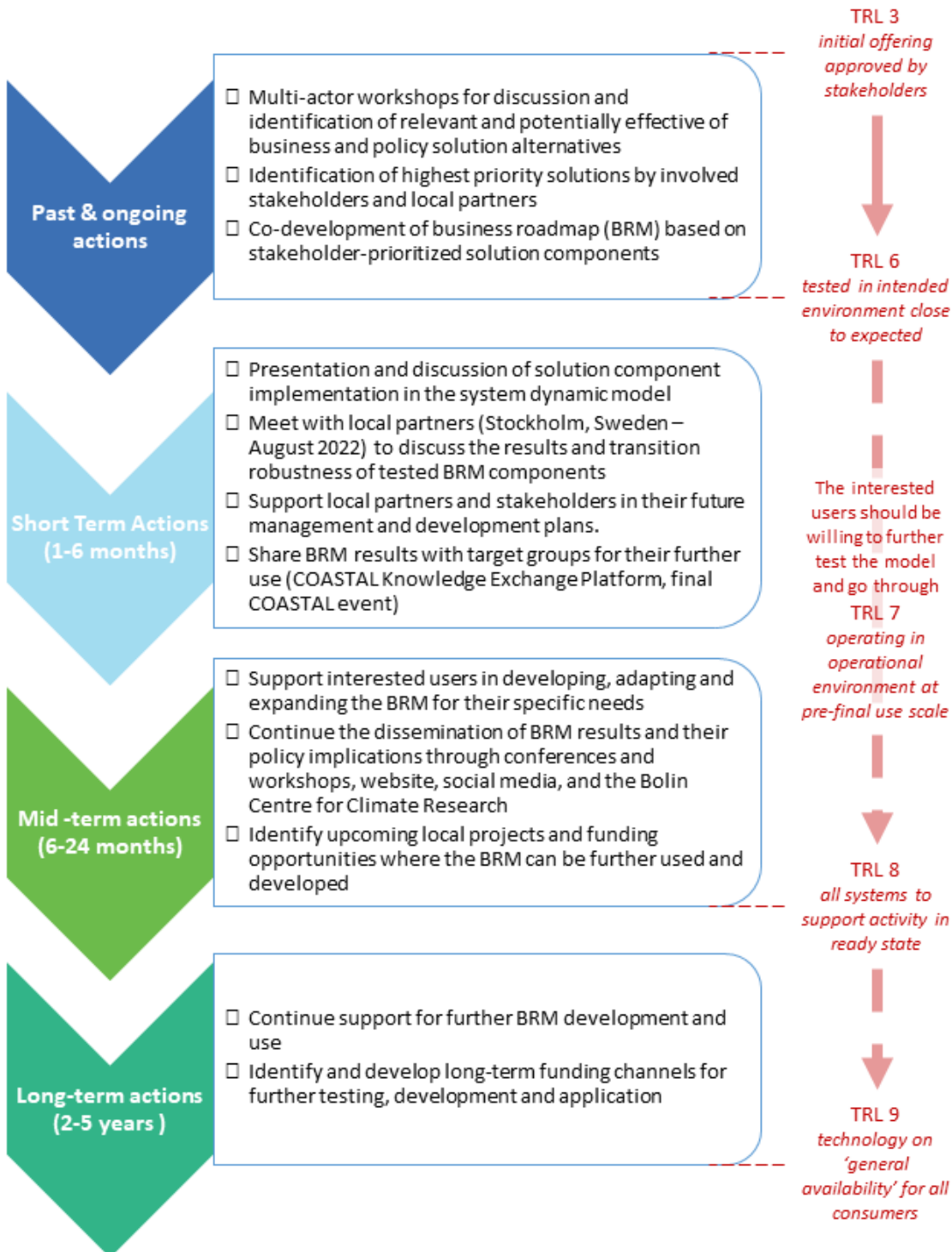


## RESULT 6: BUSINESS/TRANSITION ROADMAPS

RESULT 6: BUSINESS/TRANSITION ROADMAPS	
<b>Description of result</b>	Business and transition roadmaps prioritized and developed by stakeholders to promote rural-coastal synergies and environmental sustainability (i.e., water availability and quality) in the Swedish MAL3 coastal region
<b>Exploitation route</b>	The developed roadmaps will be used to test the impacts of various sectoral and regulatory actions in the Swedish MAL3 region through further research at Stockholm University. The outcomes of such assessments will be published in open-access publications. The roadmaps are also expected to be used by the local partners and stakeholders in their future management and development plans. The roadmaps will also be shared with the identified target groups for their potential use (e.g., through the COASTAL Knowledge Exchange Platform and in the final project seminar).
<b>Quantitative targets and indicators</b>	10 local partners and stakeholders to consider/prioritize relevant actions in the developed roadmaps within their development plans
<b>Target groups</b>	Water and wastewater managers, and regional decision and policy makers focusing on sustainability and development of inland and coastal regions as well as cross-sectoral collaboration
<b>Sector of application</b>	Local water and wastewater management authorities, Municipalities, Tourism sector, Spatial/urban planners, Green industry (agriculture, forestry and natural ecosystem), Governmental agencies
<b>Impact</b>	Societal, economic, and policy- and management-related impacts, as the developed roadmaps provide an overview of needed/prioritized action plans for business and policy development that contribute to and influence economic growth and societal sustainability in the Swedish MAL3 coastal region.
<b>IPR measures</b>	None foreseen. The publications will also be open-access and freely available.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<p><b>Barrier:</b> Generality level of the developed roadmaps that can affect their implementation.</p> <p><b>Mitigation measure:</b> Due to the problem complexity and lack of time and interactions with the Swedish MAL3 stakeholders during the project period as a result of COVID19 pandemic, the roadmaps are developed at a very general level. However, they can be further revised and expanded with more detailed action plans by users in other research or projects. If possible, relevant scenario results will be included in</p>

their presentation on the COASTAL Knowledge Exchange Platform and the final project seminar to show their impacts and support their consideration by potential target groups.

## PAST AND PLANNED ACTIONS





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## 4. CHARENTE RIVER BASIN



## LOCATION AND CHARACTERISTICS

The Charente river basin in South-West France is predominantly rural and covers an area of 10,500 km<sup>2</sup>. It is linked to the sea by the Pertuis Charente River, with a large tidal influence.

Agriculture represents the main hinterland activity (59% of the area but only 6% jobs), and major urbanization can be found in the cities of La Rochelle (on the coast) and Angoulême (further inland). The Port Atlantique-La Rochelle has extensive industrial activity, with some 8 million tons of cargo handled per year, of which around 4 million are cereals (second port in France for cereals). The tidal river Port of Rochefort/Tonnay Charente (838 000 tons in 2018) is located 25 kilometres from La Rochelle.

The region is characterized by a contrast between the densely populated coastal fringe and the rural territory with a low population density. Industrial activity is dominated by the agri-food and wine industries, centred on the cities of Cognac and Angoulême. This area produces some 204 million bottles annual, 97% of which are exported, for annual revenue of around 3.1 billion euros. There is significant tourist activity in the region, mainly focused on the coastal areas, and accounting for around 6% of employment, rising to ten percent in the summer, and accounting for around 25,000 individual jobs.

At the river mouth, the Charente river supplies fresh water to the shellfish production area of Marennes Oléron, producing around 50,000 tons of oysters and 12,000 tons of mussels per year. Freshwater is essential for shellfish farming, which depends on a sensitive balance between the temperature, salinity, and acidity of coastal waters, inland supply of freshwater and nutrients. The Marennes-Oléron bay is the biggest shellfish farming centre for spat production in Europe and has the largest number of shellfish companies (SMEs).

Charente-Maritime is home to three major marshes, whose cultivation creates a risk of imbalance, endangering both fauna and the flora. There is considerable worry about diffuse pollution of surface water by nutrients and pesticides and the resulting influence on drinking water supply. Most inland watercourses suffer from droughts and periodic low water levels, making water supply a challenge in the area. The main policy issue for the region is the current and future supply and quality of the freshwater for different functions (drinking water, agriculture, industry, and shellfish farming).

COASTAL's ambition in this region was:

- To strengthen policies for sustainable development of the upstream, downstream parts of the basin and the associated coastal zone
- Through an integrated approach, coordinate opportunities for the economic development of coastal and rural areas while preserving the environment and in particular the water resource
- Evolution towards a **diversified, harmonious, sustainable territory that maintains the major economic activities** (sustainable shellfish farming, agriculture, tourism), **population and services** both in coastal and rural areas while developing land-sea synergies

## ACTORS



## PARTNERS



## EXPLOITABLE RESULTS

### RESULT 1: SYSTEM DYNAMICS MODEL AND THE ASSOCIATED DATA TO SIMULATE THE SOCIOECOLOGICAL DEVELOPMENT OF THE CHARENTE RIVER BASIN

#### RESULT 1: A system dynamics model and the associated data to simulate the socioecological development of the Charente River Basin

##### Description of result

An integrated socioecological model of the Charente River Basin, implemented in system dynamics language (Vensim software), and datasets needed to develop the model and run simulations.

##### Exploitation route

The model and datasets will be available through the project website and an online INRAE open repository where they can be downloaded. It is intended that a published scientific paper will also present in detail the model, its development and use. The model and datasets will also be available on the open-data site of the institute HAL INRAE that is a part of HAL, France's multi-disciplinary open access archive. INRAE encourages its researchers to deposit their publications, teaching materials and patents over the course of their work, and to provide updates as necessary. This way, the wealth of knowledge and expertise at INRAE and COASTAL project results can be open and accessible to the widest possible audience.

##### Quantitative targets and indicators

30 downloads and 15 citations per year

##### Target groups

Researchers, academics, students, consultants, policy makers, (environmental) managers from the region and beyond facing similar issues.





**Sector of application**

Water (management), agriculture, shellfish (oysters) farming, tourism, territorial management, public policies, infrastructure.

**Impact**

It will be possible for researchers to download the model and adapt it if necessary in order to better tailor it to their needs and thus improve knowledge on interactions around the water resource at the territory level. Decision-makers/managers may use the model to better understand the dynamic and the functioning of the socio/economic/environmental systems within their territories.

