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The Foresight Base – MED 2050 Report of Module 1

UNEP/MAP
Athens, 2022

MED 2050
Module 1 Report

The Foresight Base

Preliminary report

May 2022

This report has been elaborated by Khadidja Amine, Antoine Dolez, Anna Goubert with the collaboration of Aloïs Aguettant, François Guerquin, Evan Le Poul, Lina Tode, Jacques Theys.

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ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (French Agency for Ecological Transition)
AFD	Agence Française de Développement (French Agency for Development)
AMU	Arab Maghreb Union
ASCAME	Association of Mediterranean Chambers of Commerce and Industry
ASEAN	Association of Southeast Asian Nations
BaU	Business-as-usual
CBD	Convention on Biological Diversity
CIHEAM	Centre International de Hautes Etudes Agronomiques Méditerranéennes (International Centre for Advanced Mediterranean Agronomic Studies)
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement (French Agricultural Research Centre for International Development)
CMI	Centre for Mediterranean Integration
COP	Conference of Parties
CPMR	Conference of Peripheral Maritime Regions
DEGEST	Demography, Environment, Governance, Economy, Society, Technology
EC	European Community
EEZ	Exclusive Economic Zone
EIB	European Investment Bank
ENSA	École Nationale Supérieure d'Architecture (National School of Architecture)
ENSSMAL	École Nationale Supérieure des Sciences de la Mer et de l'Aménagement du Littoral (National School of Marine Sciences and Coastline Planning)
ETC-UMA	European Topic Centre, University of Malaga
EU	European Union
GAFAM	Google, Amazon, Facebook, Apple, Microsoft
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IEMED	Institut Européen de la Méditerranée (the European Institute of the Mediterranean)
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer (French Research Institute for the Exploitation of the Sea)
IIASA	International Institute for Applied Systems Analysis
IMO	International Maritime Organisation
IPBES	Intergovernmental Science and Policy Platform on Biodiversity and Ecosystem Services
IRES	Royal Institute of Strategic Studies
ITES	Institut Tunisien des Etudes Stratégiques (Tunisian Institute for Strategic Studies)
IUCN	International Union for the Conservation of Nature
KIC	Knowledge and Innovation Community
MAP	Mediterranean Action Plan
MedECC	Mediterranean Experts on Climate and environmental Change

MERCOSUR	Southern Free Trade Agreement
MIO-ECSDE	Mediterranean Information Office for the Environment, Culture and Sustainable Development
MPA	Marine Protected Area
MSSD	Mediterranean Strategy for Sustainable Development
MTES	French Ministries of Ecology, Energy and Territories
NAFTA	North-American Free Trade Agreement
NATO	North-Atlantic Treaty Organisation
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organisation
OME	Observatoire Méditerranéen de l'Energie (Mediterranean Energy Observatory)
PAP/RAC	Priority Actions Programme/Regional Activity Centre
RAC/SPA	Regional Activity Centre for Specially Protected Areas
RAED	Arab Network for Environment and Development
RE	Renewable Energies
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
SCP	Sustainable Consumption and Production
SCP/RAC	Regional Activity Centre for Sustainable Consumption and Production
SDG	Sustainable Development Goal
SEMC	South-East Mediterranean Countries
SoED 2020	Report on the State of the Environment and Development in the Mediterranean
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
WB	World Bank
WTO	World Trade Organisation
WWF	World Wildlife Fund

Introduction

A. PLAN BLEU AND FORESIGHT IN THE MEDITERRANEAN

Since its creation at the end of the 1970's, Plan Bleu's mission has been to carry out foresight work on the future of the Mediterranean basin. As a Regional Activity Centre of the Mediterranean Action Plan (MAP), it has been mandated by the Contracting Parties to the Barcelona Convention for the "*preparation of analyses and prospective studies to assist in constructing visions of the future as an aid to decision-making;*" and the "*dissemination of the findings of this work in the various appropriate forms and channels, including the regular publication of state of environment and development reports and environment and development outlook for the Mediterranean region*"[1].

