

**COASTAL** Collaborative Land-Sea Integration Platform

# WP5 Inventory of scenarios and transition pathways

Deliverable 17

WP5, T 5.1 Lead beneficiary GreenBridge

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COASTAL: Collaborative Land and Sea Integration Platform - Co-creating evidence-based business roadmaps and policy solutions for enhancing coastal-rural collaboration and synergies focusing on economic growth, spatial planning and environmental protection.



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# **Executive summary**

The purpose of this deliverable is to provide an overview of the existing scenarios and transition pathways of the case study partners and at an EU-level. In order to give a balanced overview of the information currently available regarding scenarios and transition pathways relevant to the COASTAL-framework. To structure the inventory, a framework has been designed incorporating a literature study focusing on the concepts of scenario and transition pathways. Working definitions for both concepts have been developed by GreenBridge and ICRE8. These definitions were communicated to all WP- and MAL-leaders and are essential for the development of the following deliverables within workpackage 5. They will be used as a reference through further investigation especially deliverable 5.2, namely the creation of generic scenarios and transition pathways. Furthermore, other elements of the methodology were rolled out to gather relevant information by the MAL- and WP-partners. Next to the literature study, a template in a Excel-worksheet has been designed including questions to define and structure the information. Besides a brief description of the topics also other information regarding; the author, potential outcomes, methods of data collecting, source, etc. were to be completed.

Thirdly a key information document was written, providing in-depth information about the concepts of transition pathways and scenarios. This document incorporated a brief introduction to the literature study elaborated in this deliverable. More detailed questions to structure the information were provided as well as examples. Finally to facilitate and ensure the search for adequate information, skype meetings were organized. Both Greece and Spain made us of these skype-meetings.

Nevertheless it's clear that defining both concepts, especially transition pathways was not straightforward. Literature regarding transition pathways takes on a more technical perspective rather than a socio-economical one. The latter being more relevant to the scope of the COASTAL-project. Furthermore, it became apparent from both scientific and grey literature that many data gaps exist. Due to this ambiguity received information did not entirely fit the requirements to be catalogued: mainly broad input was received for the inventory. The information provided, included scientific reports, projects, management plans or even education projects were listed. Effective scenario analysis or concrete action plans with the objective to create a shift from one distinctive state to another were rare.

As such, not all received information can be classified as distinct scenario models or pathways. Information availability on the different case studies differed between partners.

The main conclusion to further elaborate WP 5 is to engage further with the MAL-partners for the development of the generic analyses. Also the methodology and topics chosen will be of utmost importance and should be discussed and decided upon by all MAL-partners. This in close collaboration with WP 2 (System Dynamics Modelling) and WP 3 (the co-creation of business road maps and in the end, the policy guidelines).







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# Abbreviations and acronyms

BSAP	Baltic Sea Action Plan
CARM	Consejería de Agua, Agricultura y Medio Ambiente
CSIC	Agencia estatal consejo superior deinvestigaciones cientificas (ES)
DIRN sud atlantique	Direction interrégionale de la mer Sud-Atlantique
DRAAF	Direction Régionale de l'Alimentation, de l'Agriculture et de la Forêt NOUVELLE-AQUITAINE
EPTB Charente	Etablissement Public Territorial de Bassin Charente
EWEA	European Wind Energy Association
GRBR	GreenBridge incubatie-en innovatiecentrum Gent- Oostende (BE)
HCMR	Hellenic centre for Marine research. (GR)
ICRE8	International centre for research on the environment and the economy. (GR)
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IRSTEA	Institut national de recherché en sciences et technologies pour l'environnement et l'agriculture (FR)
MAL	Multi-Actor Lab
NIMRD"Grigore Antipa" Constanta	National institute for marine research and development (RO).
ORACLE	the Regional Observatory on Agriculture and Climate Change
PBL	Planbureau voor de leefomgeving (NL)
VITO	Vlaamse instelling voor technologisch onderzoek N.V.(Coordinator, BE)
WWF	World Wide Fund for nature





# 1. Purpose of the document

# 1.1 Role of the deliverable

### WP5 – Scenarios and Transition Pathways – has two objectives (Figure 1):

- to develop qualitative and quantitative information on the uncertainties affecting the outcomes of business and policy solutions (interacting with WP3)
- to provide independent information on the potential transition patterns, which can be compared with the • simulated dynamics (interacting with WP4)

Understanding the role of uncertain exogenous drivers, key system parameters and structural changes of the system is crucial for developing robust business and policy strategies and developing solutions which maximize the resilience of the system.

### WP5 is organized around four work tasks:

5.1 Literature inventory of scenarios and transition pathways: Development of a broad inventory of scenarios and transition pathways together with the provision of an extensive literature study which explains both concepts. The general objective is to update the current state of the art research related to scenario and transition analysis.

5.2 Generic Scenarios & Transition Pathways: To analyze and exploit the concepts of scenarios and transition pathways as listed within deliverable 5.1 with the objective to derive generic scenarios and transition pathways for coastal and rural development.

5.3 Application to the case studies: the development of coherent sets of quantitative scenarios for system uncertainties by use of the data which was aggregated by WP2 and including these scenarios in SD model. Also the generic transition pathways will be adapted to case study level and compared with dynamic patterns within the SDmodel in order to adjust the model and eventually fine tune the transition pathways.

5.4 Robustness Analysis: Assessment of the robustness of different business solutions and policy guidelines in order to tackle the uncertain conditions represented by the scenarios in deliverable 5.3. A final synthesis report will be written describing the WP5 methodology and outcomes of the robustness analysis.



Figure 1 Workflow for the COASTAL project



Figure 1 Workflow for the COASTAL project.

### 1.1.1 Objective of deliverable 5.1

The main objective is to describe, explain and catalogue the existing scenarios and transition pathways by critically assessing different information and data sources, types of stakeholders and uses, rather than outcomes. This document provides an overview containing the current state-of-the-art literature in combination with the dispersed information involving these concepts and their relevant outcomes or translation in comparison with the coastal-rural synergies scope of COASTAL. This deliverable has linked the project partners interactions to different steps in scenario development processes while it forced the stakeholders not only to take a closer look to both concepts as well made them aware about the current available information and its translation (regardless its geographical coverage) into reports, forecasts, business road maps, policy recommendations, etc.

The deliverable explains the future trajectories of the work package. By engaging the MAL and WP-leaders to take a closer look to the approach and used methodologies (if available of course) of their collected data.

### **1.2 Contributors**

The following partners have contributed to this deliverable:

- VITO
- HCMR
- SU
- SINTEF
- IRSTEA
- NIMRD
- ICEADR
- ICRE8
- CSIC
- GEO
- GRBR

As deliverable 5.1 relates to the making of an inventory, different stakeholders were asked to give a contribution based upon their connections, interactions and relationships with stakeholders of all sorts of importance for the task they were given. Namely, bearing in mind the investigation of the coastal-rural synergies, which scenarios and transition pathways have been developed over time or are becoming developed regarding the scope of COASTAL. Except for ICRE8, all project partners delivered information related of their case study. ICRE8 co-developed and co-authored this deliverable. They assisted by preparing a literature study and safeguarding and structuring the framework in which this inventory has been created.





# **2** Methodology

# 2.1 Collaboration with other partners

GreenBridge as lead partner organised several skype meetings in first instance between GreenBridge, the project coordinator (VITO) and ICRE8 as co-lead of the workpackage to jointly set the spatial-temporal, social-economic and administrative boundaries of the system. First of all, an extensive literature study was performed by ICRE8 whereas both on- and offline sources were consulted according to relevance, scope and background. A face-to-face meeting was set up with VITO to discuss the 'best' approach to structure and develop the scope for the deliverable and how to cooperate with the other work package leaders in order to develop this inventory.

# 2.2 Literature study

An extensive review of both on- and offline sources (the latter relates to examples such as hard copy journals and books) was executed by ICRE8 in January 2019. The main conclusion regarding the literature review involves the definition of both concepts. It soon became clear (while gathering information), that the concept of transition pathways needed to be further elaborated when taking into account, the questions and lack of clarity for most MAL-partners. Most studies approach transition pathways in a technical matter and only recent years a shift has been made towards a more socio-economical point of view with regard to scientific research.

# 2.3 Design and build of template

To establish the inventory, a template has been designed to be filled for each of the case study (ANNEX 1). The uniform design and outlined scope facilitated the gathering of the required information. The questions structuring the information were developed around four key-topics which were discussed and agreed upon by VITO, ICRE8 and GreenBridge as they give a good overview representing the discussed topics, when it comes to the information that was gathered during the MAL-workshops. Additional space was available to enable partners to provide additional information. This assured information partners consider important but that didn't fit the previous question wasn't left out. The four topics are:

- 1. Blue growth
- 2. Socio-economical/institutional
- 3. Technology/innovation
- 4. Agricultural transition

### **2.3.1.1** Introduction to the building stones of the template

Jointly with ICRE8 and VITO, the decision was made to focus on the four topics/categories listed above. Based upon the mindmaps generated during the MAL-workshops and fitting the general scope of COASTAL, it was decided that these topics were most relevant with regard to all case study partners and their respective case study. These domains were chosen to direct and categorize the information regionally, on a local or national level with regard to scenarios and transition pathways. Simultaneously the framework of each theme is set generically allowing broad interpretation.

**Blue growth:** The field of Blue growth starts from the perspective of six global maritime functions: Maritime transport and shipbuilding, food, nutrition, health and eco-system services, energy and raw materials, leisure, working and living, coastal protection, and maritime monitoring and surveillance (de Vet J. M., Edwards, J., Bocci, M., 2016).

**Agricultural transition:** One of the biggest challenges policy makers in the near future have to deal with and its effects are already visible today, is spatial planning. Wolch, Byrne and Newell (2014) took a closer look at different strategies. According to their study, strategies developed to preserve urban green space may be paradoxical: while the creation of new green space to address environmental justice problems can make neighbourhoods healthier and more esthetical attractive, it also can increase housing costs and property values. They concluded that ultimately this paradox can lead to gentrification and a displacement of the very residents the green space strategies were designed to benefit.





Like urban planners, designers, and ecologists. Hence, according to the authors the definition attached to gentrifications stands for: the displacement and/or exclusion of the very residents the green space was meant to benefit (Wolch, Byrne, Newell, 2014).

**Socio-economical/institutional:** socio-economic scenarios confront the central paradox of 'future social time' between the opportunity to reflect upon and reshape the future, and the cultural, institutional and other constraints that limit the scope for change in social system according to Berkhout, Hertin and Jordan (2001).

**Technology/innovation:** according to Rotmans 'When it comes to competitiveness, innovation, scientific research and education, we still rank among the front runners in international comparisons despite the economic downturn. This excellent position is attributable to the high skill levels of our working population. The Netherlands aims to retain its position among the front runners, but this will require sufficient numbers of smart and highly skilled technical people. Because whether we are talking about healthcare, the energy supply, construction, industry, ICT, food production or our main ports, technology is absolutely essential.'

ALL MAL- and WP-leaders were asked to fill the template. The process of gathering information serving as input for the creation of an inventory was not straight forward. Although the concepts of scenarios and transition pathways were clearly outlined and defined by literature review, several partners remained having difficulties to 'grasp' the concept of transition pathways. To further facilitate partners, extra skype meetings were organised to explain in depth, what is required and considered as good input for this inventory.

### 2.3.1.2 Key information document

Next to the EXCEL template that provided the structure to organise the information, a key information document was designed as a guidance. This key information document was a two pager providing background information A short introduction to WP5 was provided, its linkages to other work packages. A short introduction to the concepts of scenarios and transition pathways was provided, next to the topics as mentioned earlier. The document ended with a list of the following questions linked towards scenarios and transition pathways (for both concepts, the questions remained the same), the following example relates to the scenario questions (ANNEX 2):

Which scenarios are available at the EU, national and regional level to describe uncertainties corresponding to the four key topics?

2. Which scenario approach/methodology was used for these scenarios?

3. Does the approach used fit with the needs of the COASTAL project and analysis of land-sea interactions for your study region?

- 4. Which scenarios have been applied for policy support i.e. what was the application?
- 5. Have you detected possible pitfalls concerning this approach, which ones?





# **3** Literature study

# **3.1** Introduction to the topics scenarios and transition pathways

An extensive literature study has been conducted by WP5 co-lead, ICRE8 (2019)(ANNEX 3) explaning the scientific background of both scenarios and transition pathways. Next to the definition, also modelling approaches are discussed and different scientific views how to assess these. What follows, is an overview of what GreenBridge and ICRE8 thinks is relevant as preliminary introduction towards scenarios and transition pathways and how this can have an effect upon other deliverables and project outcomes through the COASTAL-project.

## 3.2 Scenarios

In literature, scenarios are often considered as an umbrella concept. Nevertheless, It's essential within this deliverable that jointly with the partners of WP5, a decision will be taken upon the best suiting definition for a scenario within the COASTAL-project. As the second deliverable consists of the development of generic scenarios, this implicitly means that it should include the views of all stakeholders on possible alternative future developments,

According to Varum & Carla Melo, 2009; Amer et al, 2012; Schoemaker, 1995; Hiltunen, 2009; Godet, 2000; Heijden, 1996; J.D. Strauss, 2004; and C.A. Varum, 2010, a scenario is a tool which does not predict the future but helps deal with uncertainty; it is a description of likely future situations and the path of events that would allow the present to reach that future situation. It highlights potential future system discontinuities, classifying the nature and timing of these cases and projecting consequences of a particular choice or policy decision (ICRE8, 2019). A similar yet more scientific description relates to Berkhout, Hertin and Jordan (2002). Scenarios are planning and communication tools used to explore uncertain futures. They do not aim to predict but are designed to give representations of possible futures. Typically, futures scenarios include a narrative component as well as quantitative illustrative indicators (Berkhout F.,Hertin J. & Jordan A., 2002). Moreover, they try to help identify, explore and communicate (the consequences of) uncertainties (Vleugels, 2008).

Through looking over the different basic principles, an underlying message could be that an encompassing knowledge of the history and the possibilities stemming from a system, combined with having a creative mindset to look beyond the limits of reality and connect to potential cases in the near and far future through projection, and finally having a wide view of the system to not miss any elements that could affect the process; are the main pillars to building an appropriate scenario (ICRE8, 2019).

There is no such thing as a unique approach in order to construct scenarios. According to Berkhout, Hertin and Jordan (2002), the literature distinguishes categories as exploratory, normative and more heuristic approaches.

•Normative scenario planning: (also termed backcasting or normative forecasting), which is a narrative/ qualitative way of making predications based on positive or negative visions of the future. Furthermore this approach is used to investigate change and decision points that might lead to them. This approach is closely related to traditional objective-based planning in which milestones are set and actions plans are designed.

•Exploratory scenario planning: tries to position alternative socio-economic conditions and attempts to construct plausible representations of the future. 'The future' is pictured through the elaboration of multiple alternative states. Moreover, by incorporating and stressing the dynamic effects with this approach, the importance of adaptation to new circumstances can be investigated (Berkhout, Hertin & Jordan, 2002).

The current trend in scenario-modelling is to incorporate the exploratory, heuristic and creative elements of scenario development, as well as the role of participation by diverse stakeholders (Berkhout, Hertin & Jordan, 2002). In common language, you could say a mix of the above described approaches.





These kinds of approaches are based on four key assumptions:

- The future is not only a continuation of past relationships and dynamics but also can be shaped by human choice and action.
- The future cannot be foreseen, but exploration of the future can inform the decisions of the present.
- o There is not one possible future only. Uncertainty calls for a variety of futures mapping a 'possibility space'.
- o Development of scenarios involves both rational analysis and subjective judgement.

As such, after careful consideration, the decision has been made to work with the following definition of a scenario:

### Scenario

"A scenario is a tool which does not predict the future but helps to deal with uncertainty; it is a description of likely future situations and possible events that would allow the present to reach the future"

### 3.2.1 Scenario modelling

### 3.2.1.1 Example of scenario modelling- WLO study

Several scenario models can be used to investigate 'uncertainty' in the future. Nevertheless, it's important not only to use a model that's easy to use, but also a model that has the potential to generate scenarios which can be generalized. Which on its turn is the focus of the second deliverable, the development of generic scenarios.