**IPR measures**

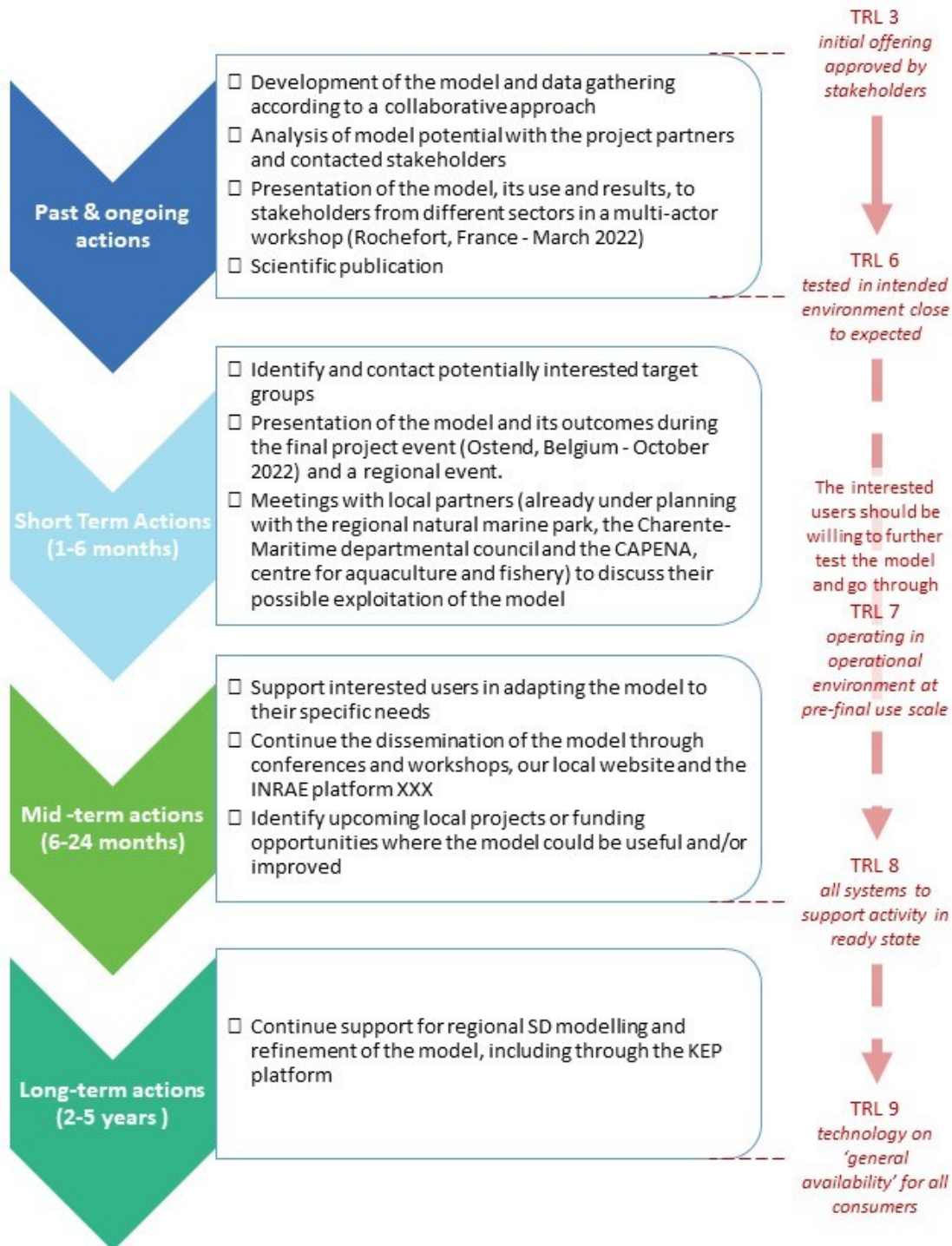
Not foreseen, as the research is open access.

**Possible barriers to exploitation activities and mitigation measures**

There are still many weaknesses/uncertainties regarding the relationships between several variables that need first to be addressed before to be trustingly exploited by decision-makers. The model has many variables whose relevance must be confirmed by stakeholders while further expertise in SD modelling would help improve its setting.



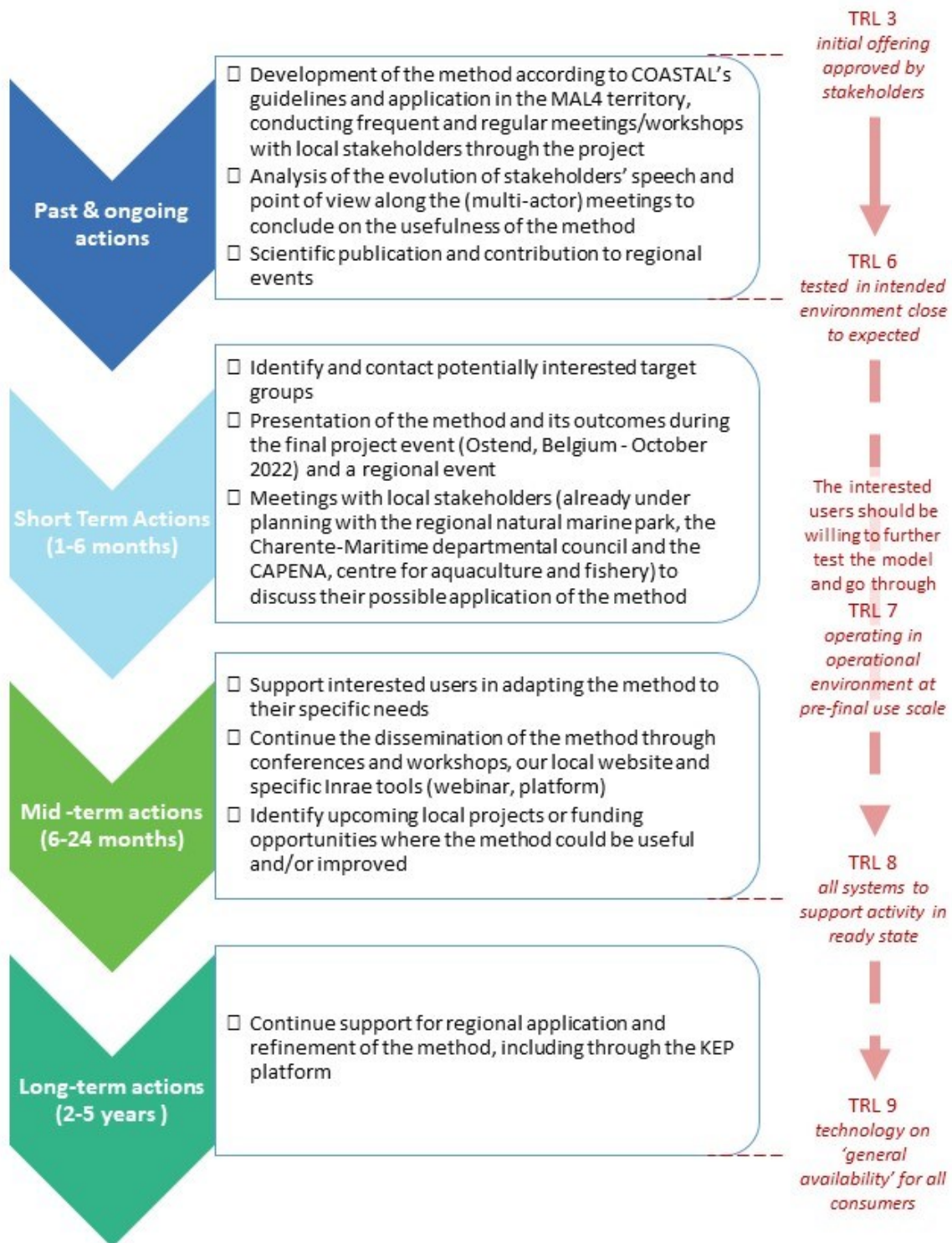
## PAST AND PLANNED ACTIONS



## RESULT 2: METHOD AND TOOLS FOR A COLLABORATIVE DESIGN AND ANALYSIS OF THE DEVELOPMENT SCENARIOS

<b>RESULT 2: Method and tools for a collaborative design and the analysis of the development scenarios</b>	
<b>Description of result</b>	The method consists in a set of steps to follow in order to design and assess scenarios using the model presented before. These steps imply collaboration with stakeholders to entrench the credibility of the method. Supporting tools (software) will allow to easily quantify, to simulate and to analyse scenarios.
<b>Exploitation route</b>	Method and tools will be available through the project website and the online INRAE open repository. A scientific paper is intended to be published in a peer-reviewed journal to explain in more details the method and its application to the MAL4 territory.
<b>Quantitative targets and indicators</b>	30 downloads.
<b>Target groups</b>	Policy makers, (environmental) managers, consultants, researchers, academics, students.
<b>Sector of application</b>	Water (management), Agriculture, Shellfish farming (oysters), Tourism, Territorial management, infrastructure.
<b>Impact</b>	In support to decision-makers who have to improve the sustainability of an activity or to manage the territory, the model once downloaded can be applied and foster/support social dialogue with stakeholders. Results from such collaborative scenario analyses can allow identifying which actions seem the most promising to reach a sustainable pathway providing this way a common ground for discussion and compromise.
<b>IPR measures</b>	Not foreseen, as the research is open access.
<b>Possible barriers to exploitation activities and mitigation measures</b>	The method requires a properly calibrated model which needs further to be validated in order to adequately represent the functioning of the system. However, this preparatory work may be a costly additional task by itself. Moreover, it is very likely that the method will be more useful if the stakeholders already agree on the objectives and are willing to collaborate.

## PAST AND PLANNED ACTIONS



## RESULT 3: BUSINESS ROADMAP AND POLICY RECOMMENDATIONS FOR THE SUSTAINABLE DEVELOPMENT OF THE CHARENTE RIVER BASIN, WITH SUPPORTING MODELLING RESULTS

### RESULT 3: Business roadmap and policy recommendations for the sustainable development of the Charente River Basin, with supporting modelling results.