To date, Plan Bleu has coordinated and published two foresight reports in 1989 and 2005[2]. They have served as a reference for drafting environmental and sustainable development policies in the Mediterranean, including of the Mediterranean Strategy for Sustainable Development (MSSD)[3]. They have supported regional, national, and sectoral planning in a variety of fields and have been cited in numerous works.

B. CHANGES TO THE MEDITERRANEAN CONTEXT REQUIRING A NEW FORESIGHT EXERCISE

Since the last MAP foresight report published in 2005, the Mediterranean context has evolved considerably as a result of the arab springs, accelerated climate and environmental changes, an oil glut, national, regional and global geopolitical changes, etc. Therefore, as early as 2017, the Contracting Parties to the Barcelona Convention tasked Plan Bleu with preparing a new foresight exercise on the Mediterranean Basin, with an outlook for 2050. Plan Bleu then conducted several preparatory activities[4] for the MED 2050 foresight exercise that started in 2019-2020.

C. MAIN OBJECTIVES AND PARTICULARITIES OF MED2050

The objectives and milestones of the MED 2050 project were defined and adopted by the Contracting Parties to the Barcelona Convention in December 2017 (for its preliminary phase) and in December 2019 for its full implementation. The framework elements, objectives and roadmap of the MED 2050 project were therefore clearly defined in two texts adopted by the Contracting Parties to the Barcelona Convention[5] - before the effective start of the project in 2019-2020[6]. The MED 2050 project has **several key features**:

- A long-term outlook - 2050 - with an intermediate outlook for 2030.
- A three-fold objective: (i) ensure the long-term protection of the Mediterranean marine ecosystem; (ii) provide long-term insights useful for the region's transition to sustainable development; and finally (iii) prevent major risks of crises or disruptions that could have an impact on sustainable development by 2050.
- Specific, but not exclusive, attention on the effects of climate change and changes to the marine ecosystem.
- The desire to fully take into account the heterogeneity of the Mediterranean sub-regions, within an overall foresight approach of the entire region.
- The importance of not just developing alternative scenarios for the future, with their risks and opportunities, but also proposing and discussing realistic transition pathways to achieve them.

[1] Decision IG.19/5, 2009: https://wedocs.unep.org/bitstream/handle/20.500.11822/7304/09ig19_08_annex2_19_05_eng.pdf

[2] "Futures for the Mediterranean Basin: the Blue Plan" (1989); A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook" (2005)

[3] UNEP/MAP (2016). Mediterranean Strategy for Sustainable Development 2016-2025. Valbonne. Plan Bleu, Regional Activity Centre.

[4] Please refer to Part 1 of this report for details of the preparatory activities.

[5] Decision IG.23/4 of the Barcelona Convention, Annex II MED 2050 Roadmap towards a Foresight Study on the Environment and Development in the Mediterranean; Decision IG.24/4 of the Barcelona Convention, Annex III Revised Roadmap for the MED 2050 Foresight Study

[6] And a preliminary phase in 2017-2018.

- And finally, the decision to develop an approach which, beyond the experts, involves affected stakeholders, including youth and civil societies, with a strong emphasis on promoting the results within and outside the institutional framework of the UNEP/MAP - Barcelona Convention system.

The approach integrates the following specific features:

- A balance between a quantitative and qualitative approach.
- Involvement of both experts and stakeholders.
- A dual approach, both on a Mediterranean-wide scale and on the scale of willing sub-regions or countries.
- Attention to foreseeable trends, but also to potential disruptions and priority issues, opportunities and major risks.
- Consideration of Mediterranean outlooks specific to the different sub-regions (North, South, East) that make up the entire Mediterranean.
- Based on the development of alternative scenarios, a specific section devoted to the transition pathways for achieving them or facing the major risks associated with them.
- Promotion adapted to different audiences (UNEP/MAP system, stakeholders, general public).
- To go beyond this report and find out more about MED2050:
- The main MED2050 productions and latest news are available on the project website www.med2050.org.

I. Preparatory work

Plan Bleu has coordinated several preparatory activities for the MED 2050 project to shed light on how it should be designed in order to fill knowledge and resource gaps. Some of these activities have been carried out specifically in preparation for the foresight project: the comparative analysis report of existing foresight studies, referred to as the "Benchmark Report of Existing Studies", the study comparing the projections made in 2005 and the current state of data, and the work on long data series. Other activities have also served as a support for foresight work: such as the "Report on the State of the Environment and Development in the Mediterranean", the "Regional Observatory of the Environment and Sustainable Development", the sustainability dashboard and its related indicators.