A famous scenario-model has been launched by the Dutch Environmental Assessment Agency (PBL) in 2006. The Dutch WLO study tried to map out which socio-economic, political and several other changes in the field of energy, environment, demographic, etc. were likely to occur in the Netherlands until 2040. Furthermore, it tried to give an impression of the consequences which can possible occur for the physical living environment. The general scope of the Dutch department was to map out which developments were to be expected to be developed in the current trend of continuing policy and the taking of policy provisions, They did not only look at the physical environment, but also at the underlying driving forces in the field of demography, economics or international politics, etc. (CPB, MNP and RPB, 2006).

Their approach consisted out of the modelling of four scenarios who were arranged around two key uncertainties. The first key uncertainty dealt with the issue; to which extent are countries willing and able to work together at an international level. With regard to the European level, the challenge is to continue to operate effectively while maintaining the legitimacy of the EU. As such, they take into account the consideration whether Europe will choose to tackle cross-border problems together with its Member States , or that Member States attach more importance to their own sovereignty and identity(CPB, MNP and RPB, 2006). This is just one of the research questions.

The second key uncertainty within their scenario modelling, central for Europe, dealt with the reformation of the collective sector as by far all European countries will face an aging population in the coming decades population, there's a tendency towards more individualization and also an increasing wage inequality between highly and low educated people which is expected to increase. According to the WLO- study (2006), these trends increase the pressure on the collective sector. As such the second key-uncertainty deals with the question whether or for which level of public facilities Member States will choose. Will they hand it over entirely to the private market, introduce a mixed system or will the public sector take the lead?

These two key uncertainties form the basis for the four scenarios. The uncertainties and the scenarios derived from it are shown in Figure 2 below.







Figure 2: : Illustration of the Lay-out of the four scenarios by WLO (MNP,2007)

# 3.3 Transition Pathways

Regarding COASTAL, it is appropriate to consider the socio-economical and societal aspects of transition as this relates most to the scope of the project namely investigating coastal-rural synergies.

The transition theory can be considered as an approach that is used in the field of sustainability and governance in order to deal with persistent problems. The transition framework offers analytical tools for structuring and explaining the dynamic behaviour of societal systems, such as the transport sector, energy supply and agriculture, or water management (van der Brugge and Rotmans, 2007).

The study dedicated to transition pathways can be used for various reasons. As such within the COASTAL-project, pathways can be considered as goal-oriented descriptions for the different transitions towards sustainability, exploiting innovative business and policy solutions aimed at the development of coastal-rural synergy.

In order to establish the concept of transition pathways, an in-depth review of literature was executed, scanning the general knowledge on transition. First of all, the transition pathways research is scattered over several disciplines and is hence rather fragmented. Moreover, most literature relating to transition relates to socio-technical theme's (de Haan, 2010). Yet, the study of societal transitions is a relatively recent development (de Haan, J. 2010). Regarding COASTAL, it is appropriate to consider the socio-economical and societal aspects of transition as this relates most to the scope of the project namely investigating coastal-rural synergies

The transition theory is an approach that is used in the field of sustainability and governance in order to deal with persistent problems. The transition framework offers analytical tools for structuring and explaining the dynamic behavior of societal systems, such as the transport sector, energy supply and agriculture, or water management (van der Brugge and Rotmans, 2007).

**Transitions** are processes of change that transform the way societal systems such as health care, water management, transport, energy supply and various others meet societal needs (de Haan, Briony, Rogers, Brown, Deletic, 2016).





Yet in order to get a more fundamental understanding of what transition and further on- transition pathways- deal with several pillars can be detected. As such the following pillar-theory by de Haan (2010) will be used for explanation: Three pillars are key to investigate when investigating transitions, namely:

### 1. The conditions of transitional change

### 2. **Patterns of transitional change**

These are driven by the aforementioned conditions. These patterns contain the processes and mechanisms that produce transitional change and can be used as building blocks for descriptions and models of transitions (de Haan, 2010).

### 3. The conditions and patterns to describe the unfolding of transitions over time

The general outline regarding the pillar theory is set according the three pillars as described above, nevertheless an important 4<sup>th</sup> element has to deal with 'scale' In defining transitions three matters apparently inevitably remain ambiguous and they all have to do with scale (de Haan, 2010).

- 1. demarcation of the societal system itself (boundary of a societal system).
- 2. The `profoundness' of the change.
- 3. Timescales at which the transition is considered.

It's important with regard to transition analysis first of all, to define the societal system and at the same time, its societal needs, in order to detect the pathway that the system follows. Examples of societal systems are; agricultural, education, healthcare and mobility systems; cities, harbour areas and nations; spatial planning, policy and legislative systems, etc. (de Haan, 2010).

Demarcation of the societal system leads to a stricter interpretation which transition is going on. Meaning for example, restructuring the financing of the agricultural department would be a transition with regard to the financing of the department, whereas the agricultural sector as a whole would not be functioning all that differently. As such according to de Haan (2010) when studying the demarcation, the leading question ought to be: how does this system fulfil its societal need?

Secondly, 'profoundness of change', refers to the timeframe. When are we speaking of *transitional* change? In order to analyze this second item, de Haan (2010) refers to idea of measuring according to the 'depth' and 'magnitude' of transition. Speaking of analyzing 'depth', the analyze could focus on the cultural or infrastructural change a societal system undergoes. On the other hand when analyzing the 'magnitude', one should ask which proportion of the societal system has been affected by the transition? For example, exploiting the agricultural example above, one could say; The restructuring measurement will most certainly have an effect upon the department of agricultural within first hand. On the second hand in the future, it could have an influence upon stakeholders working together with the department. Although this seems a good approach to investigate certain elements of transition, de Haan (2010) refers to the likely possibility that this method still comes with a big amount of ambiguity in defining the percentage of change that's most likely to result in a transition process.

Thirdly, also the time factor in general is another ambiguous element in the transition analysis process. A temporal demarcation is also a very hard concept to grasp. Nonetheless, a time-indicator can also be considered with regard to the 'pace of change'. Several models can be used to illustrate this.

In order to illustrate different phases that can emerge during a transition process a qualitative and quantitative approach can be used. With regard to the COASTAL-project, WP 5 strongly collaborates with WP 4 regarding the modelling of transition pathways in a quantitative way. Examples of these two approaches in order to model transition pathways can be shown in the following figures.





The first transition figure represents a S-shape indicator which represents four stages within the transition process:

### Rotmans et al., 2001



Figure 3: Graphical-intuitive representation of a transition pathway.

This S-shape indicator is used for qualitative modelling: 4 Transition phases (adapted from Rotmans, Kemp, Asselt 2001).

The second figure is an illustration of transitioning phases which are represented by the 'System Dynamics' modelling:

Observed patterns of corporate growth (Sterman, 2000; Forrester, 1964):

A: smooth growth B: growth followed by severe crisis C: growth stagnation D: growth with repeated crises



*Figure 4: Example of a Dynamic Hypothesis excerpted from: Business Dynamics: Systems thinking and Modeling for a complex world (Sterman, 2000).* 

This quantitative model (System Dynamics ), gives an overview how the problem arose. By identifying and categorizing key variables, which ones are included endogenously, which are exogenous, and which are excluded from the model. By use of this model, the scope of the model can be identified. Now, we have explained what transitions are about, it's possible to dig a little bit further in order to discover what transition pathways are about.





# Transition pathways:

describe possible routes from now to the envisioned future (for example achieving the Sustainable Development Goals (SDG's) or meeting the requirements of the EU Water Framework Directive). Each pathway revolves around a subtheme and describes intermediate goals, which barriers need to be overcome, actors that are/become important and essential actions/interventions. Transition paths are no fixed plans, and differ from scenarios, they can be inspiring narrative story lines describing goals and interventions on the short-, mid- and long-term. Hence, transition paths provide insight into what is needed to reach the envisioned future and give direction to the subsequent development of the transition agenda (Roorda & Akinsete, 2013)

As explained previously transitional change comes forward due to the emergent result of various processes and mechanisms eventually leading to several patterns that can be detected by using the method as it has been described by de Haan (2010). These results are eventually leading to a limited number of patterns. These patterns describe how societal systems, or rather their constellations, are affected by transitional change according to the procedure whereas the three elements become investigated. By linking patterns, it is possible to reconstruct the complex dynamics of a transition based upon specific information. Such a chain of patterns produces eventually transition paths (de Haan, 2010). As such, as the concept of a transition pathway is key to the investigation relating to WP 5 (developing scenario's and transition pathways) the following definition will be used for further exploration and eventually in order to deliver the required output that is asked as the deliverables of WP 5.

The transition concept aims at disentangling the complex interaction patterns between individuals, organizations, networks, and regimes within a societal context. It also aims at understanding / clarifying how, on the long term, these can lead to nonlinear change in seemingly stable regimes. With respect to the governance aspect, several basic principles of a complexity-based form of governance can be articulated as follows: (Loorbach 2007; Rotmans and Loorbach 2008 as cited in (Loorbach, 2010)(ICRE8, 2019):

- The specific content of the system affects how it can be steered and managed. Understanding how the system works is instrumental for effective management.
- Short-term policy decisions regarding persistent social problems should be based on long-term thinking (25 years, minimum), which entails setting long term goals through the use of scenarios.
- Flexibility and adjustability of the objectives at system level is key. Complex systems are not compatible with the rigidity of strictly defined objectives and plans.
- Complex, adaptive systems benefit from equilibrium as well as short durations of disequilibrium, since the latter state provides opportunities to move the system into desirable (perhaps unforeseen) directions.
- Creating space for innovation through building up alternative regimes in a protected environment, allowing investment of sufficient time, energy, and resources.
- Effective steering can only be done from "inside" the social system, since structures, actors, and practices adjust more effectively / readily to "inside" direction.
- Change requires social learning about different perspectives, and various options.





# **4** Inventory of scenario's and transition pathways at case study level

# 4.1 Approach

Next to the literature study and in collaboration with VITO and ICRE8, it was key to structure the incoming information and also guide this retrieval of information, to get as much relevant data as possible. As a result, a template within Excel has been designed, incorporating questions to define and structure the delivered information. Next to a brief description of the topics also other information regarding; the author, potential outcome, methods of data collecting, source, etc. was asked to be completed. The same questions or method for the listing of information was applicable for both scenarios and transition pathways within the same template but separated by different Excel-sheets. In collaboration with ICRE8 and VITO, a template was designed to be completed by all MAL-leaders. The template was structured around the following topics:

- Topic: socio-economic, technology/innovation, Blue growth, agriculture
- Source: report, forecast, indicators, ...
- Geographical coverage: local, regional, national,...
- Time coverage
- Description of the scenario/ transition pathway
- Model (qualitative, quantitative, exploratory, narrative, mix,..)
- Scenario/Transition Approach (definition and model used)
- Application
- Data owner/provider
- Associated Model & owner

Moreover, one on one skype sessions were provided to explain and discuss the topics. The same approach/methodology was used for both scenario description and description of the transition pathways. Gathering the necessary information wasn't straightforward for MAL-coordinators. Capturing both concepts was at times difficult and the translation of the information available for case studies to fit the template proved to be more challenging than originally was anticipated.

For each case study, a brief abstract is provided relating to the background of the case studies. This approach is complementary to D12 within WP4 of the COASTAL-project (de Kok et. al., 2019). A background summary of the case-study helps to frame the received information . Secondly, based upon thorough analysis per case study and on EU-level, an overview (of the most relevant to the COASTAL-project) received scenarios and transition pathways has been enlisted below. Each of these scenarios and transition pathways contains a brief abstract. The completed templates , containing the input from all case study partners complemented by the information found at an EU-level can be found within ANNEX 4

It was also important with regard to the second deliverable within WP5, to assess the used methodology (if this was mentioned in the study or report). Nevertheless, not all input by the various case study partners had a distinct or general methodology outlined. As such, not for all enlisted case studies it is possible to discussed this in detail.

# 4.2 GREECE - SOUTH WEST MESSINA (EASTERN MEDITERRANEAN REGION)

### 4.2.1 Executive summary and background information

South West Messina's main economic activities deals with agricultural activities (mainly olive cultivation). Next to the olive cultivation also fishing and coastal tourism are regarded as very important economic activities. Tourism is still developing and flourishing gaining both positive effects;, like more quality living facilities. Yet, on the other hand it increases the pressures on the environment. Coastal areas are affected by agrochemicals, soil erosion, landfill and sewage. The study area includes important cultural monuments and Mediterranean habitats included in the Natura 2000 network of protected areas. Long-term planning to achieve a sustainable model of tourism and agriculture will take into account the ecosystem's resilience to the upcoming climate change, building on the knowledge and experience of local actors (de Kok, Viaene, 2019).





### 4.2.2 Background of received scenarios

The received information was ranked according to its relevance. Most Greek scenarios needed a new topic to be introduced namely: Integrated Visions. Taking mostly into account the climate change theme. For the Greek case study the focus lied mainly upon climate change studies. Climate change scenarios can be considered as an umbrella concept as the consequences and scenarios can have far offshoots in the society. Following this general concept, the input was ranked firstly by socio-economic inspired scenarios, followed by agricultural transition.

### - Tsunami hazard assessment of the eastern part of the Mediterranean Sea:

Within the European Union funded project, SEAHELLARC, focused upon evaluating and computing seismic hazard and risk (Papoulia, J., et. al., 2014), it was considered necessary to develop a methodology and tools for seismic and tsunami safety and enhance the protection of coastal areas in the western part of Peloponnese in Greece. In order to facilitate this research, simultaneous observations and evaluation of onshore and offshore data was required. Ahmet Y. et. al. (2014) tried with their research to develop tsunami simulations and their characteristics and as such tried to develop possible tsunami source scenarios for the Pylos-Zakynthos-Filiatra and Kyparissia regions, who are located at western part of Greece. (Ahmet Y. et. al., 2014). Amongst the technical data aggregation such as NAMIDANCE tsunami simulation and the use of a visualization tool to estimate extreme but possible tsunami wave effects in these regions. Several other data sets were used to create possible scenarios.

- **XENIOS project:** Tries to calculate the impact of Climate Change on Tourism Development of Sensitive Areas of Greece. A pilot implementation was installed in Messinia. This report tried to study the synergy between phenomena and their relationship to climate change in order to evaluate how climate change will affect the region and more specific the tourism sector. By assessing the evolution of the local climate under on-going and future climate change and link it with several research questions 1. how CC will affect geophysical phenomena (extreme or not); 2. which are the synergestic effects between the above phenomena (altering and enhancing the different effects); 3. how these may affect the tourist development of the region, which is a key factor for the local economic and social development. Climatic models that are used for this research concern: RACMO2-KNMI based on A1B IPCC scenario; Tourism Climate Index (TCI) based on Mieczkowski (1985). Unfortunately information relating to this project is not yet publicly available/accessible and has been provided briefly by the Greek partner within the template.
- A future for Messinia: The report outlines the result of a preliminary field-study carried out over the month of May 2014. The results of this study have led to a number of general recommendations how sustainable development in the areas of tourism and agriculture, as well as their potential synergic overlaps, can be ascertained, are given. Messinia can according to this study, be considered as poised for economic development albeit with a number of challenges. One of the key results within the study stated that the institutional representation of the region as a whole is lacking. Moreover numerous venues to solve problems and leverage on potential in the region cannot be accessed due to problems stemming from a dearth of coordinated efforts among the various stakeholders in the region (Andéhn, M., 2014)
- Regional Climate Change Scenario study: This scenario study focused upon potential regional future changes in seasonal (winter and summer) temperature precipitation. The geographical coverage was the greater area of Greece over the 21st century under several potential scenarios such as; A2, A1B and B2 future emission scenarios which were developed under the auspices of the Intergovernmental Panel on Climate Change (IPCC). In total 22 simulations from various regional climate models (RCMs) were assessed; fourteen of them with a spatial grid resolution of 50km for the period 2071-2100 under A2 (9 simulations) and B2 (5 simulations) scenarios and eight of them with an even finer resolution of 25km under A1B scenario for both 2021-2050 and 2071-2100 time periods (Tolika, Zanis & Anagnostopoulou, 2012).