#### Description of result

A set of recommended actions that different (private and public) stakeholders may implement over time to reach a common sustainable 'desirable future' within the Charente River Basin, and policy recommendations that may help enhance land sea synergies. Simulation results, achieved using the model developed, could support the selected actions.

#### Exploitation route

The roadmap and simulation results will be available through the (European and French) project websites and the open online INRAE repository. Moreover, to promote the opening and dissemination of research data produced in France, a National research-data platform named RechercheDataGouv is being created. The roadmap and policy recommendations will be presented to local stakeholders during a multi-actor workshop or operational events and further to different academics.

#### Quantitative targets and indicators

30 downloads.

#### Target groups

Policy makers, (environmental) managers, consultants, researchers, academics, media, students.

#### Sector of application

Water (management), agriculture, shellfish (oysters) farming, tourism, territorial management, public policies, infrastructure.

#### Impact

Decision-makers and local managers can use the roadmap to inspire their own choices. Researchers may consult and compare model outputs with solutions they are testing in their own study region. Media can also use the road map to communicate about potential solutions for a sustainable development with objectives shared in common.

#### IPR measures

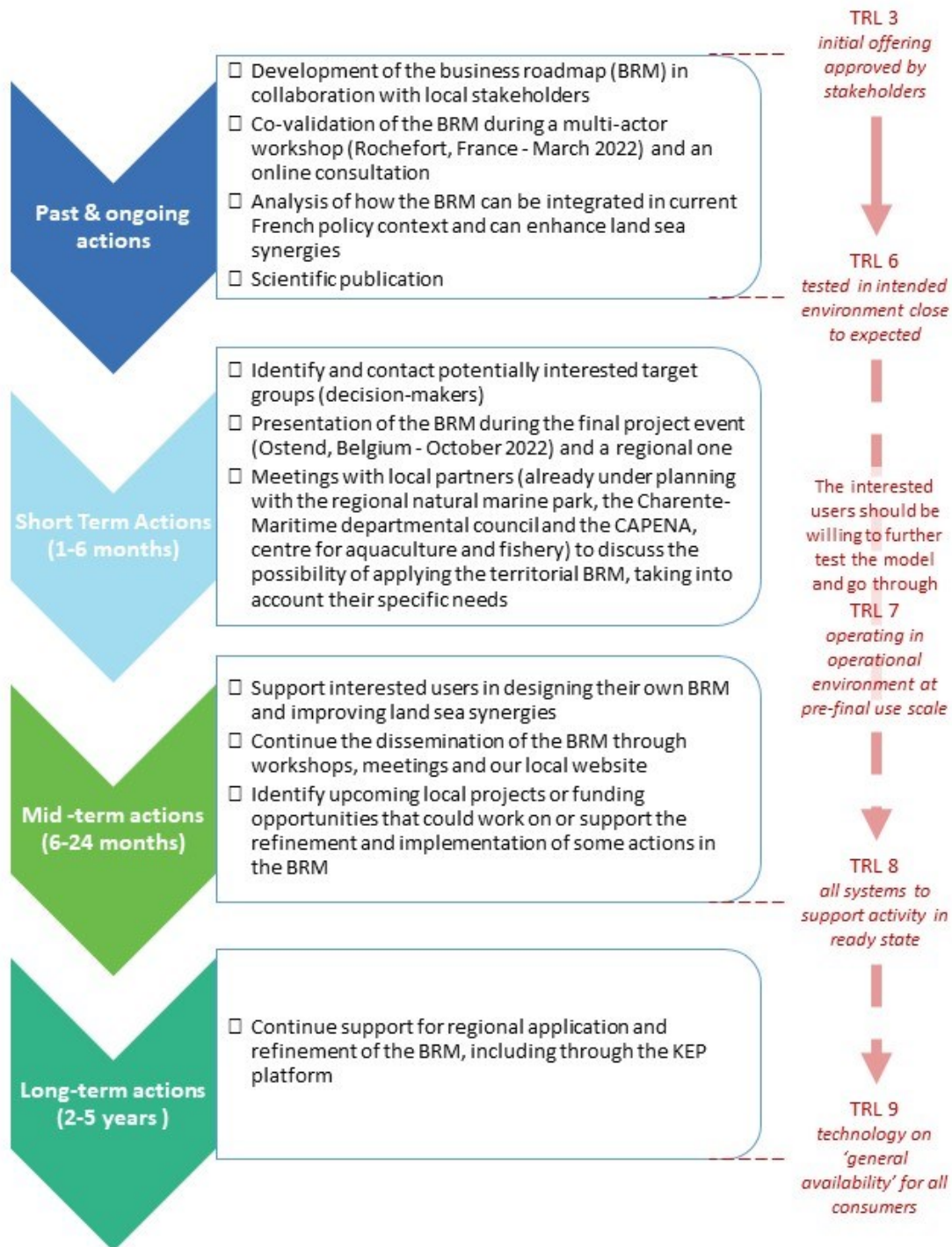
Not foreseen as the research is open access.

#### Possible barriers to exploitation activities and mitigation measures

The roadmap is addressing the sectors selected at the beginning of the project, and related to the main issues of the study area (agriculture and agro-industry, shellfish farming, tourism and population, water

sector, land sea environmental and economical synergies). If new actors (sectors) have to be involved in the discussion, the roadmap may be less relevant, however.

## PAST AND PLANNED ACTIONS





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## 5. DANUBE MOUTHS / BLACK SEA



## LOCATION AND CHARACTERISTICS

Due to the semi-enclosed location and size of the contributing catchment area the Black Sea is vulnerable to anthropogenic pressures and pollution sources (BSC, 2008). The nutrient regime of the Danube has undergone significant changes due to increased economic activity, use of fertilizers, waste water discharges, and use of detergents, leading to changes in the Black Sea ecosystem. Eutrophication results in decreased transparency, higher quantities of organic matter decomposition and oxygen depletion with bottom waters becoming seasonally hypoxic or even anoxic. Since the early 90s decreasing nutrient inputs resulted in signs of recovery.

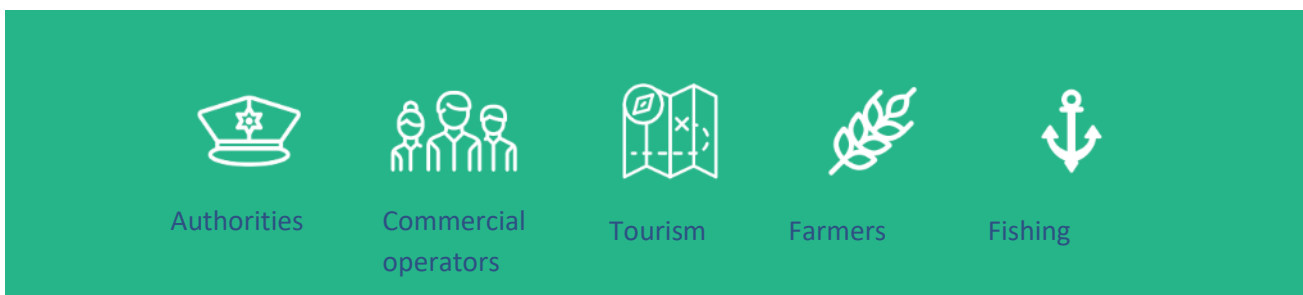
Today the Black Sea catchment is still under pressure from excess nutrients and contaminants due to emissions from agriculture, tourism, industry and urbanization in the Danube basin. This prevents achieving the Good Environmental Status by 2020, as required by the EU-MSFD. The increased rates of eutrophication, pollution and bioaccumulation affect both the biodiversity (including Natura 2000 sites) and fishing sectors.

Mass tourism is an important growth sector for the Black Sea and eco-tourism is becoming more important in the region. Approximately 65% of the Romanian coastline is located in the Danube Delta Biosphere Reserve and subject to tourism regulations, resulting in conflicts between nature conservation and economic development. Failing to resolve these conflicts has economic and political impacts.

In Danube Delta, the main activities are: agriculture, fisheries, rural tourism, agro-tourism, commerce. The biggest attraction is represented by rich natural resources, biodiversity, which attracts on average only 1% of the total number of tourists visiting Romania. Another identified problem concerns the area's inhabitants, the low-living population, and the high unemployment rate. Local farmers face different such as red tape. The main challenge in the agricultural field is the development of the ecological agriculture sector.

COASTAL's ambition was to generate effective solutions and recommendations for the business area, maximizing the potential of existing opportunities, and to integrate the perspective of the land-sea area.

## ACTORS



## PARTNERS





## EXPLOITABLE RESULTS

### RESULT 1: POLICY AND SOCIOECONOMIC SCENARIO RESULTS FOR SUSTAINABLE DEVELOPMENT OF THE DANUBE' MOUTHS – BLACK SEA AREA AND ITS SURROUNDINGS

RESULT 1: POLICY AND SOCIOECONOMIC SCENARIO RESULTS FOR SUSTAINABLE DEVELOPMENT OF THE DANUBE' MOUTHS – BLACK SEA AREA AND ITS SURROUNDINGS	
<b>Description of result</b>	The target groups can explore alternative scenarios of human activities development with the improvement of the quality of life and sustainability within the Danube Delta Biosphere Reserve and its marine waters (Black Sea), as one of the most impacted areas along the Romanian littoral.
<b>Exploitation route</b>	Scenario results will be made available to various stakeholders by digital flipbooks, scientific papers and general public papers. The outcomes of such assessments (scientific papers and general public papers) will be published in open-access publications. The digital flipbooks will be uploaded on Coastal Knowledge Exchange platform and on MAL5 partners website.
<b>Quantitative targets and indicators</b>	20 downloads / 10 stakeholders to receive flipbooks
<b>Target groups</b>	Policy makers, (environmental) managers, consultants, researchers, academics, students.
<b>Sector of application</b>	agriculture, aquaculture, tourism (rural and coastal)
<b>Impact</b>	The target groups may take the decisions or benefit from them by exploring the scenarios developed based on a specific socio shared pathway combined with the climate change scenario.
<b>IPR measures</b>	Not foreseen, as the research is open access.
<b>Possible barriers to exploitation activities and mitigation measures</b>	<p><b>Barriers:</b> Low level of understanding of the methodology used for SD modelling can lead to reluctance in uptake of scenario results</p> <p><b>Mitigation:</b> The results will be presented in an easy to understand language targeted for each stakeholder group level of understanding. Eg. For local authorities and entrepreneurs the flipbook will</p>

mainly contain graphs and their explanation, while for academic community detailed methodology will be described, together with results obtained, and comparison with other state-of-the-art literature.