A. COMPARATIVE ANALYSIS REPORT OF EXISTING FORESIGHT STUDIES (REPORT AVAILABLE IN FRENCH)

Published in December 2017, this benchmark report takes stock of foresight work on the Mediterranean that is already available, analysing strengths and weaknesses. The purpose of the study is to identify various challenges that can serve as guidelines for the MED 2050 foresight study.

The document begins by identifying and classifying relevant foresight studies. It then presents a comparative analysis of the content of these various studies, highlighting the major trends and uncertainties, the driving factors, the major families of scenarios produced, the proposed recommendations and methodological considerations. The last step of the analysis discusses the observations made in the previous sections in order to identify the "blind spots" in the existing literature.

These specificities are visible in the methodology:

- An equilibrium between a quantitative and qualitative approach.
- An involvement of experts and contracting parties.
- A dual approach, both at the Mediterranean scale, and at the level of sub-regions or voluntary states.

The study identifies various needs, as well as avenues to be explored in preparing MED 2050:

1. Improve the readability of reports. Beyond the standard "executive summary for decision-makers", it notes that it is important to produce diagrams in order to make the results more understandable so they can be disseminated to a wider audience.
2. Better take into account the major trends and uncertainties related to climate change and the environment. The report notes that climate change and the environment, although cited in most studies, are often isolated from other factors. Their interactions with the economy, agriculture and institutional issues are only partially taken into account.
3. Better take into account the sea and coastal areas, as well as climate change as a driving force. The sea is not considered as a key theme in many foresight studies, and coastal areas are not really perceived as requiring specific attention, except in regional/territorial foresight studies.
4. Explore the blind spots in existing scenarios. Two families of scenarios do not appear in previous foresight studies: scenarios combining limited regional cooperation and strong improvement of the state of the environment, and scenarios combining strong cooperation and significant environmental degradation.
5. Go beyond recommendations to develop solutions. The report notes that the recommendations are often general and not very applicable. They often do not, therefore, lead to concrete solutions.

B. COMPARATIVE STUDY OF PROJECTIONS IN 2005 AND THE CURRENT STATE (REPORT AVAILABLE IN FRENCH)

The second technical report directly related to preparation of the MED 2050 foresight project is a study aimed at comparing the projections and scenarios from the 2005 report, "A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook" in 2005, coordinated by Plan Bleu, with the actual change (between 2005 and today) in variables and phenomena addressed in the report.

This study has two objectives: (i) to compare the projections of the baseline scenario and the alternative scenario in the 2005 foresight report with the actual changes to the different variables and phenomena, (ii) to answer the following questions: what did the 2005 report correctly forecast? What did it fail to forecast? What did it incorrectly forecast, and above all, which were the reasons for such gaps?

Table 1 below summarises the main differences between the 2005 projections for 2025 and current data. Overall, the 2005 report highlighted some key issues for the next 20 years, such as food security, water availability and preserving agricultural land. Although the diagnosis carried out in 2005 was not that far off on many issues, it should be noted that some projections were more or less overestimated (primary energy demand, international air and land traffic, urban population, municipal waste, agricultural labour force, international tourist arrivals), some were more or less underestimated (global warming, population, economy - GDP of all Mediterranean countries, maritime container traffic, use of pesticides, population density in coastal regions), and some variations were not foreseen at all in 2005, in particular the rapid growth in aquaculture production or the strong increase in marine pollution linked to containers (products transported and lost or discharged at sea).

Table 1. Summary of the main differences between the projections made in 2005 for the year 2025 and current data

	Variables	Baseline scenario 2005 to 2025	Current data	2005 Projection / current data	Comments
1	Temperature, global warming	+1 °C	+1.6 °C	-	Warming was **underestimated** in 2005 (while CO_2 emissions were greatly overestimated). Relatively faster changes in the Mediterranean not foreseen. Acidification, sea level rise, precipitation changes not foreseen. Knowledge on the subject has greatly increased.
2	Population (number of inhabitants in Mediterranean countries)	513 million	515 million	-	**Underestimated**, because the jump in fertility in some countries was not foreseen (demographic transition not achieved).
3	Economy (GDP of all Mediterranean countries)	$7 trillion	$8.5 trillion	-	**Underestimated**. The Mediterranean economy (like the rest of the world) has grown faster than projected, despite the economic and financial crisis of 2008.