The future changes in temperature and precipitation were calculated with respect to the control period (1961-1990). Resulting in the following conclusions:

- $\circ$  ~ All the models estimated warmer and dryer conditions over the study area.
- The warming is more intense during the summer months, with the changes being larger in the continental than in the marine area of Greece. In terms of precipitation, the simulations of the RCMs estimated a decrease up to -60% (A2 scenario).

The study concluded that changes in the atmospheric circulation over Europe play a key role in the changes of the future precipitation and temperature characteristics over the domain of study in a consistent way for the different emission scenarios (Tolika, Zanis & Anagnostopoulou, 2012).





Scenario studies involving renewable energy: Scenarios on the long-term became developed within the framework of renewable energy. The research provides an outlook to the 2030 horizon within the energy and power system in Greece. Three scenarios are generated under different options. The first scenario deals with a baseline (which is based on historical trends). The second scenario involves the target 2020 (which is based on the European target set in 2020) and the third one relates to the target 2030 (which is based on the European target set in 2030). Furthermore, two additional scenarios were developed for the Greek GDP growth; the first one based on the International Monetary Fund (IMF) estimates and the second one takes into account the estimates of the Organization for Economic Co-operation and Development (OECD). The results have shown a substantial shift in the electricity generation mix by 2030, leading towards an economy that has to be reversed and take into account renewable energy solutions (Halkos, Kevork, Galani & Tzeremes, 2014).

### 4.2.3 Background of received transition pathways

The input for the transition pathways had a more overarching focus. One transition pathway that stood out involves the Gaiasense system which is focussed upon smart farming by taking a closer look into the agricultural transition process.

- Gaiasense system: The gaiasense system is a Greek innovation that combines different information technologies with agronomic science in a holistic way. Gaiasense is pioneering at a European level in the field of smart farming. It enhances and optimizes the decision making and precise applications in agricultural crops no matter how small or large scale they are. This exploratory model has developed a toolbox which is managed by a Gaia epicheirein company and is targeted to farmers, agricultural advisors and researchers that want to improve farm management( Gaiasense, 2019) .
- Fisheries improvement project: Action plan for the improvement of the sustainability of fisheries in Kavala. In terms of fishing, the Mediterranean fish stocks are overfished, i.e. they are fishing at a higher rate than they are breeding. This poses a major threat to both the marine ecosystem, the Greek economy and their tradition. Together with the World Wide Fund for nature (WWF), a cooperative has been established for the common managing of Kavala fishing fleet, with the participation of fishers, conservationists (WWF), researchers, local governing bodies and large resellers. The central research question focused upon a way to ensure fish for the future and to avoid the negative effects of fishing on the environment. Furthermore for the first time in the Mediterranean, a fishing fleet entered the environmental certification process for MSC fishing. Next to a set of management measures and actions, also the collection of data on discards in order to understand the impact on all major types of by-catches and to limit discards within the permissible limits is one of the actions (WWF, 2019).
- Cyclades life- project: Ecosystem Based Management and Marine Spatial Planning is considered as the foundation for the efficient design of the new marine protected area according the Cyclades life-project. The project is based on a participatory system with the active contribution and direct consultation by all involved and interested stakeholders both at local and central level, through the formulation and co-operation of a committee, which will promote and ensure direct involvement and participation in the co-management of the area. Actions are categorized according to; preparatory actions, Marine Environment Protection Actions, Monitoring Actions, Capacity Building Actions and Co-management Actions. The timeframe in which the project was enrolled was set between 2013 -2018. As such in order to initiate transition, a participatory management plan was formulated for the establishment of a marine protected area and a local maritime spatial plan(Cyclades life, 2018).

### 4.2.4 Detection of methodology

The Gaiasense system is a methodology including different smart technologies. It combines information from the field such as recording, analysing and interpreting atmospheric and soil data. Also the farmer gives input via data that is collected through daily cultivation work of the producer such as fertilization applications, plant protection, time and duration of irrigation. Also satellites and sampling or field observations are being executed in order to gather the most accurate information as possible (Gaiasense, 2019).





# 4.3 BELGIAN COASTAL ZONE (NORTH SEA)

### 4.3.1 Executive summary

The Belgian coast (67 km length) and hinterland face environmental and economic stresses from intensive multifunctional use of space. Land- and sea-based activities such as agriculture, fisheries, agro-food industry, transport, energy production and recreation are closely interwoven and competing for space both land and seawards. Potential interesting domains are blue growth, with currently a big focus upon on- and offshore energy production which create opportunities for new jobs and strategic specialization of port activities (de Kok, et. al., 2019). On the other hand, next to the scarcity of space, another stressor contains the salinization of inland waters, related to human waterworks, water management, and sea level rise. Next to the stressors, other challenges include fragmentation of policy and knowledge for coastal and rural development due to a complex governmental structure. Up till date, a common administrative framework for coastal-rural integration is lacking and policy responsibilities are fragmented at both regional and national level (de Kok et. al., 2019).

With regard to the Belgian case study, an extensive list has been provided, both in terms of scenarios and transition pathways. An additional topic was enlisted, namely 'Integrated Visions' relating to transition pathways. This topic comprises strategic actions which incorporates several domains whether at an agricultural level, Bluegrowth level,, with respect to climate change, etc.

### 4.3.2 Background of received scenarios

- **Spatial policy plan Flanders:** The aim is to generate map images and detailed, sometimes very local consequences of the scenarios. This gives insight into area-specific nature of certain activities as well as spatial and temporal scales within which future policy can make choices. This scenario model was inspired upon the previous mentioned WLO-study within the literature review of this deliverable (Ruimte Vlaanderen, 2011).
- **Challenges for Flemish agriculture**: These challenges are addressed within a report containing an exploration of determining external changes. Such as the exploration of the external changes in socio-technological factors (demography, food habits, technology, ...) affecting agriculture (Bergen, Vervloet & Van Gijseghem , 2014). This report has a time range till 2050.
- Social-Economic SWOT analysis of the regional economy of West-Flanders: This analysis focuses upon 4 'spearpoint industries': agrofood, new materials & plastics, blue growth, and mechatronics. Five different future views are presented, focused on energy, ICT, infrastructure, tourism and health care, and administration. The report contains as strategic vison towards the future for the region West-Flanders (POM West-Vlaanderen, 2015).
- Economic impact assessment for the development of offshore wind energy in the Belgian North Sea: This study analyses the socio-economic impact of the development of the offshore wind industry within the Belgian economy today and in the near future (2030). An prospection has been made which industry sectors will benefit from offshore wind energy investments. The offshore wind industry includes a wide field of actors; from project development and financing manufacturing and construction, up to and including operation and maintenance. As a methodology, the standard input-output (I / O) multiplier approach of the Federal Planning Bureau has been used to prepare a socio-economic model for offshore wind energy. Additional analyses were conducted to assess the impact of offshore wind energy development trade balance and public finances. Eventually, the impact of the offshore wind energy development on the wholesale prices of electricity. Has been measured next to the potential economic impact of avoiding greenhouse gas emissions (Breyer, Cornet, Pestiaux & Vermeulen, 2017).
- Exploration of the observable, current-day impacts of climate change in Flanders and Belgium and expectations for the future; This explorations is based on the IPCC scenarios with a low, medium and high climate change scenario and time horizon of 30, 50 and 100 years. Additional focus was put upon on flood risk and hydrology (Brouwers, et. al., 2015).





The Future of the North Sea in 2030 and 2050: a scenario study: Scenario projection for the North sea with a time range towards the years 2030 and 2050. This report incorporates four integrated scenarios (slow change, pragmatic sustainability, rapid development, sustainable together). This study focuses primarily on the main policy themes in the 2030 North Sea Strategy. For instance, energy transition, change towards resilient ecosystems or the creation of a sustainable food supply. The study focuses on the question how multiple use of space, by combining various user functions in a certain area, can be implemented to make the most efficient and sustainable use of the limited space available on the Dutch continental shelf (Matthijsen, Dammers & Elzenga,2018).

**Forecast of the Belgian energy landscape:** This forecast takes into account the evolution of the national energy system until 2050, if policy remains unchanged. Future figures make it possible to draw lessons, at the Belgian level, about the possible need for additional policies and measures in the context of the European climate and energy framework by 2030 and the transition towards a low-carbon company by 2050. (Federaal Planbureau, 2017).

- LARA: Is already the seventh, 2-yearly Agriculture Report (LARA) describing the challenges for agriculture and horticulture in Flanders. It contains a combination of policy, research and expert vision on how to deal with these challenges. The report includes SWOT analyses and uses historic data for the period 2008-2016 (Platteau, Lambrechts, Roels & Van Bogaert, 2018)

### 4.3.3 Background of received transition pathways

- **IMAGO-toolbox:** The IMAGO-toolbox has been developed in order to analyse the multitude of projects in the open space in an area and can be used as an instrument in order to coordinate those existing and some ongoing activities/ projects in a more efficient way. What are the tension fields between the several rural actors and which opportunities can be detected in order to let the rural actors work together and preserve and manage the 'remaining' open space? These questions are the global focus behind the design of the toolbox (Dewaelheyns, et al., 2017).
- **Oplossingsrichtingen voor het voedingssysteem**: Exploration of solutions for the food system (production, processing, distribution and consumption) aimed a sustainable agriculture & food system (Van Lancker, Hubeau, & Marchand, 2018).
- PACT 2020: ' Pact 2020' could be considered as a strategic pact that becomes on a yearly base monitored according to variables that have been enlisted by researchers who are attached to Statistics Flanders (a department specialized in different sorts of socio-economic domains). By developing a long-term policy, the Flemish government wants to smoothen the transition process by introducing supporting guide lines, concrete priorities and actions. Despite being launched already in 2009 and called 'Flanders in Action' plan which was centred around 13 themes', the Flemish government has opted to follow the same path for the future (with new deadline, 2050)(Vlaamse Overheid, 2009).
- **EU SCAR:** Report containing agricultural knowledge and innovation systems towards the future. The intention of this report was to enrol a strategic roadmap for innovation of agro-food systems in the EU. It includes three scenarios (high-tech, self-organisation and collapse)(EU-SCAR, 2015).
- Long-Term Vision North Sea 2050: Strategic long-term policy vision on the Belgian North Sea. It contains several strategic policy documents with a long-term vision, based on three core principles: environmental sustainability, blue economy and multi-functional use of space(Federal Public Service of Health, Food Safety and Environment, 2017).
- TOP Kustzone: The Territorial Development Programs (TOPs) are Stakeholder-driven/participatory instruments to support the realization of spatial development goals with a short- and mid-term time horizon. The TOP Coastal Zone focuses on topics such as urban transition, spatial quality and salinization of the soil (Ruimte Vlaanderen, 2017).





- Long term strategy Flanders: The Flemish government has created a long-term strategic vision aimed at innovative creation of welfare and prosperity. This policy document starts from an inventory of the international trends, followed by a strategic vision for Flanders for 2050 and is concluded with seven transition priorities (including circular economy and energy transition)(Vlaamse Overheid, 2016).
- **Metropolitaans kustlandschap 2100:** Project based on design research and aimed at examining the coastal challenges and developing a broadly supported strategy for the coast, sea and hinterland. It covers a long-term time range up to 2100 (Labo Ruimte, 2014).
- **Oplossingsrichtingen voor het energiesysteem:** This report was ordered by the Flemish department responsible for the environment. It gives a background sketch describing solutions towards a sustainable energy system, starting from a longlist of solutions (Laes, et. al., 2018).

### 4.3.4 Detection of methodology

The input-output (I/O) multiplier methodology, is considered as a standard approach and often used by the Federal Planning bureau in Belgium. A good example of the Input-output multiplier methodology can be found within the Climact study, which investigates the socio-economic impact of offshore wind energy within the Belgian part of the North Sea (Breyer, Cornet, Pestiaux & Vermeulen, 2017).

The I/O multiplier methodology, is a unique tool to improve the relationships between the different industries within an economy and analyze them. When the input-output tables are linked to macro-economic models, they can add structural elements to it. Moreover, when they are integrated into one input-output model, they quickly provide various synthetic analysis measures. the multipliers are specified within demand-driven input-output models and/or mixed input-output models. The multipliers, which are often used in the economic impact analyzes, are synthetic measures of the impact of exogenous shocks on different economic variables. For instance, they can therefore be used to estimate the effects of a change in government spending or in the existence of quotas, on production, the energy consumption, etc. However, there is caution concerning the automatic use of the multipliers. Each case must be individual become examined to choose the input-output model that is most suitable for the involved multipliers in order to assess them correctly according to the situation (Hambÿe, 2012).

# 4.4 SWEDEN - NORRSTRÖM/BALTIC SEA

### 4.4.1 Executive summary

The Norrström drainage basin (22 000 km<sup>2</sup>) comprises the major part of the Swedish water management district Northern Baltic Proper (COASTAL, 2018). The area also comprises the Swedish capital, Stockholm and faces challenges due to a large extent of agricultural and industrial activities which contributes to a considerable amount of nutrient loading to the Baltic Sea. Eutrophication and harmful algae blooms despite international agreements and environmental Regulations. The main challenge for this region therefor consists of finding a solution for managing and mitigating the nutrient loads in the short and long term, under changing human pressures and hydro-climatic conditions. Other challenges include maintaining ecosystem services and the enhancement of human wellbeing under multiple regional changes( de Kok, et. al., 2019)

The input of the Swedish MAL-partners involves different approaches of scenario modelling elaborated in scientific papers. Yet with regard to this inventory and definitely regarding the transition pathways, the information is rather limited, offering only two possible transition pathways. Moreover, no active implementation of these suggestions, (i.e. effective implementation of the propositions into concrete actions or policy implementations) can be detected which ultimately can lead on the long term towards transition. Besides, no active stakeholder involvement can be detected as it's not clear if the discussed topics have been incorporated by industries, interest groups, governmental bodies, etc. as they are entirely captured within these scientific papers.





### 4.4.2 Background of received scenarios

Regarding the scenarios, each topic is represented by an example. Nevertheless each time by use of a scientific paper background. Besides, the subject of these models also fit under the topic as suggested by the French Partners 'water management' because all models are either completely focused upon water quality or partly in comparison with more agricultural thematic. Moreover, four modelling approaches are discussed within two scientific papers.

Data-driven analysis of nutrient inputs and transfers through nested catchments: This report contains two model approaches. The first one takes into account scenario exploration in terms of regional population conditions related to various envisioned/possible socio-economic developments/states and their effects upon nutrient loads and possible coastal water-quality implications within the Baltic and Balkan region. The aim is to use the found cross-regional (and cross-temporal) relationships in order to further explore development scenarios in terms of regional population and farmland share and their implications for waterborne nutrient concentrations and associated loads to coastal waters and their quality status (Levia, Cvetkovica & Destouni,2017).

Another scenario exploration deals with agricultural transition in terms of various envisioned or possible regional farmland-share developments/states and their nutrient load and coastal water-quality implication. This exploration has the intention to use cross-regional (and cross-temporal) relationships that have been detected by research, to further explore development scenarios in terms of regional farmland share development and associated implications for waterborne nutrient concentrations and loads to coastal waters and their quality status(Levia, Cvetkovica & Destouni,2017).

- A scalable dynamic characterisation approach for water quality management in semi-enclosed seas and archipelagos: This report contains one of the modelling approaches which takes into account the nutrient loads in relation to the water quality in semi-enclosed seas and its coastal zones. Test zone incorporates parts of the Baltic Sea and one of its local archipelagos, the Archipelago Sea. With regard to scenario modelling, this report tries to explore and identify management options (technology/innovation related scenarios of nutrient loading from WWTPs) for reaching good coastal water-quality status or, alternatively, for exploring the coastal water-quality effects and implications of technology/innovation related scenarios of changed WWTP nutrient loading to rivers and/or the sea (Vigouroux, Destouni, Jönsson & Cvetkovic, 2019).