## PAST AND PLANNED ACTIONS

### Past & ongoing actions

- Analysis of the impacts of various sectoral and regulatory actions in the Black Sea & Danube Delta vbased on scenarios from operational SD model presented to target group representatives and discussed for confidence building - Qualitative and Quantitative Scenarios Scenario results validation with stakeholders
- Workshop Multi-Actorial Labs 5 Danube Mouths / Black Sea - March 2021
- Presentation scenarios during policy workshop Black Sea Action Day October 2021; Qualitative and quantitative scenarios
- Prepare flipbooks with demonstrators related to rural development and blue growth;
- Agreement for post-project exploitation and development of COASTAL toolbox

### Short Term Actions (3-6 months)

- Identify & contact MAL new target groups;
- Presentation of policy recommendations during final project event October 2022; **BRM**
- Presentation scenarios during the Blue Growth: Challenges And Opportunities for the Black Sea, October 2022; **Qualitative and quantitative scenarios**
- Presentation scenarios during the meeting with national/local authorities on ICZM Strategy December 2022/February 2023 **Qualitative and quantitative scenarios**
- Brief presentation of scenario results during annual International Symposium ICEADR

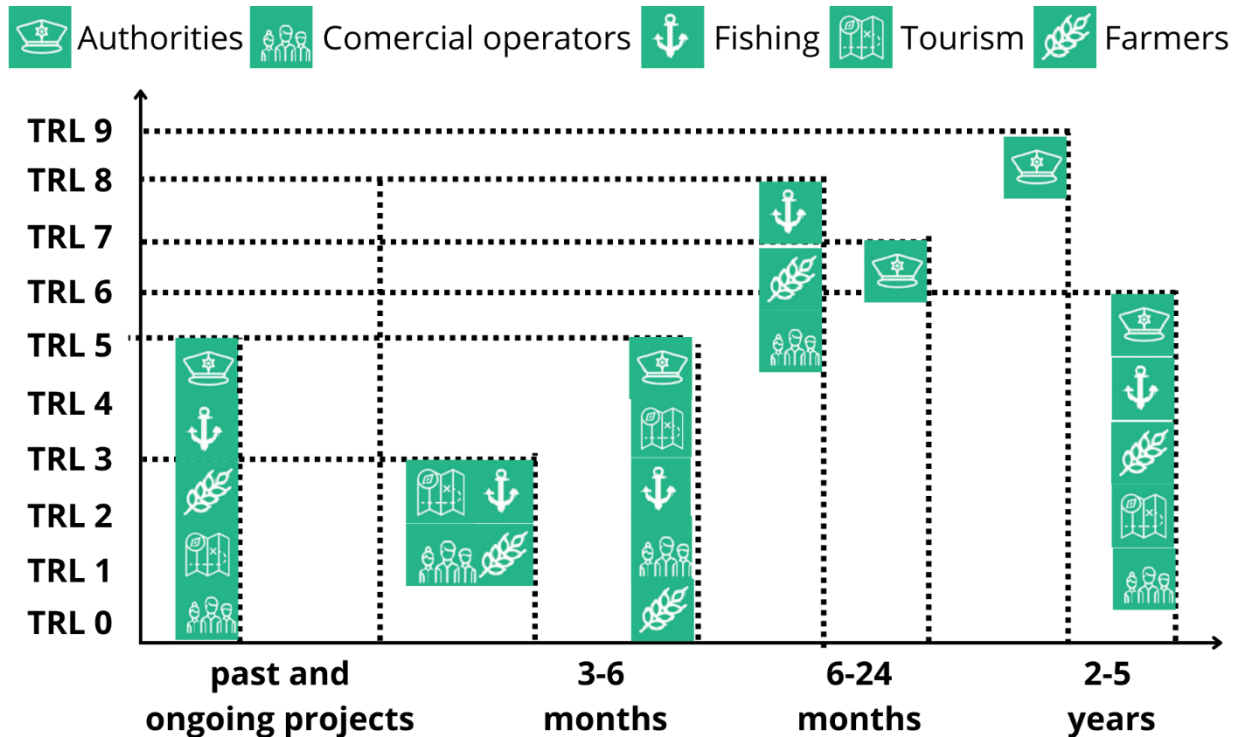
### Mid-term actions (6-24 months)

- Identify and develop funding channels for (re)development of custom policy tools and applications;
- Develop bi-lateral and international partnerships - contribution Rural Platform; Desing and setup Training Courses for the Operational Program Administrative Capacity POCA/399/1/1: Improving the capacity of the central public authority (Ministry of Environment & Waters) in the field of ICZM

### Long-term actions (2-5 years)

- Operational support for systemic environmental policy making and modelling; Contribution to Develop spatial-dynamic planning tool for coastal and marine spatial planning
- Using achieved results for influencing the decisions making process in various national and international environments, such as ministerial thematic groups, european initiatives and strategic plans design

## TIMELINE



## RESULT 2: DYNAMIC SYSTEM MODEL ON HOW MUCH CAN THE RURAL TOURISM AND THE ORGANIC FARMING CAN BE DEVELOPED WITHOUT AFFECTING THE WATER QUALITY

**RESULT 1: A dynamic system model which describes how much can the intensive aquaculture, rural tourism and the organic farming be developed without affecting the water quality**

### Description of result

A combined dynamic model developed in Vensim program that combines variables of interest for the aquaculture, rural tourism and ecological agriculture activity in the area of the case study, the Danube Delta. The links between variables and the way in which they influence each other were established following a series of workshops attended by stakeholders from reference fields such as academic area, representatives of the research and innovation domain, representatives of the public administration, economic operators, and farmers.

### Exploitation route

The model obtained from the modelling activity carried out was presented at various scientific events of interest, (such as the International Symposium "Agrarian Economy and Rural Development - Realities and

Perspectives for Romania", the international scientific session of the National Institute for Economic Research Costin C. Kiritescu and Golumbeanu M., Timofte F., Nenciu M.I., Lazar L. (2019) - Sectorial Analysis of Coastal and Rural Development in the Danube Delta – Black Sea Coastal Zone, Book of Abstracts 1st International Symposium on Climate Change and Sustainable Agriculture, Agricultural University Plovdiv, 14-15 November, Plovdiv, Bulgaria, Academic Publishing House of the Agriculture University Plovdiv, pp. 76-77, ISBN 978-954-517-286-1), and published (Pilot System Dynamics Model for Coastal Rural Interactions – Danube’s Mouths-Black Sea Case Study. Luminița Lazăr, Steliana Rodino, Alina Spînu. Cercetari marine vol. 50, 2020, <http://www.marine-research-journal.org/index.php/cmrm/article/view/157>).

**Quantitative targets and indicators**

10 number of downloads and 3 citations per year

**Target groups**

Policy makers, local administration, entrepreneurs, scientists, students, academics

**Sector of application**

Rural tourism, organic farming, aquaculture, public administration (water, infrastructure, environment)

**Impact**

The target group, as well as other interested categories, can take advantage using this model by entering their own data adapted to the users' context and they can run it to observe the dynamics of the variables of interest, depending on their needs and on the particularities of the case study area.

**IPR measures**

Not foreseen, as the research is open access.

**Possible barriers to exploitation activities and mitigation measures**

The model deals with a small part of the problems identified in the Danube Delta area and the statistical data used are collected at county level, but it can be constantly improved, so more specific results can be obtained.

## PAST AND PLANNED ACTIONS

### Past & ongoing actions

- Analysis of the impacts of various sectoral and regulatory actions in the Black Sea & Danube Delta based on other outcomes of operational SD model presented to target group representatives and discussed for confidence building. Operational model tuned and linked to evidence-based road maps - Stock-flow models for coastal-rural synergy;
- Data repository ready for use;
- Prepare flipbooks with demonstrators related to rural development and blue growth;
- Agreement for post-project exploitation and development of COASTAL toolbox.

### Short Term Actions (3-6 months)

- Continuous updating of stakeholders on latest news on coastal-rural policies through publication of results, the social media channels and website of the partners;
- Presentation of policy recommendations during final project event October 2022;
- Presentation scenarios during the Blue Growth: Challenges And Opportunities for the Black Sea, October 2022;
- Presentation scenarios during the meeting with national/local authorities on ICZM Strategy December 2022/February 2023;
- Brief presentation of SSD modeling results during annual International Symposium ICEADR
- Distribution of flipbooks to stakeholders.