4	Water demand	210 km^3 (at watershed level)	309 km^3 (at national level)	+	Watershed / national data bias. If projected increase is calculated based on historical national data, the actual change is **between the baseline and alternative scenarios**
5	Primary energy	1,380 Mtoe	959 Mtoe	+	**Overestimated.** Energy demand was lower than expected despite higher population and economic growth.
6	CO_2 emissions from energy	3,200 Mt	1,935 Mt	+	Correspondingly, CO_2 emissions from energy production have grown less quickly than expected and were **overestimated**.
7	International air and land traffic	350 billion passengers per kilometre	320 billion passengers per kilometre	+	**Overestimated.** Traffic grew slightly less than expected but significantly more than the alternative scenario.
8	Maritime container traffic	65 million TEU	70 million TEU	-	The containerisation of maritime traffic and its expansion was **underestimated** in 2005.
9	Container-related marine pollution (products transported and lost/discharged at sea)	1,456 tonnes	17,000 tonnes	-	Phenomenon **not foreseen** in 2005.
10	Urban population	371 million	355 million	+	**Slightly overestimated** in 2005.
11	Municipal waste	400 million tonnes	230 million tonnes	+	**Significantly overestimated** in 2005.
12	Agricultural labour force	30 million	25 million	+	**Overestimated.** The agricultural labour force declined faster than expected due to changes in North African countries and Turkey.
13	Use of pesticides	6.2 kg/ha	6.4 kg/ha	-	**Slightly underestimated**. The use of pesticides has grown faster than expected despite the efforts of some European countries.
14	Population density in coastal areas	156	186	-	**Underestimated.** The coastal development already identified in 2005 was stronger than expected.
15	International tourist arrivals	396 million	360 million	-	**Slightly overestimated**. Rise of tourism already identified in 2005.
16	Aquaculture production	0.718 Mt	2.2 Mt	-	The rapid growth of the sector was **not foreseen** in 2005.

Source: P. Miran, consultant

It should be noted that the approach adopted in the 2005 foresight project was very different from the one implemented for MED 2050[7]. For the 2005 study, a sectoral approach was chosen, and only one alternative scenario was considered, in addition to the business-as-usual scenario. The goal of MED 2050 is to place more emphasis on contrasting outlooks of the future in order to highlight the heterogeneity of the Mediterranean

[7] These differences in approaches are detailed below in Part III - System analysis, trends, disruptions and weak signals.

Basin, and also to work on concrete multi-sector transition pathways for working towards a sustainable Mediterranean by 2050.

C. REPORT ON THE STATE OF THE ENVIRONMENT AND DEVELOPMENT IN THE MEDITERRANEAN

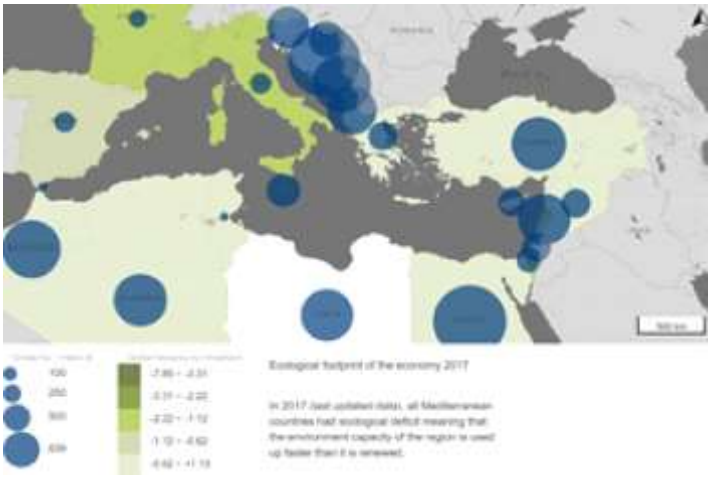
From 2018 to 2020, over one hundred experts and scientists worked on the Report on the State of the Environment and Development in the Mediterranean (SoED 2020), the findings of which are alarming. The report highlights a number of pressures that the Mediterranean Basin is currently facing (air pollution, plastic waste in the sea, concentration of populations on the coasts and associated pressures, etc.), and which threaten to increase in the next thirty years. Although progress has been made in the last decade (implementation of sustainable development policies, integrated strategic frameworks and action plans in Mediterranean countries), there are still many challenges to be overcome. The SoED 2020 is a valuable and solid basis for exploring the potential futures of the Mediterranean Basin, and proposing a sustainable and shared future, within the framework of MED 2050.