The other model deals with the detection of scenarios of blue-growth related changes in open-sea marine water quality conditions, by use of a cross-scale modelling approach to the land-sea interactions. It tries to identify management options (blue-growth related scenarios in order to reach good coastal water-quality status or, alternatively, for exploring the coastal water-quality effects and its implications upon blue-growth related scenarios (Vigouroux, Destouni, Jönsson & Cvetkovic, 2019).

### 4.4.3 Background of received transition pathways

The Swedish MAL-partners have provided a brief summary with regard to transition pathways as only two were enlisted, both of them within the socio-economical domain. Yet in comparison with the French input, at least one information document offered a more elaborated approach when it comes to stakeholder involvement. One of the scientific papers, is actually more an opinion piece that was written in 2018 offering a pathway in order to cope with legislative boundaries, proposing mitigating measures in order to reduce nutrient concentrations and the legislative framework around this ((Destouni & Jarsjö, 2018).

Does Divergence of Nutrient Load Measurements Matter for Successful Mitigation of Marine Eutrophication?: Was the research question behind a report which tried to explore and quantifies uncertainties with regard to costs, and fairness implications for the different Baltic countries of complying with the Baltic Sea Action Plan (BSAP). This plan requires nutrient reductions for reaching good coastal-marine water quality and ecosystem status. The modelling approach exemplified within the report can be further used to explore other measures (transition pathways). The explored measures and their combinations can have implications for different sectors, including for agriculture, technology/innovation and responsible public institutions (Gren & Destouni, 2012).





Zones of untreatable water pollution call for better appreciation of mitigation limits and opportunities: Opinion piece addressing an alternative way (in order to create transition) by trying to reduce nutrient concentrations and loads in cases of dominant legacy releases of nutrients (pollutants). The modelling approach used is outlined in the piece describing a diagnostic test for identifying dominant nutrient (pollutant) legacies over the regional landscape, which can be further used to explore alternative options for nutrient (pollutant) and the need of accompanying mitigation measures (transition pathways). Also associated institutional and sector management implications are suggested in order to create in the end, a good coastal water-quality/ecosystem status (Destouni & Jarsjö, 2018).

# 4.5 ROMANIA - DANUBE MOUTH (BLACK SEA)

### 4.5.1 Executive summary

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 problems such as red tape. The main challenge in the agricultural field is the development of the ecological agriculture sector. On the other hand, fisheries and aquaculture remain an interest field for the area, representing a significant source of income for a part of the population living in the coastal rural area and the Danube Delta (COASTAL, 2018).

The information provided by the Romanian case study partners focussed on the socio-economic domain as well as on Blue growth. Despite the case study having a strong agricultural focus only one model with an agricultural background was provided. As is the case with the previous partners, the concept of transition pathways has not yet been widespread as a methodology. Nevertheless, one report stands out, "The village of Sfântu Gheorghe" (NICHERSU et. al., 2014). Yet depending on the point of view. This report can be catalogued whether under the concept of scenarios or transition pathways as it incorporates elements of both concepts

### 4.5.2 Background of received scenarios

- **The MONERIS model**: This model has been established in order to calculate the emissions of nitrogen and phosphorus to the surface water, using different pathways as well as the instream retention in the surface water network. Through MONERIS the nutrient loads within the Danube river network have been calculated up till now and a scenario has been developed for 2015. The application of the MONERIS (Modelling Nutrient Emissions into RIver Systems) approach was successfully for the modelling of the nutrient inputs within the Danube River Basin. MONERIS is a semi-static emission model for point and diffuse sources of nutrients. It can also be adapted in order to deal also with heavy metals and some priority substances (e.g. Lindane) (ICPDR, 2019).
- **The MARSPLAN project:** Contains detailed studies for a complete analysis of Romanian and Bulgarian maritime areas. The studies were executed between 2009 and 2016. The purpose of these studies was to define the existing conditions and dynamics within these maritime areas in terms of human uses both on coastal and marine areas, their economic value, environmental conditions and natural valuable areas amongst other variables (Ministry of Regional Development, Public Administration and European Funds (2015).





- The PlanCoast project: Can be seen as a manual or handbook in order to set up an Integrated Maritime Spatial Planning (IMSP). It combines the tools and procedures of terrestrial spatial planning with the principles of Integrated Coastal Zone Management (ICZM). One the steps in this spatial process and within the handbook deals with scenarios and involves the setting out of a clear vision. The case study: "Scenarios for the West coast of Schleswig-Holstein" was used as an example and was governed by the nationals 'Coastal Futures' research project. Different scenarios were drawn up to show several development options on the West coast of Schleswig-Holstein. The research question involved the timeframe of 2030 and how the region actually could be like? The case study was used an element in this handbook to refer to as an exercise in 'reasonable extrapolation' (Schultz-Zehden, Gee & Scibior, 2008).
- **The World Bank report 2.2 of the Danube Delta Integrated sustainable development strategy (2030).** This report is about the development of a strategy for the Danube delta and adjacent areas within the 2030 horizon. It tries to identify action plans for the implementation of such a strategy (The World Bank, 2014). The environmental report of the Danube Delta Integrated sustainable development strategy (is about the impact of the development of the Danube delta on the environment (Dimache et al., 2015)

### 4.5.3 Background of received transition pathways

WP 5 received one transition pathway example and although the report has been noted twice cf. supra, the Sfantu Gheorghe case study shows affinity with the concept of transition pathways based upon the following description an due to the use of the Sketch Match methodology.

The case study has led to new findings on the hydrological impact of Danube and sedimentology, in an area included in the Danube Delta Biosphere Reserve (Sacalin island). Based upon morphological evolution analyses, it can be stated that the Sacalin island is fragile and continuously under natural pressures which are constantly changing its shape. Based upon the gathered information, there is a need of protecting and conserving the new maritime ecosystems formed and meanwhile enhance the awareness of all type of stakeholders, such as scientific community, conservationists, maritime spatial planners and economic environment. Moreover, to fulfil the above objective, the decision was made to apply active participation by implementing the Sketch Match methodology in order to identify the common issues, challenges and solutions for Sfantu Gheorghe territorial development and coastal protection (NIMRD "Grigore Antipa" Constanta, 2019).

### 4.5.4 Detection of methodology

Of particular interest is the "Sketch Match" method. It consists of an interactive planning method, that has been developed by the Government Service for Land and Water Management in the Netherlands (DLG). It's a method that brings insight into spatial development issues together with several regional partners. The method can be used to identify and visualize potential development paths and so facilitates the decision-making process for managers, policymakers and local stakeholders. It is an intensive process that organizations and other interested parties can use in their own development areas (Voorbrood, 2007). The end-result of a Sketch Match is a spatial design, in the form of a ground plan, map, book, visual story, model, 3-D GIS visualization. In fact, the format can differ according to the project. Several disciplines come together in a Sketch Match amongst them are; layout, GIS, ecology, hydrology, hydraulics, socio-economy, spatial planning (Voorbrood, 2007). Particularly, in this case it was used the Land Cover maps using Corine Land Cover (CLC), Tthe map of infrastructure and the fragmentation degree of coastal area, the Flood hazard map for 30 and 100 years (using LIDAR technology, ArcGIS and CoreIDRAW). The qualitative analysis used the Insight-Matrix and CONSIDEO MODELER.





# 4.6 FRANCE - CHARRENTE RIVER BASIN (ATLANTIC REGION)

### 4.6.1 Executive summery

The case study for France is focused upon the Charente River watershed (10000 km<sup>2</sup>). Numerous economic activities with all sorts of background as well as an increasing urban coastal population cause a pressure rise on an environmental and rural level. Just like with the other case studies, the problem scope is likewise. Yet, the situation within the Charrente river basin has exacerbated. Next to a scarcity relation to the water resources both at a quantity (increasing domestic and rural use for irrigation) and quality level (increasing level of nitrate and pesticides), new ways have to be found in order to cope with these problems (de Kok et. al., 2019). Water management is consequently highly ranked on the agenda of the concerned governments and stakeholders both at a rural level and with regard to the Coastal water quality. As such, much of the received information within the template relates to this topic. Moreover, due to several factors, stakeholders are faced with questions how to cope with this changing environment. For example, a shift towards more organic farming or with regard to climate change, the setting up of a new strategy in order to cope with possible outcomes of climate change.

### 4.6.2 Background of received scenarios

The French MAL-leaders provided an extensive list regarding their input for the scenario inventory. Moreover, just like the Greek case-study partners, they introduced a new topic: "water management". The information provided within varied according to information and studies generated by the government, industry or other stakeholders who were participants of the MAL-workshop. Next to reports also background knowledge of the participating stakeholders of COASTAL and educational or academic input was enlisted. This background was enlisted to serve as inspiration by enlisting research questions which could eventually later on become studied by means of scenario- or transition analysis/ methodology. The undermentioned subjects were selected as most relevant for this inventory.

- **South Atlantic Maritime Facing Strategy:** The objective behind this strategy is to define and implement by 2030 a project of global development for their maritime facade. The development of the maritime façade strategy consists into the broadening of the horizon of the process and the planning of maritime areas. The strategy has been written down in a revisable document that becomes revised every 6 years. But it carries the ambition to project itself to a more distant horizon set at 2030. Furthermore, The vision is divided into the three major axes of the National Strategy for the Sea and the coastline(DIRN sud atlantique, 2018).
- Plan national d'adaptation au changement climatique: This plan concerns a long term prospective but governmental action plan with a time horizon of 5 years. The plan tries to raise awareness of the actors on the realities of climate change and adaptation and prepare them to be able to cope with uncertain developments. The plan tries to analyse the impacts on competitiveness and develops pahtways as part of forward-looking approaches. Besides it identifies the paradoxes and antagonisms to be addressed (e. g. globalization vs. short circuits). The plan was launched in 2016 (Ministère de la transition écologique et solidaire, 2016).
- **The Aquitaine Coastal Tourism Foresight Study:** Provides a prospective reflection on coastal tourism. The study was published in 2013 and defines regional orientations and proposals for operational actions to meet the challenges of future tourism. Policy measures are focused upon the assets of the coast and by anticipating demographic, societal, environmental and economic changes in the best possible way. Next to data aggregation, the approach existed out of trend study and the elaboration of trends by 2020 2040 on the evolution of tourism supply and demand (GIP Littoral Aquitain, 2013).

### SRADDET (The Regional Plan of Planning, Sustainable Development and Equality of Territories):

SRADDET can be considered as a strategic plan for the Aquitaine Region and its inhabitants. Six major issues are addressed. Amongst them; the development of business and the creation of sustainable jobs; Provision of quality training adapted to the needs of companies and territories; the facilitation of access for all to health, in terms of both care and prevention, facilitation of the ecological and energy transition as a lever for economic development, innovation and improvement of the quality of life, etc. The project integrates several policies that were previously treated independently of each other, in order to improve the overall coherence of public





policies and to propose a shared vision on the balanced and sustainable development of New Aquitaine. The SRADDET-project covers the timeframe between 2030 and 2050 (Région Nouvelle Aquitaine, 2018).

- SCRAE (Schema regional Climat, air, energie): Can be considered as the predecessor of the SRADDET-project. From 2019 onwards this plan will be incorporated by SRADDET. The SCRAE-project presents potentials, objectives and orientations in the matter of: Efficiency and energy control, Reduction of Greenhouse Gas Emissions, Development of renewable energies, Prevention and reduction of atmospheric pollution; Adaptation to climate change. The results Recommendations regarding public information (Région Nouvelle Aquitaine, 2013).
- Les scénarios du SER: The union of renewable energy sources has by use of current development rhythms, a national trend scenario established in relation to different regions within France according to the deposit and the constraints of their territory; These scenarios have been translated into business roadmaps. The timeframe of this study covers the period from 2019 onwards till 2030 (SER, 2019).
- ORACLE: Contains a report regarding the adaptation of agriculture to climate changes in the region Nouvelle Aquitaine. The report tries to give an overview of the main trends for agricultural production (by observing data and indicators) and becomes reviewed once a year (.Chambre régionale d'agriculture Nouvelle-Aquitaine, 2018)
- **SCRATCH08:** Is one of the studies executed under the auspices of the Charente 2050 programme. scenarios climate changes on river flows). It deals with the modeling of climate scenarios on medium term comprising hydrological foresight linked to global changes (EPTB, 2010).
- CHARENTE 2050: The amendment to the PGE Charente has included the "Charente 2050" project dedicated to the climatic evolution of the Charente basin. By the development of these scenarios, L'Etablissement Public Territorial de Bassin Charente (EPTB Charente) tries to assess the impacts of climate change on the Charente catchment area, water uses and proposes adaptation solutions. They try to anticipate the consequences of climate change on low-water hydrology and anticipate upon trends in the evolution of irrigation needs (change of practices, choice of crop rotation) over the coming low water level and over the long term (EPTB, 2015).
- SAGE Charente: Can be seen as an integrated and sustainable management plan for water, aquatic environments and their use on the Charente basin. Moreover its considered as a reference for the river basin management. Sage sets up a single framework regulation for the Charente basin, it analyses the volumes that can be collected for irrigation by controlling water demand, adapts and provides agronomic and socio-economic advices for agriculture in line with the available water resource and coordinates the Single Collective Water Management Organizations (OUGC) of the basin (EPTB, 2014). By making use of trend scenarios it makes it possible to build a forward-looking SAGE strategy for the period 2015-2025, in full awareness of the determining factors, economic, societal (town planning, economy, local or macro-economy) or physical / climatic (EPTB ,2015).

**MODCHAR2:** Assessment of different possible scenarios for agriculture with impacts on water flows, quality in streams and at the outlet of the Charente river + Costs analysis of the changes. Time coverage was set at 2015-2025. The outcome of this research was intend to couple a ecohydrological model and a spatial distributed bio-economic model road map for the Local Public Basin Establishment (EPTB) of the Charente river (Vernier F., et. al., 2010).





### 4.6.3 Background of received transition pathways

Besides the input for the scenario-inventory, the information that has been provided for the inventory of transition pathways is also quite comprehensive. There's not only the introduction of the water management topic, a lot of propositions or suggestions have been included by various stakeholders proposing transition pathways like a better management of coastal wetlands by public policies (managing the land-sea interface both by preserving freshwater wetlands for breeding activities and by preserving salted wetlands for shellfish production). Another example also relevant is the suggestion to enhance more strict control on water resources which eventually will lead to a conversion of conventional farms to organic farming (sustainable farming systems) to respond to growing demand from consumers for local and certified produce.

- Territory with Positive Energy for Green Growth (TEPCV): In an ideal setting this represents a territory of excellence in the energy and ecological transition. The community is committed to reduce the energy needs of its inhabitants, buildings, economic activities, transportation, leisure, etc.. It proposes a global program for a new model of development, more sober and more economical. Six areas of action have priority in these territories: Reducing energy consumption; Pollution reduction and the development of clean transport; The development of renewable energies; Preserving biodiversity; Combating waste and reducing waste; Environmental education. The Ministry of the Environment highlights the fact that territories with positive energy create jobs that cannot be relocated in the areas of building, waste, renewable energies, energy savings, etc. As such by means of education such as Médiathon and government steering, they try to create a shift within the Green Growth domains on a regional level (Région Nouvelle Aquitaine, 2018).
- PRAD (Regional plan for sustainable agriculture) : The PRAD-plan is a Strategic document containing both recommendations and actions which sets the main orientations of the agricultural, agri-food and agro-industrial state policy of the Nouvelle Aquitaine. It covers a time range of seven years for the Aquitaine region, taking into account the local specificities as well as the economic, social and environmental issues. The PRAD has been incorporated in national commitments within the agricultural domain. It has been conducted by the Prefect and is developed in consultation with all the regional actors concerned. The Regional Commission responsible for the agricultural economy and the rural world ensures the follow-up of PRAD., strategic orientations, the actions of the State corresponding to these orientations, the indicators allowing to follow the implementation of the orientations during the duration of the plan. PRAD rans from 2014-2020 (BALNY et. al., 2015).
- **BIO 2022:** By introducing an ambitious plan. The governmental department responsible in France for agriculture and food wants to create a shift towards more organic producing. The concerned actions involve; the development of organic production up to 15%; Structuring the sectors; development of consumption and support for the supply of organic products for all consumers, including for the poorest and most vulnerable publics. The objectives of the plan contain the strengthening of research; Adaptation of regulation and stakeholderstraining (Ministére de l'agriculture et de l'alimentation, 2018).
- **Region-state planning contract:** 'The objectives are to increase the attractiveness of the territory around the port of La Rochelle. In order to improve access to the Charente coast. Further it wants to develop the following strategic sectors: food quality, green chemistry, environment and health, advanced materials, eco-mobility, sustainable building, digital technologies, bio-health and aeronautics (Région Nouvelle Aquitaine, 2015).
- MAEC: stands for agri-environmental and climate measures. It's categorized into three categories. It's one of the major tools of the second pillar of the French Common Agricultural Policy (CAP) for maintaining favourable practices for the Environment, and supporting agricultural transition in order to respond to environmental pressures identified at territorial level. (DRAAF, 2014).