### Mid-term actions (6-24 months)

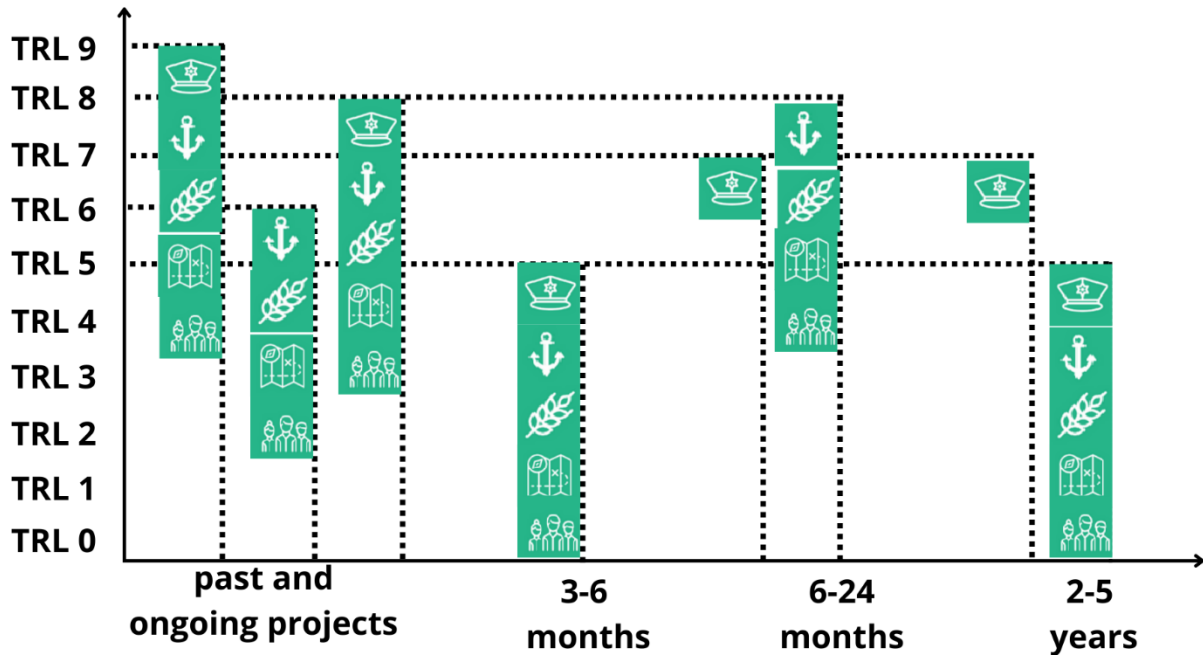
- Identify and develop funding channels for (re)development of custom policy tools and applications;
- Develop bi-lateral and international partnerships - contribution to Rural Platform; Design and setup Training Courses for the Operational Program Administrative Capacity POCA/399/1/1: Improving the capacity of the central public authority (Ministry of Environment & Waters) in the field of ICZM;
- Further development of the SD model for running with various other input data (e.g. other crop for agriculture model; data from a different county for the tourism model)
- Continuous publicity on flipbooks available for the SD models

### Long-term actions (2-5 years)

- Operational support for systemic environmental policy making and modelling; Alignment with international SD modelling community ;
- Support stakeholders in decision making process by all means, using experience achieved during modelling work.

**TIMELINE**

 Authorities 
  Commercial operators 
  Fishing 
  Tourism 
  Farmers





Author: Javier Giménez

## 6. MAR MENOR COASTAL LAGOON



## LOCATION AND CHARACTERISTICS

The Mar Menor coastal lagoon (135 km<sup>2</sup>) is located in the Region of Murcia (SE Spain).

The area is characterized by multiple environmental, social-cultural and economic interests, often competing for scarce resources, water being the most important. There is a high potential for complementarity, win-win scenarios and development of sustainable business cases based on public-private collaboration, efficient use of water, and innovative farming practices and a transition to sustainable models of tourism and agriculture.

The catchment draining into the Mar Menor covers an area of 1.255 km<sup>2</sup> and is mainly covered by intensive irrigated agriculture and tree crops. The intensive and highly profitable irrigated agriculture depends on scarce low quality groundwater and water from inland inter-basin water transfers. Agriculture provides labor and income to the region, but forms a source of excessive nutrients and contamination into the Mar Menor coastal lagoon. The resulting poor water quality affects the ecology of the lagoon with severe implications for its potential function for tourism and fisheries.

The coastal lagoon forms part of a Specially Protected Area of Mediterranean Importance (SPAMI).

The Mar Menor is one of the hotspots for tourism in the Region of Murcia, with a total number of 346,000 tourists and 1.4 million over-night stays in 2016. Beside international visitors, the Mar Menor has an important touristic function for the regional population (1.5 million inhabitants).

The availability of water for irrigation and drinking water for tourism will be further reduced under future climate conditions. As such, the Mar Menor is strongly influenced by interactions between inland agriculture on the one side, and coastal tourism and fisheries affecting natural ecological values and socioeconomic sustainability on the other side. The need to move towards sustainable models of agriculture, fishery and tourism is increasingly recognized and recently revived strongly due to sudden increase in contamination levels resulting in a strong drop in tourism.

COASTAL's ambition was to:

- **Develop management models based on the effective use of natural resources** through the transition to sustainable tourism and agriculture models that allow a good ecological status of the lagoon.
- Identify pioneering sustainable business opportunities to initiate an ecological transition.

## ACTORS





## PARTNERS



## EXPLOITABLE RESULTS

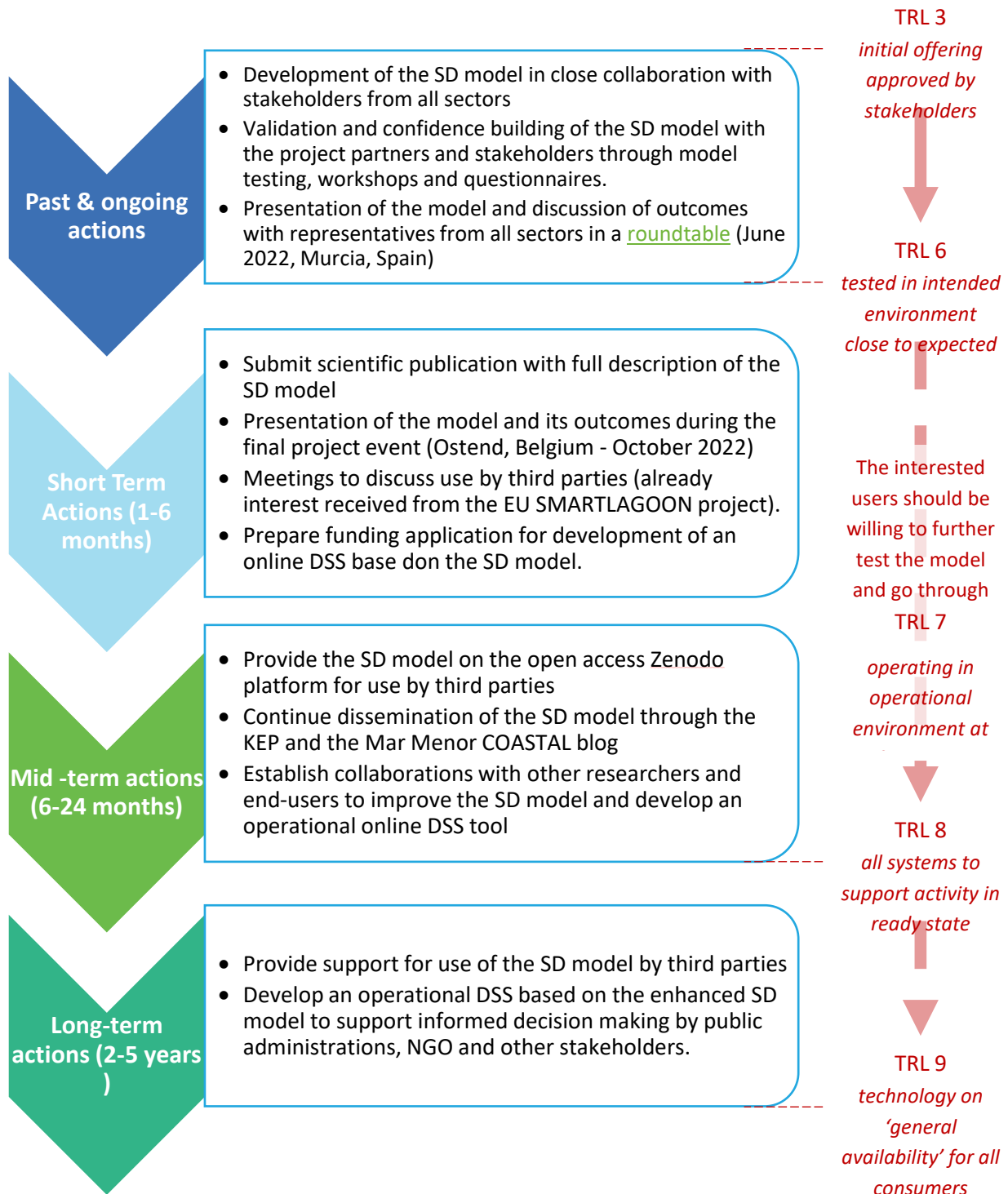
### RESULT 1: DSS FOR SUSTAINABLE MANAGEMENT OF MAR MENOR SOCIO-ECOSYSTEM

RESULT 1: DSS for sustainable management of Mar Menor socio-ecosystem.	
<b>Description of result</b>	A Decision Support System (DSS) based on System Dynamics modelling to support integrated assessments of the impacts of policies related to agriculture, coastal and rural tourism, renewable energy and integrated management on Key Performance Indicators of sustainability.
<b>Exploitation route</b>	The DSS will be available through the project website and an open online repository (ZENODO) from which it can be used to support policy development or for further research. The system dynamics model underlying the DSS will also be documented in a scientific open access journal.
<b>Quantitative targets and indicators</b>	10 downloads and 15 citations per year
<b>Target groups</b>	Policy makers, CSOs, and scientists from the Region of Murcia (Spain) and from other coastal areas in Europe with similar challenges for sustainable development and looking for coastal-rural synergies.
<b>Sector of application</b>	Agriculture, Tourism, Fisheries, Sustainable Energy, Policy, Blue Growth.
<b>Impact</b>	<b>Policy:</b> the DSS allows for integrated assessments of policy options and expected impacts on sustainable development; <b>Social:</b> the DSS will have an educational impact to help understand the system interactions and importance for integrated assessments; <b>Scientific:</b> the DSS will be available for other researchers to use it, tweak it, build on it and contribute to science.
<b>IPR measures</b>	None foreseen. The DSS will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial
<b>Possible barriers to exploitation activities and mitigation measures</b>	

**Barrier:** the use of the DSS requires installation of a free version of Vensim software.

**Mitigation measure:** COASTAL consortium will provide clear instructions to where the free software can be downloaded and how it can be used to use the DSS.

## PAST AND PLANNED ACTIONS



## RESULT 2: BUSINESS ROAD MAP AND POLICY GUIDELINES FOR SUSTAINABLE DEVELOPMENT OF THE MAR MENOR AND ITS SURROUNDINGS

### RESULT 2: Business Road Map and Policy Guidelines for sustainable development of the Mar Menor and its surroundings

#### Description of result

A full description of a co-developed business road map (BRM) and policy guidelines and their modelled impacts on key performance indicators of sustainability of coastal and rural areas around the Mar Menor (SE Spain).