One of the key messages identified in the SoED 2020 directly concerns foresight. It states that it is urgent to plan for the transformation of marine and coastal areas, activities and landscapes. The report says that in the face of the expected increase in sea level rise, coastal erosion and extreme coastal events, it is essential to implement preventive measures, which are less costly and more effective than curative measures. For example, the report recommends extending integrated coastal zone management practices to offshore waters through marine spatial planning, and better studying and monitoring the development of the marine biotechnology and deep sea mining industries. This is motivated by uncertainties about how such sectors will impact ecosystems and the environment.

Overall, the SoED 2020 concludes that "to reach commonly-set goals and objectives such as achievement of Good Environmental Status of the Mediterranean Sea and coast, and more broadly the SDGs, and to avoid projected failures, current trajectories must urgently be corrected. The transition towards more sustainable pathways requires radical changes in behaviour at all levels and in all areas, the main driver for increasing pressures and degradations being our production and consumption patterns" (SoED 2020, p'309). This is the main goal of the MED 2050 foresight project, which aims to use data and research gathered in the SoED 2020 to achieve concrete transition pathways for a sustainable future in the Mediterranean by 2030 and 2050.

D. OBSERVATORY AND SUSTAINABILITY INDICATORS

Observing changes to the environment and development in the Mediterranean region, particularly by establishing and monitoring sustainability indicators, is essential in the framework of MED 2050 foresight work.



The Mediterranean Strategy for Sustainable Development 2016-2025 (MSSD) "provides a strategic policy framework, built upon a broad consultation process, for securing a sustainable future for the Mediterranean region consistent with Sustainable Development Goals". Written in line with the results of the United Nations Conference on Sustainable Development (Rio+20), as well as the Sustainable Development Goals (SDGs)[8], the Strategy is broken down into six objectives, each associated with specific indicators required for implementing and monitoring the objectives, which are as follows:

1. Ensuring sustainable development in marine and coastal areas;
2. Promoting resource management, food production and food security through sustainable forms of rural development.
3. Planning and managing sustainable Mediterranean cities;
4. Addressing climate change as a priority issue for the Mediterranean;
5. Transitioning towards a green and blue economy;
6. Improving governance in support of sustainable development.

The Mediterranean Commission on Sustainable Development (MCSD), a key structure within the UNEP/MAP system, supports the implementation of the MSSD.

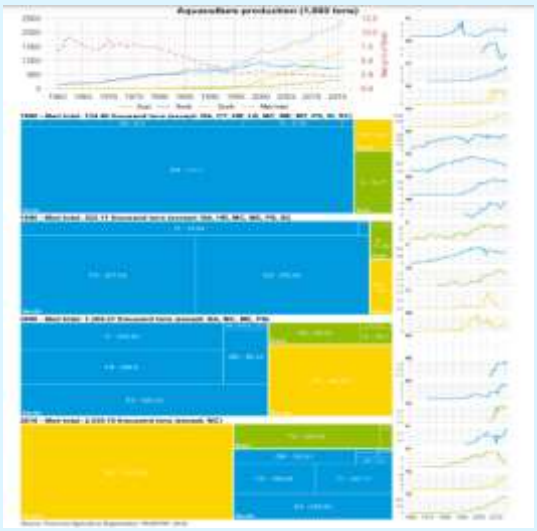
A total of 28 indicators are included in the MSSD dashboard for monitoring its 6 objectives, and 24 indicators are directly related to the SDGs. These indicators are very useful for the MED 2050 project, especially for developing a complete and up-to-date foresight base. In very concrete terms, a large majority of the MED 2050 factsheets (see Part IV of the report) are directly linked to indicators in the MSSD dashboard, and the indicators could also be integrated in subsequent phases of MED 2050 (outlooks, scenarios, transitions). Linking the MED 2050 scenarios with indicators measuring the achievement of national and international objectives would allow a real decision-making tool to be developed which would be immediately useful for Mediterranean decision-makers.