- Adaptation to Climate Change: Comprises a complementary program of the Aquitaine Coast Observatory, funded by the Nouvelle-Aquitaine Region, DREAL Nouvelle-Aquitaine, Europe (FEDER funds) and BRGM. This report can be considered as an evaluation of adaptation mechanisms to natural hazards in the face of climate change: assessment of adaptation measures on the Aquitaine coast. The project is divided into two phases:
  - $\circ$   $\;$  Phase 1: First Assessment of Adaptation Measures on the Aquitaine Coast  $\;$
  - Phase 2: Practical application and analysis of feedback for a better anticipation of the effects of climate change in the Aquitaine region.

Recently the final report of phase 1 has been launched. It tries to identify the adaptation measures to existing coastal risks, envisaged or conceivable on the Aquitaine coast. Furthermore these risks are then being evaluated by confronting them with anticipated changes in risks related to climate change. The approach being implemented is based in particular on recommendations made by the Intergovernmental Panel on Climate Change (IPCC) in AR5 WG2 "Foundations for decision making" (Garcin M., Baills A., Bulteau T., 2018).

- Quantitative water management territory projects: In watersheds affected by a structural deficit, the quantitative water management territory project allows local stakeholders to collectively commit themselves to balanced, sustainable and comprehensive resource management. The general purpose of the water agency's aid is to restore the quantitative equilibrium in deficit area (Ministère de l'Écologie, du Développement durable et de l'Énergie, 2015).
- ORACLE: Has already been discussed with regard to scenarios. Nevertheless the objectives of the Regional Observatory on Agriculture and Climate Change (ORACLE) focus upon climate change and how it manifests within the region while analysing its expression on regional agriculture. It aims to help the agricultural community to better integrate climate change into decision-making for adaptation and mitigation purposes. With regard to crop-farming, they try to provide relevant elements to farmers and agricultural organisations in order to take measures and in function of adaptation of climate change (Chambre d'agriculture nouvelle Aquitaine, 2018).





# 4.7 SPAIN – MAR MENOR COASTAL LAGOON (WESTERN MEDITERRANEAN)

### 4.7.1 Executive summary

The Mar Menor coastal lagoon (135 km2) is located in the Region of Murcia (SE Spain). Multiple activities within the area are often competing for scarce resources in which water can be considered as the most important one. Mar Menor has also an important touristic function. On the other hand, the lagoon can also be considered as a good case study when it comes to the development of win-win scenarios and development of sustainable business cases based on public-private collaboration, with efficient use of water and innovative farming practices. Also the transition to sustainable models of tourism and agriculture is not far off (de Kok, et. al., 2019). Also the water quality in the lagoon is low due to among other things, excessive nutrients which has an effect upon the ecology of the lagoon with severe implications for its potential function for tourism and fisheries. The Mar Menor lagoon is part of a Specially Protected Area of Mediterranean Importance (SPAMI). Current challenges comprise good policy for sustainable initiatives and finding the right balance between support of touristic activities, favouring the development of agriculture, and being aware of the fragile ecosystem of the Mar Menor (de Kok, et. al., 2019).

The Spanish partners delivered a first draft of their template in March 2019. Afterwards a skype meeting was organised for an in depth exchange of information. After this meeting the template was adjusted, taking into account the suggestions that were mentioned during this meeting. As such, the following overview can be presented.

### **4.7.2** Background of received scenarios

- **Nuestro Mar Menor:** Could be described as an educational project in which a public elementary school collected proposals from the Educational Community, families and neighbours to present them to the Public Administration of the Region of Murcia with the intention to improve the state of the Mar Menor (CEIP La Asomada, 2018).
- CORDEX: CORDEX is a global partnership that wants to advance and coordinate the science and application of regional climate downscaling by use of a Global Climate Model (GCM). This model tries to provide reliable prediction information on scales of around 1,000 by 1,000 km covering what could be a vastly differing landscape (from very mountainous to flat coastal plains for example) with greatly varying potential for floods, droughts or other extreme events. Cordex applies to the Region of Murcia but also Europe in general (CORDEX, 2019).
- Protocol containing a study with solutions for the objective of the zero discharge to the Mar Menor from the Campo de Cartagena: Protocol between the Ministry of Agriculture, Food and Environment and the Autonomous Community of the Region of Murcia that serves as a framework for collaboration and coordination for integrated management in the surroundings of the Mar Menor. Amongst a thorough analysis of the concerned place, three scenarios of combination of actions are proposed, identifying the disadvantages and benefits for the purpose of the study zero discharge to the Mar Menor. These scenarios focus on its costs and investigates its opportunity for execution in time. The three scenarios are defined according to the trend, the adaptive or temporal and the objective (Ministerio para la transición Ecológica, 2018).
- Comprehensive Management Plan for the Protected Areas of the Mar Menor and the Mediterranean Littoral Strip of the Region of Murcia: The plan describes the components of biodiversity, especially habitats, biocenosis and species. It provides a socio-economic analysis and contains elements of cultural heritage and landscape. Furthermore it determines the key elements on which it must primarily influence and carry out a diagnosis of their conservation status and their threats and requirements (COEC, 2016).
- The Integrated Territorial Investment (ITI) of the Mar Menor: This plan is intended to contribute to the achievement of the objectives of the Strategy of Integrated Management of Coastal Zones (GIZC) of the Socio-Ecological System of Mar Menor and its environment (SSEMM). More specific, it can be considered as an instrument designed to support a set of integrated actions in a given geographical area in order to respond to





the specific needs or challenges of that area. It allows a territorial approach to be applied in the design and implementation of public policies (Ministerio de Agricultura, Pesca y Alimentación, 2017).

Next to the input described above, the Spanish MAL-leaders have also enlisted scientific papers regarding Mediterranean case studies. More specifically, these studies deal mainly with scenario development. Scenario development by use of participatory means, such as stakeholder involvement or other approaches. Amongst the topics, there's also a study regarding the Lagoons project which becomes discussed as a topic when talking about scenarios at an EU-level.

### 4.7.3 Background of received transition pathways

- **AlVelAl**: Is an association that wants to set rural development plans for regenerative agriculture and the Almendrehesa from a local perspective. They want to convince local communities that a self-sufficient region is possible. In order to obtain this goal, they try to restore farmland that has suffered from severe degradation or erosion by use of regenerative techniques. By means of education they try to communicate about their mission and progress. Besides educational workshops they try to give technical support to farmers interested in increasing their yields using ecological techniques (AlVelAl, 2019).
- Intemares: Is a project that deals with coastal governance. Intemares was initiated in order to cope with the challenge of managing the Natura 2000 marine network with the active participation of the sectors involved and research as basic tools for decision-making. Specific objectives became outlined comprising amongst other things; the improvement of the knowledge necessary for the management of the marine spaces of the Natura 2000 Network, Conservation of habitats and species, improvement of surveillance and monitoring of marine spaces, etc. The project was set for a time coverage between 2014-2020 (Ministerio para la transición Ecológica, 2014).
- **Comité de Participación Social del Mar Menor:** Is a working group belonging to the Ministry of Water, Agriculture and Environment. They generate and possess to a large account knowledge of the ecological status of the Mar Menor and its evolution. One of their core activities also comprises the assessment of the different actions necessary for the progressive improvement and contribution of the Mar Menor. The committee ensures compliance with the Comprehensive Management Plan of the protected areas of the Mar Menor and the regulations and plans approved in this area (CARM, 2017).
- **Pacto por el Mar Menor:** (Pact for the Mar Menor) is a platform existing out of stakeholders and organisations with different backgrounds such as social, professional, cultural, environmental, trade union, etc. to which the desire for conservation and ecological, cultural, and also economic values of the Mar Menor are considered priceless. They provide a range of measures i.e. the implementation of a sustainable agricultural model in the Campo de Cartagena that is compatible with the protection of the Mar Menor, the design of a comprehensive flood prevention plan that avoids runoff which causes soil erosion and nutrient trawling, phytosanitary products and plastics throughout the basin, etc. One by one these measures try to provide a framework in order to restore the Mar Menor's deterioration (Pacto por el Mar Menor, 2019).
- The Mediterranean project (MAP): Contains an institutional framework for cooperation in addressing common challenges of marine environmental degradation. The original MAP has been established in 1975. Next to the establishment of a framework, it also endorsed the preparation of a framework convention for the protection of the marine environment against pollution. Furthermore two protocols were signed that would provide a legal basis for action in protecting the Mediterranean marine environment against pollution. Later on MAP Phase II was established in 1995 with an extension of its original objectives. Later on, in 2008 and 2012; There was the adoption of an ecosystem-based vision, together with the adoption of 11 Mediterranean ecological objectives. Also a timetable was installed for the implementation of the Ecosystem Approach of the MAP system (UNEP, 2015).





The Rural Development Program 2014-2020 of the Region of Murcia (RDP): is a structural agricultural policy that the Region has developed in order to determine actions, aid and investments aimed at contributing to the maintenance and sustainable development of the rural areas of the Murcia Region. Examples within the policy contain investments with a special focus upon the strengthening of the agricultural sector and its transformation towards industry, sustainable agriculture and forestry, and economic activities in the villages. The period of time for the execution of the actions included in the RDP is between January 1, 2014 and December 31, 2023 (Région dé Murcia, 2019).

### 4.8 Remarks on the received information

After the call was launched related to the information gathering for scenarios and transition pathways, it was clear that this would be challenging. Moreover not all MAL-leaders are active on a daily basis in modelling scenarios, nor have they worked with the concept of transition pathways. Taking into account their various backgrounds and the fact that information is dispersed at a national, regional, local or at stakeholder level is also a challenge. The timing was also an issue: Some MAL-leaders asked the stakeholders involved in the MAL sector workshops for more information, yet due to the strict timing, it was not always possible to receive the feedback before they had to hand in their inventory. Last but not least comprehension of both concepts proved difficult even after briefing and the key information document. Keeping the topics rather general ensured as much relevant information as possible was gathered. An interesting observation was that in the templates new topics were introduced by the MAL-partners, such as water management. Mostly with a climate change-inspired background. Other new topics such as 'integrated visions' in the French case study were interesting, yet harder to translate generically.

Nevertheless it's clear that defining both concepts, especially transition pathways was not straightforward. Literature regarding transition pathways incorporates a more technical background rather than a socio-economical perspective the latter being more relevant to the scope of the COASTAL-project. Defining this concept implicates more than the mere description on how to cope with the 'uncertainty-factor'. Scenarios can be built in a narrative, quantitative, etc. way. Nevertheless an umbrella-concept is susceptible to interpretation. That is also the reason that WP5 opted for practical approach towards the definitions rather than restricting to one definition,

Due to this ambiguity and possibly also due to the lack of existing information, received information did not entirely fit the requirements to be catalogued. Mainly broad input was received for the inventory. The information provided included scientific reports, projects, management plans or even education projects were listed rather than effective scenario analysis or concrete action plans with the objective to create a shift from one distinctive state to another.

As such, not all received information can be classified as distinct scenario models or pathway. It is also a possibility that little information is available or found with regard to the case-study independent of the geographical coverage.





# **5** European level

### 5.1 Executive summary

Also the European union is preparing itself for the future in several strategic domains. Yet numerous of other domains become explored with a future outlook. Below, an example can be found regarding general and specific scenario modelling and studies involving transition processes and investigation.

### 5.1.1 Background of relevant scenarios

- Lagoons project: investigates and tries to create an integrated water resources and coastal zone management in European lagoons in the context of climate change. The research question behind the project comprises the anthropogenic deterioration and climate change impacts (especially the effects of extreme weather events) on surface water and lagoons ecosystems. The anticipated outcome of the project is to contribute to a sciencebased seamless strategy. The project seeks to underpin the integration of the EU Water Framework Directive, Habitat Directive, the EU's ICZM Recommendation, and the EU Marine Strategy Directive (Lagoons, 2014). One of the case study-partners within the COASTAL-project also participated within this project, namely the MAR MENOR region within Spain. An eco-hydrological model SWIM (Soil and Water Integrated Model) for the drainage areas of four European lagoons: Ria de Aveiro (Portugal), Mar Menor (Spain), Tyligulskyi Liman (Ukraine) and Vistula Lagoon (Poland/Russia) were placed under a set of 15 climate scenarios covering the time period until the year 2100. (Hesse, Stefanova, Krysanova, 2015).
- AQUACROSS-project: Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services ACROSS EU policies (AQUACROSS) aims to support EU efforts to protect aquatic biodiversity and ensure the provision of aquatic ecosystem services. AQUACROSS seeks to advance knowledge and application of ecosystem-based management (EBM) for aquatic ecosystems to support the timely achievement of the EU 2020 Biodiversity Strategy targets (Aquacross, 2015).
- Future of Europe: The EU has launched in march 2017 it's whitepaper containing five possible scenario's with
  regard to the future of Europe. It gives reflections upon the future of Europe after the 'Brexit' and bears in
  mind the European Parliament elections in May 2019. The timeline for the scenarios has been set on 2025. The
  study starts with an overview of the driving factors that potentially will lead to possible changes in the near
  future. Due to these driving factors five scenarios have been listed:
  - Carrying on (sticking to the same course): Europe continues to focus on jobs, growth and investments by strengthening the single market and by stepping up investment in digital, transport and energy infrastructure. Approach: adjustments to the course will only be made if problems arise, priorities will be updated along the road, etc.
  - Nothing but the single market: The European is gradually re-centred around the single market): scenario dealing with the disability of decision-making amongst the member-states. Single market can be seen as the main "raison d'être" of the EU27. Further progress in policy-making and undertaking actions depends on the capacity to agree on related policies and standards.
  - Those who want more do more: The European Union allows willing member states to do more in specific areas i.e. new groups of Member States agree on specific legal and budgetary arrangements to deepen their cooperation in commonly chosen domains (earlier example was the introduction of the Schengen-zone). Most likely with regard to defence matters and safety procedures.
  - Doing less more efficiently: the European Union focuses on delivering more and faster in selected policy areas while doing less in other domains) This is probably the case when there's consensus how to tackle certain problems. New rules and enforcement tools become developed in order to deepen the single market in key areas such as high-tech clusters and the completion of regional energy hubs.
  - Doing much more together: the European Union decides to do much more together across all policy areas cooperation between all Member States goes further than ever before in all domains. Europe speaks and acts as one in trade and is represented by one seat in most international fora. One voice for the whole of Europe in several domains (European Commission, 2017).





- Wind Europe: Has developed a trend analysis relating to a short-term forecast on the potential for wind energy (off and onshore), using 3 capacity scenarios (low, central and high). These scenarios are based on Wind Europe's analysis of the potential conditions determining wind energy deployment post-2020 (Wind Europe, 2017).
- Wind energy scenarios 2030: EU-wide scenario study for the potential for wind energy using three scenarios (low, central and high). Including employment, investments and CO2 emissions. This mid-term forecast largely depends upon a dominant governance factor. As European Wind Energy Association (EWEA) describes within this report that to a large extent scenario development depends on recent policy developments in the major EU climate and the given energy priorities and concerned governance (EWEA, 2015).