#### Exploitation route

The BRM and policy guidelines will be available through the COASTAL website and an open online repository (ZENODO) from which it can be used to support policy development or for further research. The result will also be documented in a scientific open access journal.

#### Quantitative targets and indicators

50 downloads and 15 citations per year

#### Target groups

Policy makers, CSOs, and scientists from the Region of Murcia (Spain) and from other coastal areas in Europe with similar challenges for sustainable development and looking for coastal-rural synergies.

#### Sector of application

Agriculture, Tourism, Fisheries, Sustainable Energy, Policy, Blue Growth

#### Impact

**Policy:** the BRM and policy guidelines will serve as source of inspiration for the development of new policies for sustainable development; **Social:** the BRM and policy guidelines will have an educational impact to help understand the diversity of solutions and the importance for development of road maps of integrated solutions; **Scientific:** the BRM and policy guidelines will be available for other researchers to use, build on it and contribute to science.

#### IPR measures

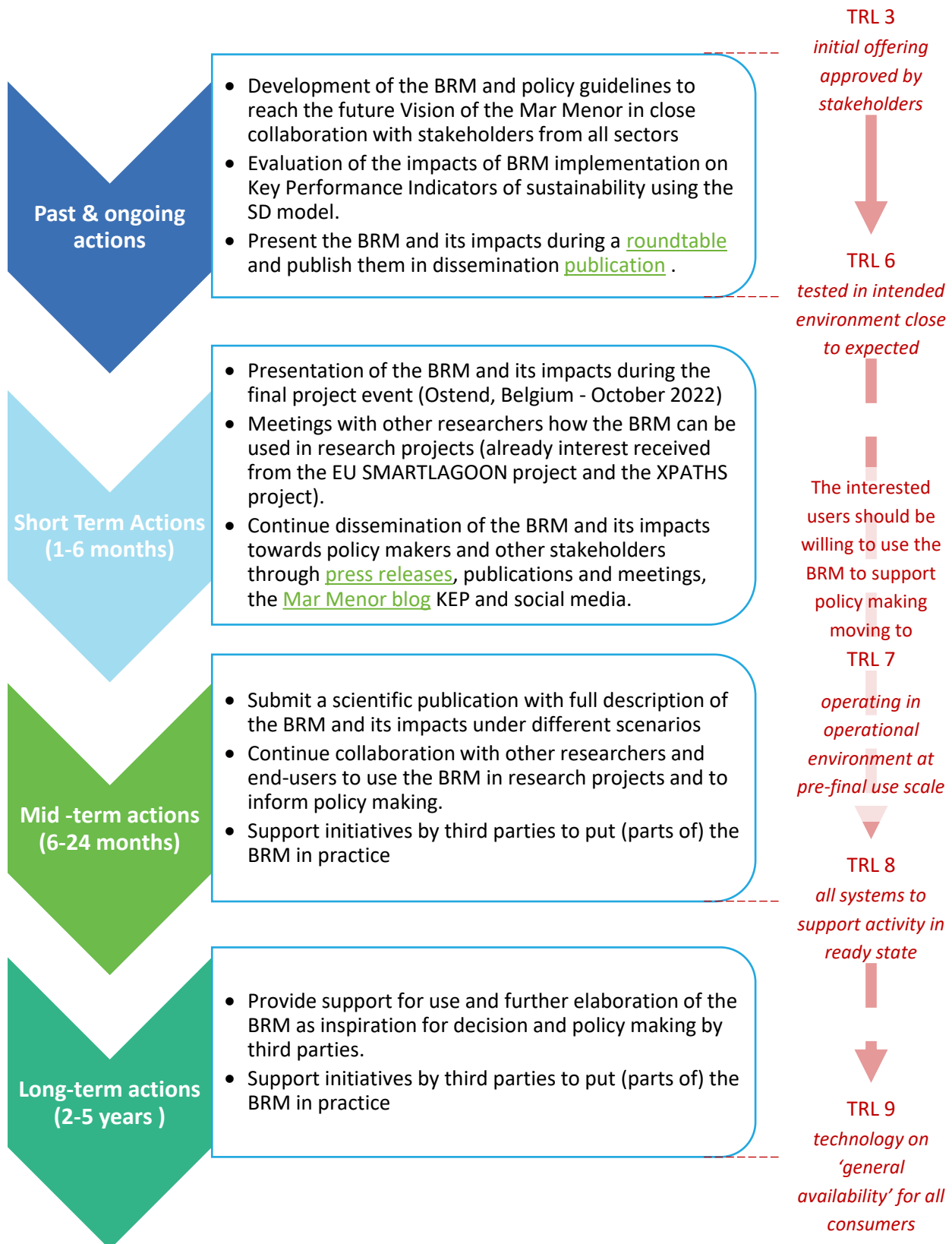
None foreseen. The BRM and policy guidelines will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial

#### Possible barriers to exploitation activities and mitigation measures

**Barrier:** the BRM and policy guidelines are very specific for the particular conditions of the Mar Menor and surroundings and were co-developed by local stakeholders, impeding extrapolation to other areas.

**Mitigation measure:** The COASTAL consortium will provide examples of BRM and policy guidelines for six European case studies, which together will be representative for a wide range of conditions. The documents will however always clearly indicate that each situation requires the co-development and adaptation to the local context.

## PAST AND PLANNED ACTIONS



## RESULT 3: METHODOLOGY FOR PARTICIPATORY MODELLING OF COASTAL – RURAL INTERACTIONS AND CO-DEVELOPMENT OF TRANSITION PATHWAYS FOR SUSTAINABLE DEVELOPMENT

### RESULT 3: Methodology for participatory modelling of coastal – rural interactions and co-development of transition pathways for sustainable development.

#### Description of result

A full description of the methodology applied for participatory modelling and co-development of the business road map (BRM) and policy guidelines for sustainable development of the Mar Menor and its surroundings.

#### Exploitation route

The methodology will be available through the COASTAL website and an open online repository (ZENODO) from which it can be used to support policy development or for further research, and it will be published in open access scientific articles.

#### Quantitative targets and indicators

50 downloads and 15 citations per year

#### Target groups

Policy makers, CSOs, and scientists from the Region of Murcia (Spain) and from other coastal areas in Europe with similar challenges for sustainable development and looking for coastal-rural synergies.

#### Sector of application

Agriculture, Tourism, Fisheries, Sustainable Energy, Policy, Blue Growth

#### Impact

**Policy:** the methodology for co-development will serve as an example of good practice for development of new policies and co-governance; **Social:** the methodologies will have an educational impact to help understand how to co-design models and transition pathways adapted to local contexts; **Scientific:** the methodologies will be available for other researchers to use, build on it and contribute to science.

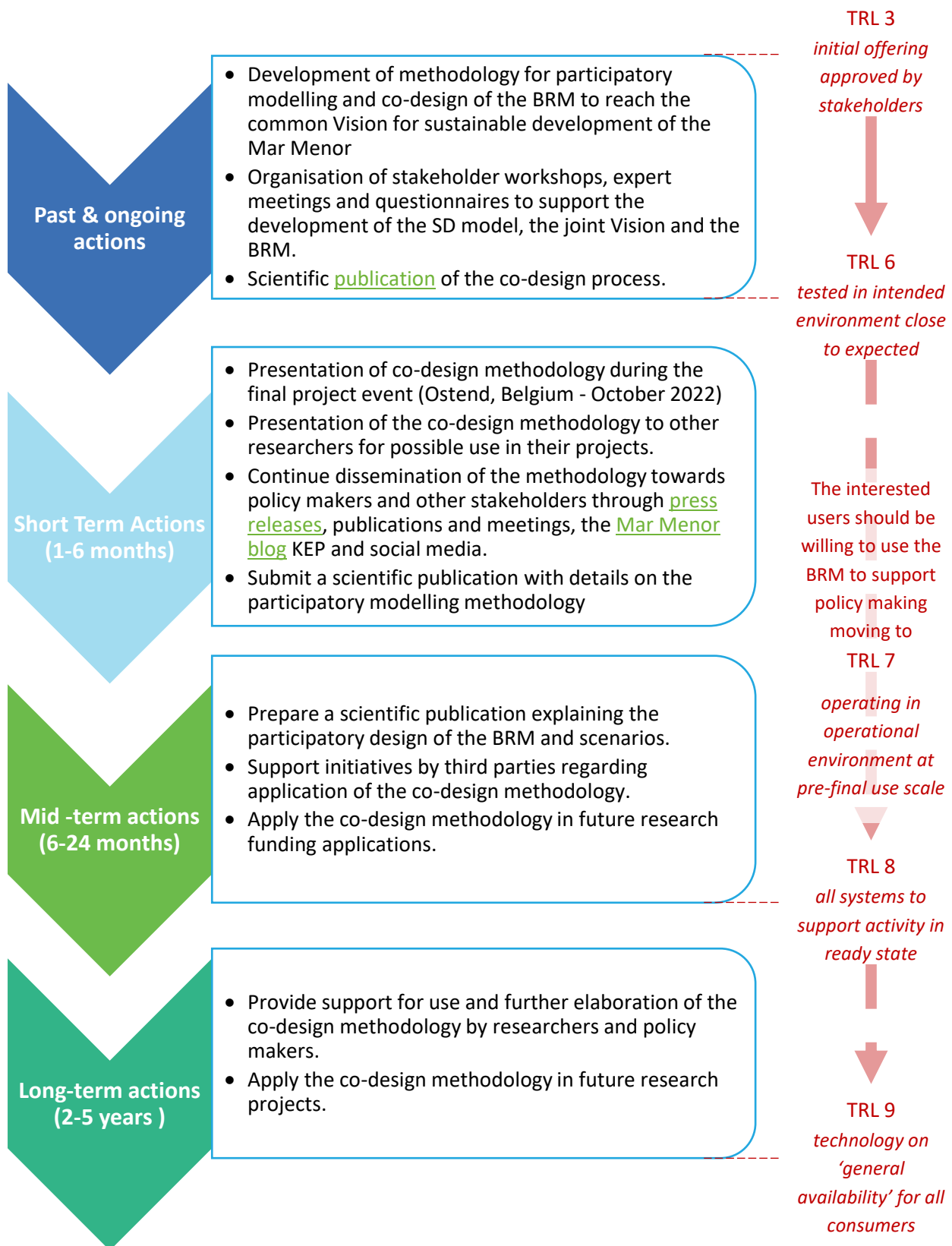
#### IPR measures

None foreseen. The methods will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial

#### Possible barriers to exploitation activities and mitigation measures

No barriers expected

## PAST AND PLANNED ACTIONS





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## 7. SOUTH-WEST MESSINIA



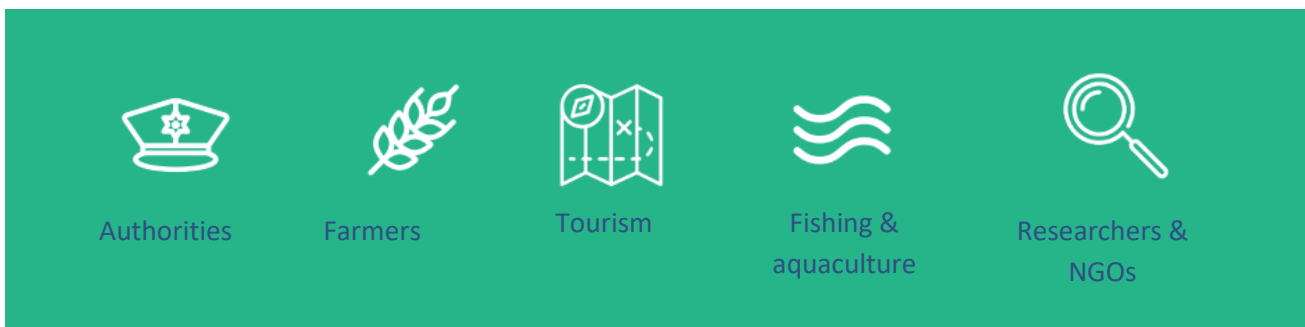
## LOCATION AND CHARACTERISTICS

Agriculture (mainly olive trees) and coastal tourism are the two major economic activities in Western Messinia, Greece. Tourism is expanding and goes hand in hand with infrastructure development (hotels, roads and airports) and can provide opportunities for diversified livelihoods, but also increases pressures on the environment and cultural sites.

Climate change is expected to increase coastal erosion and decrease the availability of freshwater, with increased risk for saltwater intrusion into coastal wetlands and aquifers. There are also plans for offshore oil and gas exploration that will have implications for the area's rich coastal biodiversity. The study area comprises several important cultural sites and Mediterranean habitats included in the reference list of the Natura 2000 initiative.

COASTAL's ambition was to **develop management models** based on the efficient use of natural resources and transition to sustainable tourism and primary production models that will allow for sustainable development in the region; and to **coordinate** through an integrated approach, **the opportunities for economic development of coastal and rural areas**.

## ACTORS



## PARTNERS



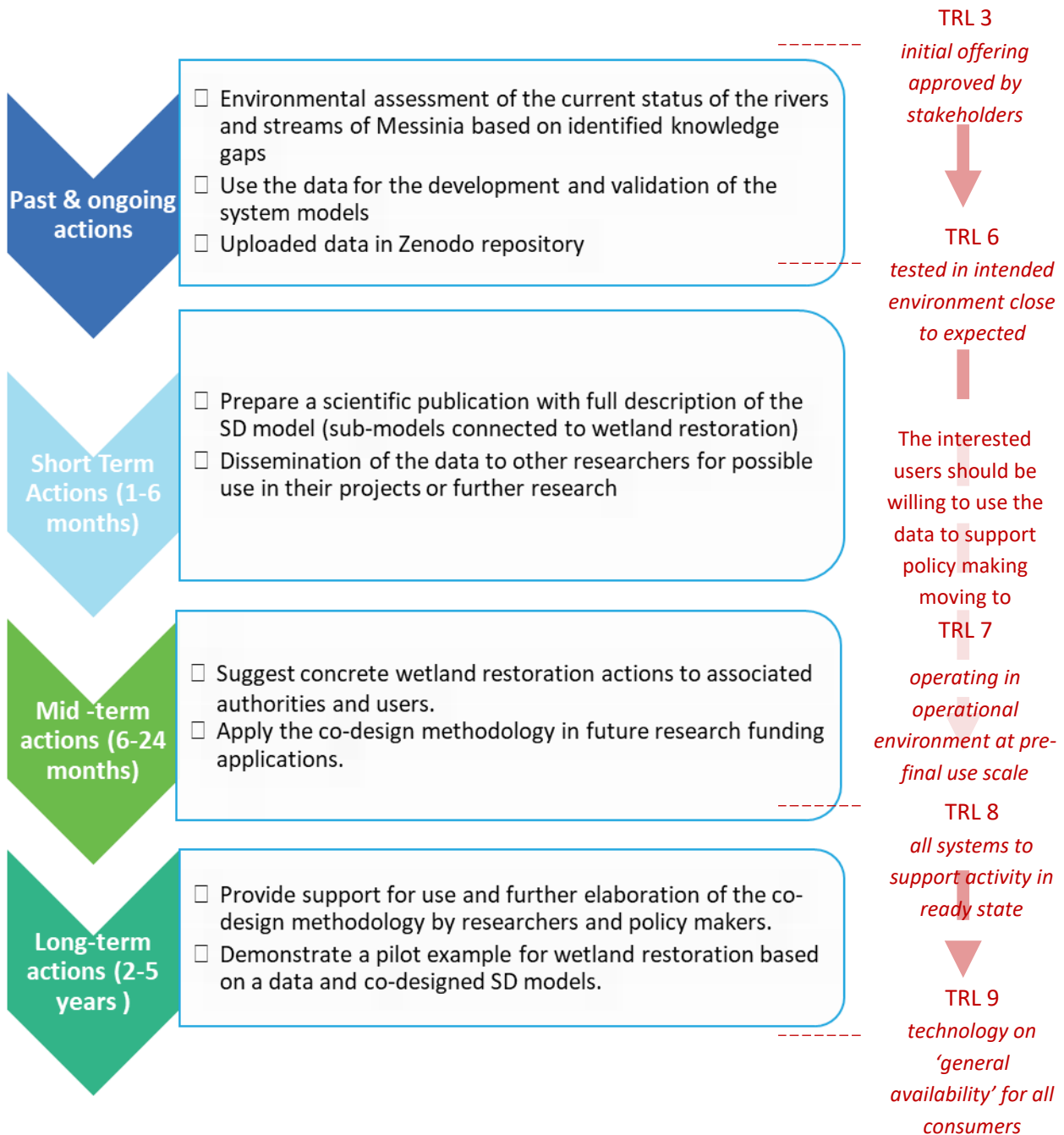


## EXPLOITABLE RESULTS

### RESULT 1: FIELD DATA ON THE ENVIRONMENTAL QUALITY OF THE INLAND WATERS OF MESSINIA

RESULT 1: Field Data on the Environmental quality of the Inland Waters of Messina	
<b>Description of result</b>	Physicochemical and Benthic quality assessment of the 6 streams in Messina based on repeated field visits from winter 2018 to winter 2021
<b>Exploitation route</b>	Will be uploaded to open online repositories (e.g., ZENODO and Open Aire) for their reuse by end-users
<b>Quantitative targets and indicators</b>	10 number of downloads and 3 citations per year for relevant publications as well as for COASTAL database
<b>Target groups</b>	Scientists, students,
<b>Sector of application</b>	Local water management authorities, Natural Environment and Climate Change Agency (NECCA), Governmental agencies, Academia
<b>Impact</b>	Technical, scientific, policy making impacts as water quality data can help inform policy measures for the protection of the inland waters and the restoration of Gialova Lagoon
<b>IPR measures</b>	None foreseen. Data Will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial.
<b>Possible barriers to exploitation activities and mitigation measures</b>	None foreseen. Data will be available to download and be used to further advance research and knowledge of the area.