### 5.1.2 Background of relevant transition pathways

### Pathways

A relatively recent example of transition study deals with EU FP7 project PATHWAYS, which was finished by the end of 2016. PATHWAYS was a unique project that explored the possibilities for transitions into a low-carbon, sustainable Europe. The project focused on a couple of key objectives of EU sustainability policy. The used transition-methodology was linked towards two types of transitions:

- 1) the energy transition
- 2) the land-use transition.

According to the different project members, transitions are studied by different disciplines. As such overlap with regard to scenario-modelling is possible based on integrated assessment models. The PATHWAYS project used methods and tools from several disciplines to provide an integrated story about the changes necessary to meet the EU targets. PATHWAYS focused on a selected set of transition domains – electricity, heat & building, mobility, agro-food-systems, and multifunctional land use & biodiversity. By combining and coordinating information from the different disciplines for selected cases, PATHWAYS provided insight to European policy-makers (PATHWAYS, 2016). The intention and ultimate goal for the project was to provide better policy advice for European, Member State and local policymakers(PATHWAYS, 2016).

The results and information out of the different case studies were used to formulate two alternative pathways. Those pathways were designed in order to be consistent with the long-term goals for climate and biodiversity. In Pathway A the current (governance) regime remains strong, and incumbent actors mainly search technology substitution responses to the current challenges. In pathway B, new actors come in which results in a total regime shift with more radical response strategies. These pathways have been elaborated both in quantitative and qualitative transition scenarios (van Vuuren, 2016).

### Plan4Blue

Plan4blue is a project that tries to identify pathways to the sustainable use of the sea areas and resources. The project activities focus on Estonian and Finnish sea areas in the Gulf of Finland and the Archipelago Sea areas. maritime spatial planning for sustainable blue economies. examines the sea areas and maritime sectors of the Archipelago Sea and Gulf of Finland. The central idea of the project is to search for a balance between the economic, social and environmental aims and pressures that seas face (Syke, 2019).

### Farmpath

Another interesting transition pathways example is "FarmPath". Farmpath has undertaken processes of participatory visioning and scenario development, in order to identify and assess future transition pathways to sustainable agriculture. A combination of bottom-up and top-down approaches was used amongst the stakeholders. The output involved policy recommendations for farming systems on regional, national and EU level for identifying and pursuing future transition pathways and social and technological innovation needs. The project tried to initiate flexible combinations of farming models. These models could vary to reflect the specific opportunity sets embedded in regional culture, agricultural capability, diversification potential, ecology and historic ownership and governance structures.





The project ran between 2011-2014. The FarmPath-project also targeted a specific group of stakeholders, namely young farmers and tried to investigate issues surrounding young people and new entrants to farming in specific relation to the developed initiatives and scenarios(Sutherland, 2014)

### IMPACT ASSESSMENT: Blue energy

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Ocean Energy. It contains information about required actions which are required or needed to become delivered on the potential of ocean energy by 2020 and beyond (European Com mission, 2014).

### 5.1.3 Detection of methodology

Whether at case study- or at European level, its rather rare to detect an outlined methodology which can be used both for scenario- or transition pathway modelling. Robust and reliable data is essential for scenario development. Depending on the topic or the case, the received data becomes catalogued into different domains. An example that was given by the Romanian partner involved the; "Copernicus system".

Copernicus can be considered as an European system where data becomes gathered for monitoring the Earth. Collected by different sources such as Earth observation satellites and in-situ sensors. The aggregated data becomes processed and catalogued in six thematic areas: land, marine, atmosphere, climate change, emergency management and security. The land theme is divided into four main components resulting in a global, pan-European, local focus complemented with imagery and reference data.

The collected data serves multiple purposes such as calls for tenders, negotiated procedures and calls for expression of interest, explanation in which way the provided information can be used (for example the making of business road maps); access to an user community, ... . Depending on the user and the required data, the Copernicus system can be adjusted according to their needs. As such, next to the methodological aspect, the system can be seen as a an adjustable toolbox (Copernicus, 2019).





# **6** Conclusions

This deliverable was designed to assess and define the concepts of scenarios and transition pathways through a literature review and by collating information available to the COASTAL-partners. With respect to the inventory-making, a large amount of information was provided. Based on questions received via mail and/or skype, most project partners seemed to be more familiar with the concept of scenario analysis as opposed to transition pathways.

The collated information on scenarios was categorized according studies, forecasts, modelling approaches, etc. No standard approach was found for transition pathways across case studies. Regular skype meetings were organized with MAL-partners (Spain and Greece), to elaborate upon both concepts.

Despite receiving an instrumental template and a key information document guiding the project partners through this inventory process, it was challenging to assess whether or not the received information fit the requirements. As such, for the further progress of this work package, it will be important to develop accurate definitions of both concepts and to create generic scenarios and transition pathways that are both easy to understand and use as they have to be adaptable to coastal-rural synergies. As was the case in the WLO study of the Dutch government that provided an example for scenario modelling within this deliverable. Within the COASTAL-project base models will be developed for transition pathways which include socio-economic parameters.

The information availability on the different case-studies differed between partners. This may be due to several reasons. First, resource allocation to this research subject: funding availability across countries/governments can differ. Second the level of involvement of regional and national governments and third the political agenda. For example climate change, sustainable agriculture and water management are high on the political agenda in all involved member states as well studied by the scientific community.

This first deliverable sets out the general outlines and framework which will have an impact on other deliverables within workpackage 5, especially the second deliverable is important for WP 5. Based on the development of generic scenarios & transition pathways provided in this deliverable, an in-depth analysis will be carried out to develop generic transition pathways for coastal and rural development. Taking into account deliverable 5.3, this generic analysis should be applicable to the case studies which includes a definition of the system drivers and parameters for the scenarios. To this end, WP3 and WP5 will closely collaborate with local R&D partners. The generic scenarios, transition pathways and their relevance for coastal and rural development will be completed by M20 (MS4) and described in a summary report (D18, M20).





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# Appendix

General information concerning the templates and Word-documents:

- The Annexes have been included as objects within a Word-document and can be opened when clicking via cursor. The annex will pop-up in a new document.
- The colour codes refer to a listing method with respect to the topics. Some case study partners used these colour codes, others not. Blue growth was indicated in Blue, Agricultural transition in green, socio-economical/institutional in soft orange and Technology/innovation in red.
- If difficulties arise concerning the accessibility of the annexes, on request the information can be provided in a normal Excel Worksheet or Word-document. Mail to: <u>maxime.depoorter@greenbridge.be</u>
- Via PDF uploading, information from the annexes will be visible as an image. On request the Word-document of this deliverable or the relevant annex can be provided via the same mail address.



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# **ANNEX 1: Template developed for case study partners**

	TOPIC (focus on socio-economic,	Source (Report, indicators, forecast,)	Description/ word limit (eg 1000 words)	Model (qualitative/normative)	Geographical Coverage: local,	Time Coverage	Scenario Approach (definition and model	Application (has it been used in policy,	Data Owner / Provider	Associated Model & owner (specify if	URL
	technology/innovation, Blue growth,			narrative - (Quantitative/	regional, nation, Europe,		used)	prospectives, business road maps?)+		relevant)	
	agriculture)			exploraty) by use of trends				example			
ID											
1	socio-economic/ institutional	report	process models that are spatially explicit	Mix	Flemish Region/ provincial/ local	2010-2050	The initial WLO study (2006) was used as a	The aim is to generate map images and the	Founding Fathers	VITO	https://ruimtemodel.vlaanderen/do
							referece for the Flemish study and	detailed, sometimes very local			
							describes in qualitative and	consequences of the scenarios. This gives			
							quantitative terms the possible changes of	insight into			
							the Netherlands from 2002 to 2040 on the	area-specific nature of certain activities as			
							basis of	well as spatial and temporal scales			
							four scenarios: Strong Europe, Global	within which future policy can make			
							Economy, Regional Communities and	choices			
							Transatlantic Market. Adaptations were				
							made to this approach based upon unique				
							quantitative and qualitative material				
							representing the Flemish case. A four step				
							model was launched with regard to the				
2	Technology/innovation										
8	Blue growth	Report	maritime spatial planning for sustainable blue	mix	the Gulf of Finland and Archipelago Sea	2016-2019					http://www.centrumbalticum.org/u
			economies.								
4	Agricultural transition										
5											
6											
7											
			water snortage is one of the future societal				Planneu approach and implementation	Evnerted results and effects			
			challenges. Our vision is to build a water-smart				The project consists of 3 scenarios (Kalmar	I ong-term effects and results of the			
			society where everyone's needs for water are		Kalmar urban area, Kalmar west and		urban area, Kalmar west and Kalmar south)	nrniert are: 1) Implement water reuce in	KALMAR VATTEN AB - RENINGSVERK		
8	Agricultural transition	Feasibility study	met by "right" water in the "right" place. The	Mix	Kalmar south)/ regional	November 2018 - August 2019	and 5 work packages (WP). WP1 is end-	Swadan 2) Ruild water.cmart	TEGELVIKEN	KALMAR VATTEN referance numer: 2018-	https://www.vinnova.se/en/p/susta
9	Agricultural transition										
40											





# **Annex 2: Key information document**

# Key information

# Content

S	cope.		1
1	Lit	terature study	2
	1.1.	Scenario's	2
	1.2.	Transition Pathways	3
2	Ρι	urpose of the template	4
	2.1 5	Scenarios	4
	2.2 1	Fransition pathways	4
3	Sc	ources	5

# Scope

WP5 – Scenarios and Transition Pathways – has two objectives (Figure 1):

- to develop qualitative and quantitative information on the uncertainties affecting the outcomes of business and policy solutions (interacting with WP3)
- to provide independent information on the potential transition patterns, which can be compared with the simulated dynamics (interacting with WP4)

Understanding the role of uncertain exogenous drivers, key system parameters and structural changes of the system is crucial for developing robust business and policy strategies and developing solutions which maximize the resilience of the system.

### WP5 is organized around four work tasks:

- 5.1 Literature inventory of scenarios and transition pathways
- 5.2 Generic Scenarios & Transition Pathways
- 5.3 Application to the case studies
- 5.4 Robustness Analysis

The results for Task 5.1 will be reported in deliverable D5.1 (due by April 30, 2019).







# Annex 3: ICRE8's literature study concerning scenarios and transition pathways

### Review of the literature on state of the art scenario analysis

According to Varum & Carla Melo, 2009; Amer et al, 2012; Schoemaker, 1995; Hiltunen, 2009; Godet, 2000; Heijden, 1996; J.D. Strauss, 2004; and C.A. Varum, 2010, a scenario is a tool which does not predict the future but helps deal with uncertainty; it is a description of likely future situations and the path of events that would allow the present to reach that future situation. It highlights potential future system discontinuities, classifying the nature and timing of these cases and projecting consequences of a particular choice or policy decision.

According to Dator's work, he has created four archetypes for scenarios (J. Dator, 1979):

- 1- Continued growth: the future is assumed to have all statuses enhanced and optimized
- 2- Collapse: the future assumed great contradictions and continued growth failure
- 3- Steady state: the future aims to limit growth and find balance within economy and nature with a fairer society
- 4- Transformation: the future aims to change main assumptions of the other three, through either dramatic technological change or spiritual change.

On the basis of perspective, scenarios are classified either into descriptive extrapolative in nature scenarios, which present a range of future likely alternative events, or normative goal oriented scenarios, which respond to policy planning concerns to achieve targets (A.L. Porter, 1991).

On the basis of characterization, scenarios are classified according to topic (problem or global specific), breadth of scope (mono or multi sector), focus of action (environmental or policy), and level of aggregation (micro or macro) scenarios (D. Mietzner, 2005).

Building a scenario has been covered by many authors like Wack, 1985; Burt, 2010; and Durance 2010 and most of the principles of building a scenario were connected to the Royal Dutch Shell scenario building by Pierre Wack. The 3 basic principles are as follows:

- 1- Identify predetermined elements in the environment; historical actions and events that have already happened or likely to take place, which is similar to a baseline study.
- 2- Ability to change mindset to recreate reality, which is affected by level of creativity of the contributors.
- 3- Develop a macroscopic view of the system environment; exploration of the system over a bigger area brings about a wider, complex interconnected system where the system exists. This ensures that a scenario is intertwined with the facts of the existing system and develops in a way that is realistic to the state of the present situation.

Moreover, according to Durand and the French method " la prospective" is made up of four main principles (Durand, 1972):

- 1- The base: deep analysis of the present situation
- 2- The external context: study the general environment of the system surrounded
- 3- The progression: historical stimulation resulting from the dynamic base and the limits of the external context.
- 4- The images: finally, in the progression toward the future, there is a need for establishing a kind of cross section that represents reality at that time, called images of the future in a scenario.







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# Annex 4: Templates of case study partners: Greece

	TOPIC (focus on socio-economic, technology/innovation, Blue growth,	Source (Report, indicators, forecast,)	Description/ word limit (eg 1000 words)	Model (qualitative/normative)	Geographical Coverage: local, regional, nation, Europe,	Time Coverage
ID	agriculture)			narrative - (Quantitative/ exploraty) by use of trends		
			Impact of Climate Change on Tourism Development of			
			Sensitive Areas of Greece. Pilot Implementation:			Past (1960-1990) - present
			Messinia—Areas of Integrated Tourism Development,			- future projections (2021-
7	socio-economic/ institutional	Report	2014	Mix	Local/ regional	2050 and 2051-2100)
			agricultural sector in Messinia: This study aims to			
			contribute to the development of a plan for the			
			sustainable development of the agricultural sector in			
			the regional unit of Messinia. The study first examines			
			the basic demographic and financial characteristics of			
			Messinia and analyzes the structure of agricultural			
			production—especially in relation to the other regional			
			units of the Peloponnese—as well as the financial			
			study then presents the latest developments			
			concerning the agricultural sector's support			
			framework and attempts an initial evaluation of the			
			nossible impact of the changes in Common Agricultural			
			Policy (CAP) on the Messinian agricultural sector			
			Moreover, it presents the strengths.			
			weaknesses, opportunities and threats facing the			
			agricultural sector in Messinia;			
8	Agricultural transition	Report	and finally it defines a set of aims and actions that will	Mix	Local	present-future
			A future for Messinia: The report outlines the result of			
			a preliminary field-study carried out over the month of			
			May 2014. Based on the results of the study a number			
			of general recommendations for how sustainable			
			development in the areas of tourism and agriculture,			
			as well as their potential synergic overlaps, can be			
			ascertained, are given. In summary the report			
			Indicates that the bulk of the results point towards			
			development albeit with a number of challenges. One			
			of the key results is the finding that institutional			
			representation of the region as a whole is lacking and			
			that numerous venues to solve problems and leverage			
			on potential in the region cannot be accessed due to			
			problems stemming from a dearth of coordinated			
9	Agricultural transition	report	efforts among the various stakeholders in the region.		Local	present-future
10						