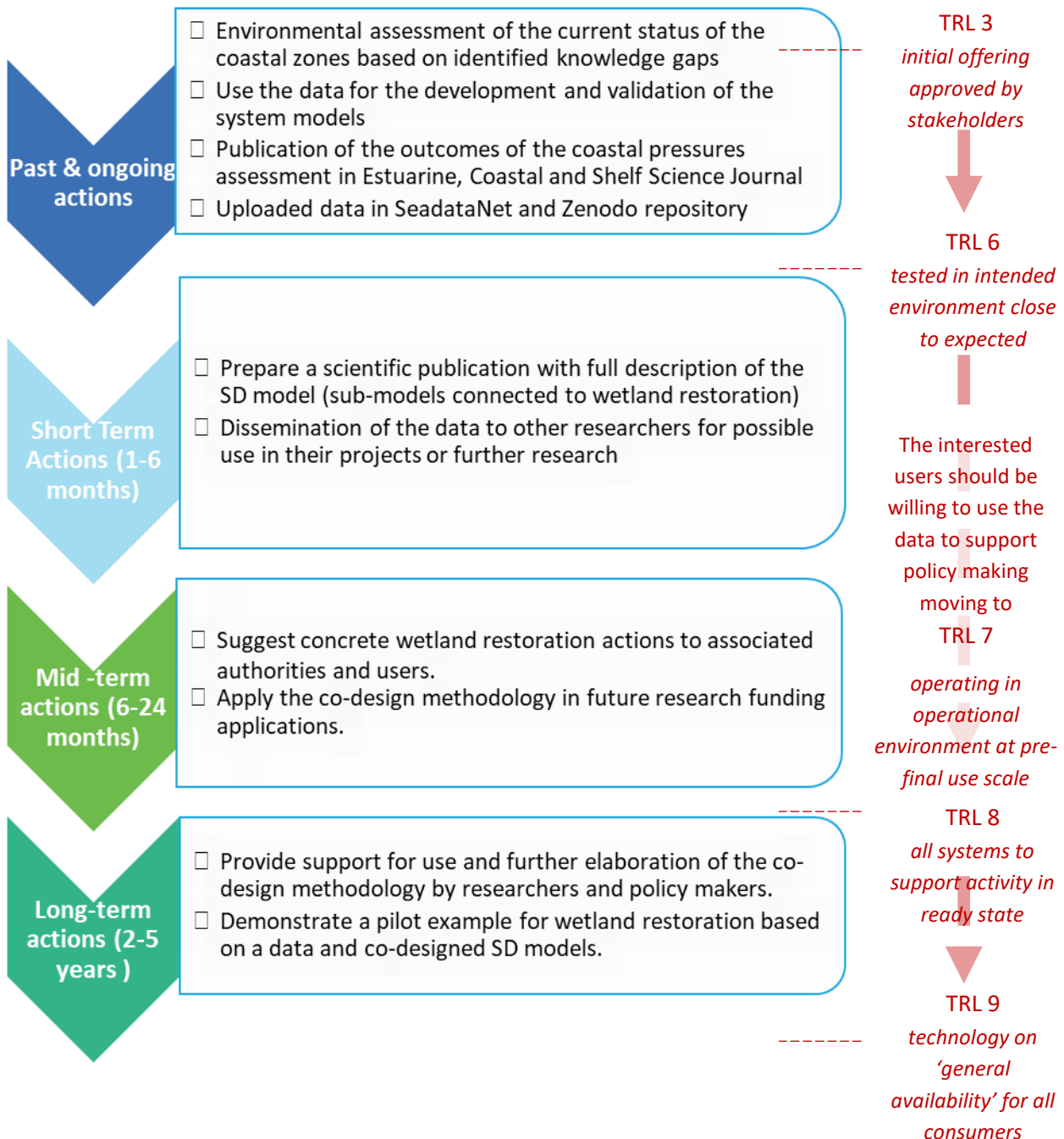
## PAST AND PLANNED ACTIONS



## RESULT 2: FIELD DATA ON THE ENVIRONMENTAL QUALITY OF THE MARINE AND TRANSITIONAL WATERS OF MESSINIA

RESULT 2: Field Data on the Environmental quality of the Marine and Transitional Waters of Messina	
<b>Description of result</b>	Physicochemical and Benthic quality assessment of the Coastal Waters and Gialova Lagoon based on the two sampling periods in December 2018 and March 2019
<b>Exploitation route</b>	Will be uploaded to open online repositories (e.g., ZENODO and Open Aire) and other databases (e.g., EMODNET) for their reuse by end-users
<b>Quantitative targets and indicators</b>	10 number of downloads and 3 citations per year for relevant publications as well as for COASTAL database
<b>Target groups</b>	Scientists, students,
<b>Sector of application</b>	Local water management authorities, Governmental agencies, Academia, Natural Environment and Climate Change Agency (NECCA)
<b>Impact</b>	Technical, scientific, policy making impacts as water quality data can help inform policy measures for the protection of the coastal waters and the restoration of Gialova Lagoon
<b>IPR measures</b>	None foreseen. Data Will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial.
<b>Possible barriers to exploitation activities and mitigation measures</b>	None foreseen. Data will be available to download and be used to further advance research and knowledge of the area.

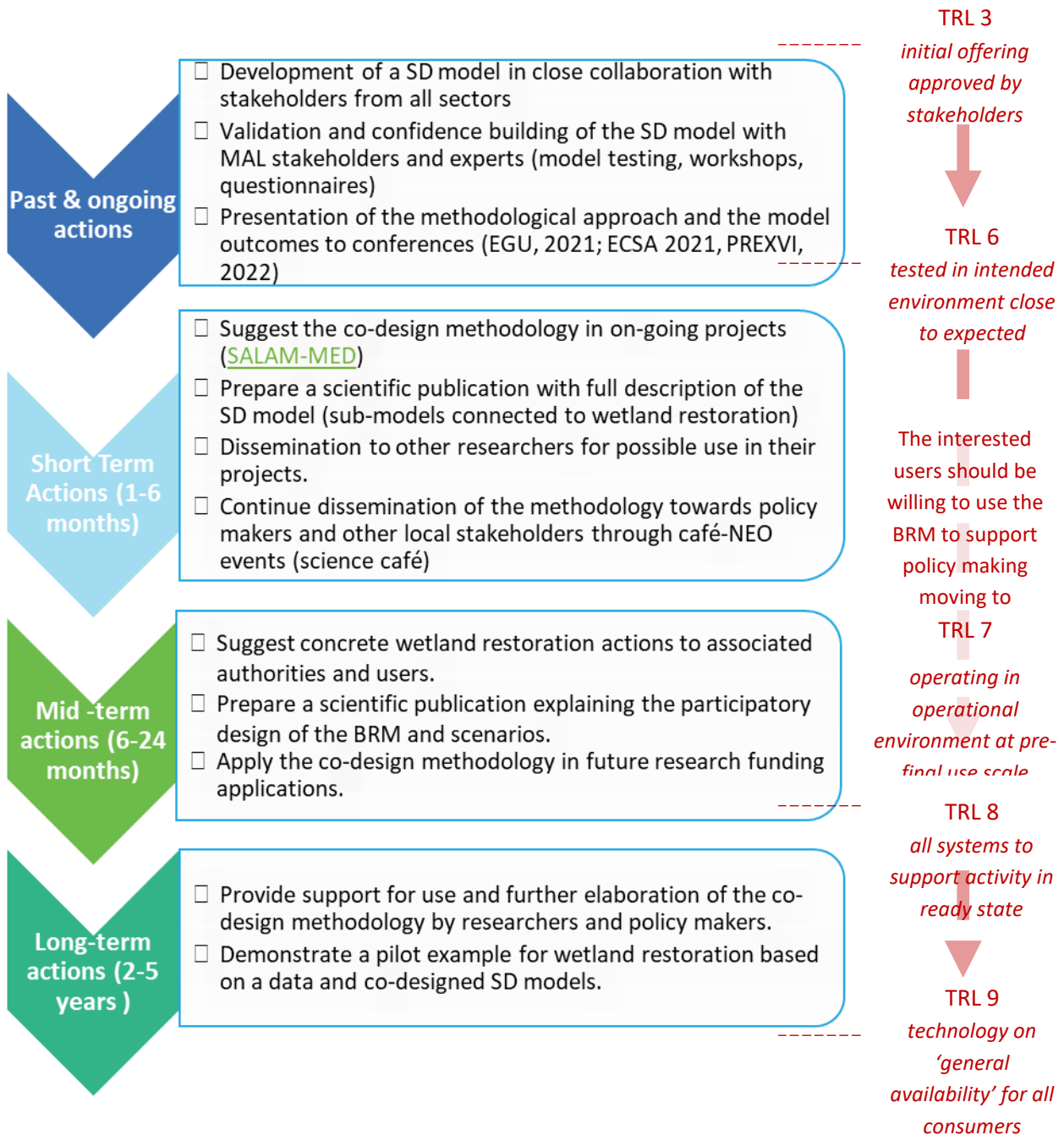
## PAST AND PLANNED ACTIONS



### RESULT 3: BUSINESS ROADMAP

RESULT 3: Business Roadmap	
<b>Description of result</b>	Business and transition roadmaps prioritized and developed by stakeholders to promote rural-coastal synergies and environmental sustainability
<b>Exploitation route</b>	The developed roadmaps are being used by the local partners and stakeholders in their future management and development plans, through processes that have already begun, such as the formation of small partnerships. The roadmaps will also be shared with the identified target groups for their potential use (e.g., through the COASTAL Knowledge Exchange Platform and in the final project seminar).
<b>Quantitative targets and indicators</b>	10 local partners and stakeholders to consider/prioritize relevant actions in the developed roadmaps within their development plans
<b>Target groups</b>	Local businesses, A.N.M.E.S.A.E,
<b>Sector of application</b>	Municipalities, Tourism sector, Farmers, Industry, Governmental agencies
<b>Impact</b>	Technical, scientific, policy making impacts as wetland restoration is expected to enhance wetland ecosystem services, and pave the way for nature conservation, sustainable fishing, and eco-tourism development in the years to come.
<b>IPR measures</b>	None foreseen. Data Will be protected with 'Attribution-Non-commercial', CC BY-NC license, which lets others remix, tweak, and build upon our work non-commercially, as long as the project gets acknowledged and as long as their work is non-commercial.
<b>Possible barriers to exploitation activities and mitigation measures</b>	A delay in implementation of restoration work could increase the risk of a collapse.

## PAST AND PLANNED ACTIONS



## RESULT 4: BUSINESS ROAD MAP AND POLICY GUIDELINES FOR SUSTAINABLE OLIVE-OIL PRODUCTION IN SW MESSINIA

RESULT 4: Sustainable olive-oil production	
<b>Description of result</b>	The adoption of Integrated and eventually Organic cultivation practices by olive-oil producers and associated industry (olive-mills), needs to build on synergies, exploit technological advances (e.g. smart agriculture) and respond to new requirements of the Green Deal.
<b>Exploitation route</b>	The BRM and policy guidelines will be available through the COASTAL website and ZENODO repository, from which it will be open to use for policy development and or further research
<b>Quantitative targets and indicators</b>	10 downloads and 3 citations per year
<b>Target groups</b>	Farmers, Olive-oil industry
<b>Sector of application</b>	Farmers, Farmers' associations and cooperatives, Local industry (olive-mills), Fishers, Tourism
<b>Impact</b>	In the long-run, farmers will benefit with better prices (local labelling or certification for the quality of the production and the sustainable management of their land), increased possibilities for sales and exports (cooperatives) and lower costs (costs for fertilising, pest control). Farm biodiversity is expected to increase, groundwater and coastal (lagoon, marine) waters quality is expected to improve (reduced application of agrochemicals), and groundwater availability is expected to improve (irrigation based on tree needs and not on farmers' perception).
<b>IPR measures</b>	None foreseen. The DSS will be protected with Attribution-non commercial CC BY NC licence
<b>Possible barriers to exploitation activities and mitigation measures</b>	Farmers' willingness and capacity to change and adopt new farming practices.

## PAST AND PLANNED ACTIONS