# Annex 4: Templates of case study partners: Greece

TOPIC (focus on socio-economic.	Source (Report, indicators,	Description/ word limit (eg 1000	Model	Geographical Coverage: local.	Time Coverage	Transition (definition and model used)	Application (has it been used in policy.	Data Owner / Provider	Associated Model & owner (specify if	URL
technology/innovation Blue growth	forerast )	words)	(qualitative/normative)	regional nation Europe			prospectives business road maps?)		relevant)	
agriculture)	iorecast,)	words)	narrative - (Quantitative/	regional, nation, curope,			prospectives, business road mapsing		(c)evancy	
agriculture)			ovplorate) by use of trends							
		The gaiggonge system is a Creek	explorately by use of trenus							
		inequation that combines information								
		innovation that combines information				gaiasense collects data from the field, the				
		technologies with agronomic science i	n			satellite, the scientist, and the farmer, and				
		a holistic way. galasense is pioneering	5			provides the tools to the agricultural advisor, the	Toolbox is managed by Gaia epicheirein company			
Technology/innovation	area-oriented processes	at a European level in the field of smar	t Exploratory	On farm		researcher and the farmer in order for them to	and is targeted to farmers, agricultural advisors and	Gaia FPicheirin		http://www.gajasense.gr/en
61/		farming. It enhances and optimizes th	e			take advantage of every opportu-nity to produce	researchers that want to improve farm managemen			
		decision making and precise				hetter more and economical agricul-tural produce	+	<b>`</b>		
		applications in agricultural crops no				from the Creek land	A			
		matter how small or large scale they				from the Greek land.				
		are.								
		Response of a multi-stressed								
		Mediterranean river to future climate								
		and socio-economic scenarios. Three								
		scenarios (future words) are simulated	1							
		with annlicability at the National level								
		(techno, conconsus and fragmonted								
Agriculture & Energy Transition	forecast	(recinit), consensus and magnement	Narrativo	Pogional/Grooco	206					https://doi.org/10.1016/i.critotopy.2019.01.292
Agriculture & Energy Transition	TUTECASE	wordsj.	Inditative	Regional/ Greece	200					https://doi.org/10.1010/j.scitotenv.2018.01.282
		INADACT ACCESSMENT								
		INIPACI ASSESSIVIENT								
		Accompanying the document								
		Communication from the Commission	1							
		to the European Parliament, the								
	EU Commission - DG Mare	Council, the European Economic and								
	(2014). Ocean Energy	Social Committee and the Committee								
	Action needed to deliver on the	of the Regions Ocean Energy Action								
	potential of ocean energy by	needed to deliver on the potential of								
Blue Growth & Energy Transition	2020 and beyond.	ocean energy by 2020 and beyond		EU	203	)		EU Commission/DG-MARE		https://ec.europa.eu/maritimeaffairs/policy/coastal_tourism_en
							policy recommendations at farming system,			
							regional, national and EU levels for identifying and			
		Farmpath -assess future transition				FarmPath has undertaken processes of	pursuing future transition pathways and social and			
		pathways towards regional				participatory visioning and scenario development	, technological innovation needs. / initiate a network			
		sustainability of agriculture in Europe,				in order to identify and assess future transition	of regional level stakeholders and			
		and the social and technological				pathways to sustainable agriculture, by and	organisationsinvolved in transition processes in			
		innovation needs required to initiate				for regions, using a combination of bottom-up	agriculture and to further equip, enable and			
Agricultural transition	Report	and progress along these pathways	mix	EU		and top-down approaches /	consolidate it			http://farmpath.hutton.ac.uk/welcome
		Cyclades life - Ecosystem Based								
		Management and Marine Spatial								
		Planning will be the foundation for the								
		efficient design of the new marine								
		protected area which will be based on								
		a participatory system with the active								
		contribution and direct consultation by								
		all the involved and interested	Y							
		an the involved and interested								
		stakenolders at local and central level,								
		unough the formulation and co-								
		operation of a committee, which will								
		promote and ensure direct				Capacity building seminars, education and	Formulation of a participatory management plan for			
		involvement and participation in the o	D			communication activities, stakeholder	the establishment of a marine protected area and a	wwf, GreekLife Taskforce, harokopeic		
Bluegrowth	Report	management of the area	Mix	Regional/Greece	2013 - 2018	engagement	local MSP	university		cycladeslife.gr/en
							Establishment of a cooperative for the common			
							managing of Kavala fishing fleet, with the			
		Action plan for the improvement of				successfull management of fisheries, policy	participation of fishers, conservationists (WWF),			
Bluegrowth	Report	the sustainability of fisheries in Kavala	mix	Regional/Greece		proposals	researchers, local governing bodies, large resellers	wwf		https://www.wwf.gr/sustainable-economy/fishery





# Annex 5: Template case study partner: Belgium

ID	TOPIC (focus on socio-economic, technology/innovation, Blue growth, agriculture)	SOURCE	Description/ word limit (eg 1000 words)	Model (qualitative/normative) narrative - (Quantitative/ exploraty) by use of trends	Geographical Coverage: local, regional, nation, Europe,	Time Coverage	Scenario Approach (definition and model used)	Application (has it been used in policy, prospectives, business road maps?)+ example	Data Owner / Provider	Associated Model & owner (spe relevant)
1	socio-economic/ institutional	report	process models that are spatially explicit	Mix	Flemish Region/ provincial/ local	2010-2050	The initial WLO study (2006) was used as a referece for the Flemish study and describes in qualitative and quantitative terms the possible changes of	The aim is to generate map images and the detailed, sometimes very local consequences of the scenarios. This gives insight into	Founding Fathers	VITO
2	Technology/innovation									
3	Blue growth	Report	maritime spatial planning for sustainable blue	mix	the Gulf of Finland and Archipelago Sea	a 2016-2019				
			economies.							
6	Agriculture & Food Transition	Platteau J., Lambrechts G., Roels K. & Van Bogaert T. (reds.) (2018) Uitdagingen voor de Vlaamse land- en tuinbouw. Landbouwrapport 2018, Departement Landbouw en Visserij, Brussel. – REPORT	Seventh, 2-yearly Agriculture Report (LARA) describing the challenges for agriculture and horticulture in Flanders. A combination of policy, research and expert vision on how to deal with these challenges. The report includes SWOT analyses and uses historic data for the period 2008-2016	mix	Regional - Flanders	2008-2014	Trend Analysis & Inventory	unknown	Departement Landbouw en Visserij - Dept of Agriculture & Fisheries	not applicable
7	Agriculture & Food Transition	Bergen D., Vervloet D. & Van Gijseghem D. (2014) Uitdagingen voor de Vlaamse landbouw – Een verkenning van bepalende externe veranderingen, Departement Landbouw en Visserij, afdeling	An exploration of the external changes in socio- technological factors (demography, food	largely narrative	Regional - Flanders	2050	Charles and De Para	unknown	Departement Landbouw en Visserij -	ant and Parkle
	Agriculture & Food Transition	Monitoring en Studie, Brussel- REPORT Planbureau voor de leefomgeving (PBL) en Centraal Planbureau (2015). Toekomstverkenning Welvaart en Leefomgeving Cahier Landbouw. REPORT	habits, technology,affecting agriculture. Thematic Chapter on Agriculture accompanying the WLO 2015 (Welvaart & Leformgeving) Scenario Study for the Netherlands (2015- 2050), using a "low" and "high" scenario for 2050 in terms of demographic and economic growth	mix	EU/Abroad	2050	Strategic Policy		Dept of Agriculture & Fisheries Planbureau voor de Leefomgeving en Centraal Planbureau, Nederland.	not applicable
	Blue Growth & Energy Transition	Planbureau voor de keefomgeving (PBL) en Centraal Planbureau (2015). Toekomstverkenning Welvaart en Leefomgeving Cahler Klimaat en Energie. REPORT	Thematic Chapter on Climate and Energy Transition accompanying the WLO 2015 (Welvaart & Leefongeving) Scenario Study for the Netherlands (2015-2050), using a 'low' and 'high' scenario for 2050 in terms of demographic and economic growth	mix	EU/Abroad	2050	Seenario Study		Planbureau voor de Leefomgeving en Centraal Planbureau, Nederland.	
5	Blue Growth & Energy Transition	Federaal Planbureau (2017). Het Belgische energielandschap tegen 2050. Een projectie bij ongewijzigd beleid.	Forecast of the Belgian energy landscape by 2050 without changes in policy - focusing on energy production, demand and GHG emissions	mix	National - Belgium	2015-2050	Trend forecast		Federal Planning Agency (FPB)	
11	Blue Growth & Energy Transition	Sacha Breyer, Michel Cornet, Julien Pestiaux en Pascal Vermeulen (2017). Climatt SOCIO- ECONOMISCHE IMPACT VAN DE BELGISCHE OFFSHORE WINDINDUSTRIE. Belgian Offshore Platform	Economic impact assessment for the development of offshore wind energy in the	mix	Regional - Flanders	2020		unknown	Palaise Officient Distance	
	Other - MSP	(Buty: AEVAN Jan Mathijsen, ef Dammers en Hans Elzenga. Planbursau voor de Leefomgeving (2018). The Future of the North Sea. The North Sea in 2030 and 2050; a scenario study.	Beggan North Sea. Scenario projection for the years 2030 and 2050 for four integrated scenarios (slow change, pragmatic sustainability, rapid development, sustainabile together)	mix	EU - Abroad	2050	scenario Study			not applicable
8	Other - Climate Change	Brouwers J., Peeters B., Van Steertegem M., van Lipzig N., Wouters H., Beullens J., Demuzere M., Willense P., De Ridder K., Maheus D., De Troch R., Termonia P., Vansteenkiste Th., Craninx M., Maetens W., Defloor W., Cauwenberghs K. (2015) MRA Klimaatzpoor 2015, owr wangenomen en toekomstige klimaatveranderingen. Vlaamse Mileumaatschappij I.s.m. KU Leuren, UTO er KMI. Aalst, Belgium, 147 p. – REPORT	Exploration of the observable, current-day impacts of climate change in Flanders and Belgium and expectations for the future; based on the IPCC scenarios with a low, medium and high climate change scenario and time horizon of 30, 50 and 100 years. Focus on flood risk and hydrology.	mix	Regional - Flanders	2100	Forecast		Vlaamse Milieumaatschappij - Flande	22
	Social-Economic	Planbureau voor de leefongeving (PBL) en Centraal Planbureau (2015). Toekomstverkenning Welvaart en Leefongeving Cahier Demografie REPORT	Thematic Chapter on Demographic Change accompanying the WLO 2015 (Welvaart & Leefomgeving) Scenario Study for the Netherlands (2015-2050), using a 'low' and 'high' scenario for 2050 in terms of demographic and economic growth	mix	EU/Abroad	2050	Scenario Study		Planbureau voor de Leefomgeving en	Centraal Planbureau, Nederland.





# **ANNEX 6: Template case study partner: SWEDEN**

ID	TOPIC (focus on socio-economic, technology/innovation, Blue growth, agriculture)	Source (Report, indicators, forecast,)	Description/ word limit (eg 1000 words)	Model (qualitative/normative) narrative - (Quantitative/ exploraty) by use of trends	Geographical Coverage: local, regional, nation, Europe,	Time Coverage	Scenario Approach (definition and model used)	Application (has it been used in policy, prospectives, business road maps?)+ example	Data Owner / Provider	Associated Model & owner (specify if relevant)	URL
	socio-economic/ institutional	Report	Cross-regionally emerging, data-given relationships between waterborne nutrient concentrations and socio-economic activity in terms of population density and farmand share within the relevant catchment area (see specifically results shown in Figure 8 of the report, with associated text and further references in the report)	Exploratory	Baltic region and Balkan region	1994-2006 for the Baltic region; 1979-1991 for nitrogen data and 2001-2013 for phosporous data for the Balkan region	The report findings enable scenario exploration in terms of regional population conditions related to various envisioned/possible socio-economic developments/states and their nutrient load and coastal water-quality implications	The aim is to use the found cross-regional (and cross-temporal) relationships to further explore development scenaros in terms or regional population and farmland share and their implications for waterborne nutrient concentrations and associated loads to coastal waters and their quality status	Various data sources described in the open access report	The model relationships are described in the report, which is an open access peer- reviewed journal article: 15. Levi L, Cyetkovic V, Destouri G, Data-driven analysis of nutrient inputs and transfers through nested catchments, Science of The Total Environment, 610-611, 482- 494, 2018	http://www.sciencedirect.com/sc
2	Technology/innovation	Report	Management-relevant modelling and scenario analysis approach to coupling technology/innovation related effects on nutrient loading from waste water treatment plants (WWTPs) with resulting coastal water quality	Exploratory	Cross-scale - Coastal Archipelago Sea and whole Baltic Sea	Based on 2000-2009 with management scenarios forward in time	Scenarios of tenchology/innovation related changes in nutrient loading from WWTPs, explored using the reported cross-scale modelling approach to the land-sea interactions and resulting status in coastal water-quality.	The aim is to use the approach to explore and identify management options (technology/innovation related scenarios of nutrient loading from WWTPs) for reaching god cosstal water-quality status or, alternatively, for exploring the coastal water-quality effects and implications of technology/innovation related scenarios of changed WWTP nutrient loading to nivers and/or the sea.	Various data sources described in the open access report	The model is described in the report, which is an open access peer-reviewed journal article: Vigouroux G, Destouni G, Jönsson A, Ovetkovic V, A scalable dynamic characterisation approach for water quality management in semi- enclosed seas and archipelagos, Marine Pollution Bulletin , 139, 311–327, 2019	hitos://www.scencedirect.com/s
	Blue growth	Report	Management-relevant modelling and scenario analysis approach to coupling blue-growth related water quality conditions in the open sea, with nutrient load conditions from land and associated coastal water quality	Exploratory	Cross-scale - Coastal Archipelago Sea and whole Baltic Sea	Based on 2000-2009 with management scenarios forward in time	Scenarios of blue-growth related changes in open-sea marine water quality conditions, explored using the reported cross-scale modelling approach to the land-sea interactions and resulting status in coastal water-quality.	The aim is to use the approach to explore and identify management options [blue- growth related scenarios of resulting open sea water quality for reaching good coastal water-quality status or, alternatuley, for exploring the coastal water-quality effects and implications of blue-growth related scenarios that change the open-sea water-quality.	Various data sources, as described in the report	The model is described in the report, which is an open access peer-reviewed journal article: Vigouroux G, Destouni G, Júnsson A, Cvetkovic V, A scalable dynamic characterisation approach for water quality management in semi- enclosed seas and archipelagos, Morine Pollution Bulletin, 139, 311–327, 2019	https://www.sciencedirect.com/s
4	Agricultural transition	Report	Management-relevant modeling and scenario analysis approach that can enable coupling of agricultural transition scenarios on land, through their effects on river-bornen nutrient loading to the sea, with coastal water quality	Exploratory	Cross-scale - Coastal Archipelago Sea and whole Baltic Sea	Based on 2000-2009 with management scenarios forward in time	Not done in this specific report but can also be used (and is being used in ongoing work) to also explore scenarios of changes in agricultural nutrient loading to and through rivers to the sea, using the reported cross- scale modelling approach to the land-sea interactions and resulting status in coastal water-quality.	The aim is to use the approach to explore and identify management options (agricultural transition scenarios) for reaching good coastal water-quality status or, atternatively, for exploring the coastal water-quality effects and implications of various inland (agricultural) transition scenarios that change the nutrient loads through rivers to the sea.	Various data sources described in the open access report	The model is described in the report, which is an open access peer-reviewed journal article: Vigouroux G, Destouni G, Jönsson A, Ovetkovic V, A scalable dynamic characterisation approach for water quality management in semi- enclosed seas and archipelagos, Marine Pollution Bulletin, 139, 311–327, 2019	https://www.sciencedirect.com/s
	Agricultural transition	Report	Cross-regionally emerging, data-given relationships between waterborne nutrient concentrations and sfarmland share within the relevant catchment area (see specifically results shown in Figure 8:c4 of the resport, with associated text and further references in the report)	Exploratory	Baltic region and Balkan region	1994-2006 for the Baltic region; 1979-1991 for nitrogen data and 2001-2013 for phosporous data for the Balkan region	The report findings enable scenario exploration for agricultural transition in terms of various envisioned/possible regional farmland-share developments/states and their nutrient load and coastal water-quality implications	The aim is to use the found cross-regional (and cross-temporal) relationships to further explore development scenarios in terms of regional farmland share development and associated implications for waterborne nutrient concentrations and loads to coastal waters and their quality status	Various data sources described in the open access report	The model relationships are described in the report, which is an open access peer- reviewed journal article: 15. Levi L, Cvetkovic V, Destouni G, Data-driven analysis of nutritent inputs and transfers through nested catchments, Science of The Total Environment, 610-611, 482- 494, 2018	http://www.sciencedirect.com/sc





# ANNEX 7: Template Case studypartner: Romania

TOPIC (focus on socio-economic,	Source (Report, indicators,	Description/ word limit (eg 1000	Model	Geographical Coverage: local,	Time Coverage	Transition (definition and model used)	Application (has it been used in policy,	Data Owner / Provider	Associated Model & owner (specify if	URL
technology/innovation, Blue growth,	forecast,)	words)	(qualitative/normative)	regional, nation, Europe,			prospectives, business road maps?)		relevant)	
agriculture)			narrative - (Quantitative/							
			exploraty) by use of trends							
						Stantu Gheorghe case study provides new	to identify and ensure the full engagement of	Various data sources described in the	participatory method, entitled the Sketch	
						findings on the hydrological impact of Danube	the stakeholders in order to work together to	onen access renort	Match method (developed by the	
		The village of Sfantu Gheorghe study				and sedimentology, in area included	identify common threats and solutions for	openaccorepore	Government Service for Land and	
socio-economic/ institutional	Report	case	Narrative	Danube Mouths - Black Sea		in the Danube Delta Biosphere Reserve (Sacalin	territorial development and coastal protection in the		Water Management in the Netherlands	http://www.marsplan.ro/en/results/case-study/429-the-village-
								The aim is to improve the regional po	icy instruments to foster the capabilities of	using ecosystem services in river deltas to strengthen regional econ

TOPIC (focus on socio-economic	Source (Report indicators forecast )	Description (word limit (eg 1000 words)	Model (qualitative /normative	Geographical Coverage: local	Time Coverage	Scenario Annroach (definition and mode	Application (bas it been used in policy	Data Owner / Provider	Associated Model & owner (specify if	LIRI
to he flocus on socio-ccononic,	source (nepore, manators, rorecase,,	beschption, word milit (eg 1000 words)	nonetical (Quantitative)	and and antion formers	inite coverage	section of approach (actimation and mode	r poppiedelon (nus it been used in poney,	bata owner, rionaer	resounce moder a owner (specify if	one -
technology/innovation, blue growth,			nanative - (Quantitative/	regional, nation, Europe,		useu)	prospectives, business road maps: /+		relevancy	
agriculture)			exploraty) by use of trends				example			
						A comprehensive description of current	The alim is to define of the existing	Various data sources described in the	e The report identifies connects and,	
						existing conditions of the manume areas o	conditions and dynamics of Romanian and	open access report	possibly, synergies, both in space and	
		Detailed studies for a complete analysis of				both countries: physical, biological, natura	Bulgarian maritime		time, between uses highlighting issues	
socio-economic/ institutional	Report	Romanian and Bulgarian maritime areas	Narrative	Black Sea - Romania and Biulgaria	2009-2016	preservation features and main maritime	- reaso in terms of human user both on		which particularly require a	http://www.marsplan.ro/en/results/msp-stu
						Stantu Gneorgne case study provides new	to identify and ensure the full engagement	Various data sources described in the	e participatory method, entitled the Sketch	
						findings on the hydrological impact of	of	open access report	Match method (developed by the	
						Danube and sedimentology, in area	the stakeholders in order to work togethe	r	Government Service for Land and	
socio-economic/ institutional	Report	The village of Sfantu Gheorghe study case	Narrative	Danube Mouths - Black Sea		included	to identify common threats and solutions		Water Management in the Netherlands	http://www.marsplan.ro/en/results/case-stu
Bluegrowth	Platform			Romania - Black Sea						https://www.msp-platform.eu/countries/roi
							Integrated Maritime Spatial Planning		IMSP views coasts and seas as	
							combines the tools and procedures of		constituent parts of an integrated system	
							terrestrial		both in terms of	
							anatial alexa in a with the ania sigler of			
							spatial planning with the principles of		ecology and socioeconomic factors.	
							Integrated Coastal Zone Management		Inrough intensive stakeholder	
							(ICZM).		involvement and the	
									use of Geographic Information Systems	
									(GIS), IMSP extends terrestrial spatial	
									planning	
		HANDBOOK on Integrated Maritime							and principles of ICZM to the open sea	
		Castlel Discolar Functioner, Tasla 8								
		Spatial Planning Experience, Tools &							because of the many interconnections	
		Instruments, Case Studies							between	
		from the NTERREG III B CADSES		European Seas - Baltic Sea, Adriatic					land and sea, IMSP considers terrestrial	
Bluegrowth	Handbook	PlanCoast Project	Narrative	Sea, Black Sea					and marine space as equally important.	http://www.plancoast.eu/files/handbook_w
									Copernicus is a European system for	
									monitoring the Earth. Data is collected by	
									different sources, including Earth	
									observation satellites and in-situ sensors	
									The data is processed and provides	
									calleble and up to data information in also	
									reliable and up-to-date information in six	
									thematic areas: land, marine,	
									atmosphere, climate change, emergency	
									management and security. The land	
									theme is divided into four main	
									components:	
										https://land.conerpicus.eu/
										(https://whiteopermetis.co/
						territorial integration of the Danube Delta				
						Region. The five strategic pillars				
						demonstrate complementarity. The				
						tourism notential will remain constrained				
						unless urban services (water, sanitation				
						and as the as collection) as discusion				
1		1		1	1	and garbage collection) and tourism				
1		1		1	1	intrastructure are improved. Services such				
1	1	1	1	1	1	as nearth and education will rely		1		1
1		1		1	1	increasingly on virtual communication tool	ls			
1		1		1	1	(ICT). More tourism benefits will emerge,				
						once more attractions and recreational				
1	1	1	1	1	1	fishing.		1		1
1	1	1	1	1	1	aquaculture, organic farming, guided tours		1		1
1		1		1	1	ate are developed. Since the patient	7			
1	1		1			etc. are developed. Since the natural and			1	
1	1		1			cultural assets are the key attraction of the			1	
1	1	1	1	1	1	region, restoring, protecting and enhancing	B	1		1
1		1		1	1	them is of utmost priority.				
1		1		1	1	Beyond integration and synergies across				
1	1		1			sectors through the broad-based planning			Integrated Sustainable Development	
1	1	1	1	1	1	process, links between physical		1	Strategy" under the Advisory Services on	1
1	1	1	1	1	1	investments, policy and regulatory		1	Danube Delta Integrated Sustainable	1
1	1	1	1	1	1	changer, and institutional development		1	Davelopment	1
1	1		1			and tochnical assistance onhances has after			Strategy between the Ministry of Pool-	
			1	1	1	and reconflical assistance enhances penetits		1	I SU BLEEV DELWEET UTE IVITISTIV OF REGIONA	





# **ANNEX 8: Template case study partner: France**

TOPIC (focus on socio-economic, technology/innovation, Blue growth, arriculture)	Source (Report, indicators, forecast,)	Description/ word limit (eg 1000 words)	Model (qualitative/normative) narrative (Quantitative/ exploraty) by use of transfe	Geographical Coverage: local, regional, nation, Europe,	Time Coverage	Transition (definition and model used)	Application (has it been used in policy, prospectives, business road maps?)	Data Owner / Provider	Associated Model & owner (specify if relevant)	URL
socio-economic/ institutional	report/action plan	Region-State planning contract (Contrat de plan état_région)	Narrative	regional	2015-2020		The objectives are to increase the attractiveness of the territory around the port of La Rochelle, to improve access to the Commence of the second second second second second the commence of the second second second second presen chemistry, environment and health, advanced materials, eco-mobility, sustainable building, digital technologies, bio-health, aeronautics.			http://www.nouvelle.aquitains.divy durable.enuv.fr/MG/edf/ceer_natiou_cl ndf
socio-economic/ institutional	report/action plan	Agri-environmental and climate measures (MAEC) Regional Rural Development Programmes (PDRI) drawn up by the former Aquitaine, lincusin and Politou: Charentes regions (merged in New Aquitaine region), through which regional agri-environmental and climate strategies are defined.	Exploratory	regional	2014-2020		The NAECs are one of the major tools of the second pillar of the Common Agricultural Policy (CAP) for maintaining favourable practices for the Environment, and supporting agricultural practiceschanges in order to respond to environmental pressures identified at territorial level.	DRAAF Nouvelle Aquitaine		htto://drasf.nouvella. aquitaina-agriculture-pouv.fr/Mesures-ag environnementales-at
Technology/innovation	report	REGIONAL STRATEGY OF INNOVATION FOR A INTELLIGENT SPECIALIZATION POLITOU-CHARENTES (53)	Exploratory	regional	2014-2020		phase of young innovative companies at private fundraising as well as commercial developments, promote the efforts of companies and organizations in the field of social	The Poitou-Charentes Regional Innovation Agency Région Poitou Charentes		http://www.onlines3.eu/v content/uploads/RI53_strategy_ro <u>FR_53-Poltou-Charentes-2014-2</u>
Blue growth	Genral data overview	Strategic Document of the South-Atlantic coast Existing situations, Strategic objectives, Planning for maritime and coastal areas	Narrative	regional	2018-2030		policy, business road maps	Ministry of Ecological Transition and Solidarity		http://geolittoral.din.developpement- durable.gouv.fr/telechargement/dsf/cons
Bluegrowth	report	Evaluation of adaptation mechanisms to natural hazards in the face of climate change: assessment of adaptation measures on the Aquitaine coast	Exploratory	regional (Aquitaine)		Adaptation schemes	policy, business road maps	et minières, literally Geological and Mining Research Bureau is the French	not known	http://infoterre.brgm.fr/rapports//RP-67
Bluegrowth	proposed by stakeholders	Changing the anthropic pressure with the objective to limit pollution by defining what is considered as good quality o the coastal environment. This could be achieved by enhancing relations between the maritime and agricultur, professions, the actors of tourism and urban planning. Thi scenario considers two issues (i) change in population in	Exploratory	regional	n/a					
Bluegrowth	proposed by stakeholders	Better management of coastal wetlands by public policies (managing the land-sea interface both by preserving freshwater wetlands for breeding activities and by preserving salted wetlands for shellfish production). This	Exploratory	regional	n/a					
Bluegrowth	proposed by stakeholders	Renewed public policies in the horizon of 2030-2050 allowing the integration of the climate change issue inte urban planning management – this could include the	Exploratory	regional	n/a					
Agricultural transition	report	The objectives of the Regional Observatory on Agriculture and Cinnate Change (ORACLE) is to understand how climate change is manifesting in the region and analysing its espression on regional agriculture Oracle and the standard of the observation of the observation relation of the standard of decision-making for adaptation and mitigation purposes.	Narrative	Nouvelle Aquitaine Region			For the main crops, it provides relevant elements to farmers and agricultural organisations regarding the adaptation of climate change			otter: freewelle and sine chambres amounter fri environment changement chinatoue/ericle nav
Agricultural transition	proposed by stakeholders	Continuation of traditional farming methods ("Nothing changes" scenario)	<sup>5</sup> Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	effects on agriculture as a possible evolution of land use occasive	Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Water is stored in reservoirs with changes in farming practices due to climate change that calls for water to be managed in terms of both time and space	t Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Wider spread (or "mosalc") of farming activities with a more diverse range of farming systems, implying growth in new sectors, a larger numbers of young farmers setting up on their own, and greater preservation of the rura environment as a whole. less concentration of energy	s Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Adaptation of traditional farming industries (farm holding is considered as better able to resist market and climate pressure, and avoid over-specialization of territories)	Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Development of more sustainable agriculture with farming industries (Territorial Food Programs)	Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Development of water resources, the development o insurance-based systems, of innovation (particularly in genetics), finding and developing new production model that are attractive to farmers and recognized by rural	Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	more strict control on water resource leading to conversion of conventional farms to organic farming (sustainable farming systems) to respond to growing demand from consumers for local and certified produce.	s Narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Agricultural transition	proposed by stakeholders	Changes of winegrowing practices (High environmenta value certification and practices). Cognac industry unable to effectively develop "organic" production technique because of semantic semanticate	narrative	regional	n/a	vision of sectorial workshop stakeholders	n/a	n/a	n/a	n/a
Water Management	Report	Strategy for the SAGE Charente	Exploratory	regional	2015-2025		Organization, Stakeholder participation and communication, Installations and Watershed; Prevention of floods and marine submersions; Management and prevention of water shortare at low water			http://www.gesteau.fr/sites/default/files/ files/document/projet_strategie_16-07-0
Water Management	Report	(Projets de territoire de gestion quantitative de l'equi). In wateraheds affected by a structural deficit, the quantitative water management territoirey project allows local stakeholders to collectively commit themselves to balanced	Narrative		n/a					http://www.charente_ maritime.gouv.fr/content/download/150 3-DDTM_presentation_projet_territ_AG.a
Water Management	proposed by stakeholders	public expectations) and reexamination of the hierarchy of water uses: drinking water, biodiversity in hydrosystems,	Narrative	Regional/local	n/a					
Water Management	proposed by stakeholders	and sanitation costs, quantification of uptakes leading to a better balance of water resource and uses of irrigation with	Narrative	National/regional	n/a					

# ANNEX 9: Template case study partner: Spain



### Deliverable 5.1 Inventory of Scenarios & Transition Pathways



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	TOPIC (focus on socio- economic, technology/innovation, Blue growth, agriculture)	Source (Report, indicators, forecast,)	Description/ word limit (eg 1000 words)	Model (qualitative/norm ative) narrative - (Quantitative/ exploraty) by use	Geographical Coverage: local, regional, nation, Europe,	Time Coverage	Scenario Approach (definition and model used)	Application (has it been used in policy, prospectives, business road maps?)+ example	Data Owner / Provider	Associated Model & owner (specify if relevant)	URL
1	socio-economic/ institutiona	report	process models that are spatially explicit	Mix	Flemish Region/ provincial/local	2010-2050	The initial WLO study (2006) was used as a referece for the Flemish study and describes in qualitative and quantitative terms the possible changes of the Netherlands from 2002 to	The aim is to generate map images and the detailed, sometimes very local consequences of the scenarios. This gives insight into area-specific nature of certain activities as well	Founding Fathers	νιτο	https://ruimtemodel.vlaanderen/download/\ _4_wereldbeelden.pdf
2	Technology/innovation										
8	Blue growth	Report	maritime spatial planning for sustainable blue economies.	mix	the Gulf of Finland and Archipelago Sea	2016-2019					http://www.centrumbalticum.org/uutishuone
4	Agricultural transition										
5	socio-economic/ institutiona	Report	A public elementary school which has collected proposals from the Educational Community, families and neighbors to present them to the Public Administration of the Region of Murcia and improve the state of the Mar Menor.	Narrative	Mar Menor lagoon and surroundings	2018				Public school La Asomada	https://www.facebook.com/NuestroMarMenor
6		Report	Modelling the dredging of the entrance to the Mar Menor	Exploratory	Mar Menor lagoon					IMIDA and University of Murcia	
7		forecast	Climate change scenarios for high and low GHG emission pathways		Region of Murcia and entire Europe	2010-2100	using 9 Regional Climate Models and different emisison scenarios (RCP4.5 and RCP8.5)	widely used in climate impact and adaptation studies	open acces to raw data	CORDEX-EUROCORDEX- MEDCORDEX	http://www.cordex.org/
8		Report	Revegetation scenarios of the Campo de Cartagena	Exploratory	Campo de Cartagena watershed					Universidad Politécnica de Valencia	
9		Report	Comprehensive Management Plan for the Protected Areas of the Mar Menor and the Mediterranean Littoral Strip of the Region of Murcia	Narrative	Mar Menor lagoon	2016				CARM	https://coecmarmenor.es/Aesistacion-v-estudies/
		Poport	The Integrated Territorial Investment (ITI) of the Mar	Narrativo	Mar Monor Jagoon	2017				CARNA	
1		Article	Comparison of Water Flows in Four European Lagoon Catchments under a Set of Euture Climate Scenarios	Exploratory	Mar Menor Jagoon	2017					uup / www.sanamamenar.es/ documents/s / synu/hu3227/MemorlastT
12	2	Article	Kok, K., Rothman, D.S., Patel,	M., 2006. Multi-scal	Mediterranean case studies						https://doi.org/10.1016/J.FUTURES.2005.07.001
13	3	Article	Kok, K., Patel, M., Rothman, E	0.S., Quaranta, G., 20	Mediterranean case studies						https://doi.org/10.1016/j.futures.2005.07.006
14	6	Article	Patel, M., Kok, K., Rothman, E	S., 2007. Participat	Mediterranean case studies Mediterranean case						https://doi.org/10.1016/j.landusepol.2006.02.
19	5	Article	Kok, K., van Delden, H., 2009.	Combining two app	studies						https://doi.org/10.1068/b32137
			1	i	1	I	1	1	1	1	