[8] https://www.un.org/sustainabledevelopment/sustainable-development-goals/

E. QUANTITATIVE EXPLORATORY WORK ON LONG DATA SERIES

Box 1. List of the long data series studied

In order to place a long-term emphasis on MED 2050 foresight work, a database of long retrospective data series has been created. This database includes economic, social and environmental variables. For some variables, data series start back in the 1960s. These long data series come from international databases (United Nations, World Bank, etc.). A graphic presentation by country and, when possible, an analysis for each rim of the Mediterranean have been produced. This work therefore helps to develop the foresight base by exploring the evolution of different variables over several decades, and contributes to the work on the factsheets mentioned below.



List of long data series studied:

- Ecological reserve and deficit from 1960 to 2016
- Development and environmental footprint
- Agricultural trade balance
- Aquaculture production per capita
- Aquaculture production
- Domestic credit allocated to the private sector
- Per capita electric energy consumption
- Electric energy consumption
- Energy used per capita
- GDP
- GDP per capita
- Internet users (% of population)
- Area of land equipped for irrigation
- Life expectancy at birth
- Youth literacy rate (ages 15-24) - Gender parity index
- Percentage of youth literacy rate / total youth aged 15-24
- Subscription to a mobile phone service
- Pesticide use (thousands of tonnes)
- Research and development expenditure (% of GDP)
- Percentage of renewable energy consumption (% of total end energy consumption)
- Total renewable energy consumption (million tonnes of oil equivalent)
- Rural population percentage
- Total rural population (millions of people)
- International tourism (number of arrivals)
- Total unemployment (% of total labour force)
- Urban population (% of total population)
- Urban population (millions of people)
- Freshwater withdrawals per capita
- Total freshwater withdrawals

II. Project structuring

A. INSTITUTIONAL ORGANISATION OF THE PROJECT

An organisation was put in place at the beginning of the foresight study, including different bodies that have specific but complementary roles.

The Plan Bleu team dedicated to the MED 2050 project is responsible for the operational implementation of the project in accordance with the methodology developed. It is supported in its project management by a **Steering Committee**, which, in addition to the members of the MED 2050 team, includes three members of the Plan Bleu Board with extensive experience in the field of foresight. The members of the Steering Committee are also involved in the foresight group.

Table 2. List of the MED 2050 Steering Committee members

Plan Bleu / PAM Steering Committee members	
Name et surname	
AMINE Khadidja	Sustainable Development and Foresight Project Officer
COMOLET Arnaud	Project Manager (Oct. 2020 - July 2021)
DE MONTGOLFIER Jean	Plan Bleu Secretary General (Board member)
DOLEZ Antoine	Post-Doctoral Fellow Aix-Marseille University
GOUBERT Anna	PhD Student Aix-Marseille University
GUERQUIN François	Director
LACROIX Denis	Plan Bleu Vice Chairman (Board member)
THEYS Jacques	Plan Bleu Vice Chairman (Board member)
TODE Lina	Deputy Director

MED 2050 also benefited from the expertise of other members of the Plan Bleu team and its Board members: Céline Dubreuil, Eloïse Faure, Yves Henocque, Michael Karner, Antoine Lafitte, Thierry Lavoux, Gloria Lázaro, Rachid Mellak.

The Foresight Group is the main committee working on the MED 2050 project. The members of the foresight group have a strategic production role. Their main function is to ensure the consistency of all contributions and analyses, through joint synthesis work carried out during workshops held regularly since the group's creation in May 2020, and which will continue until the completion of the exercise. For the development of the foresight base, the group met on average every two months.

Generally speaking, the joint working sessions aim to identify trends, disruptions and weak signals, but also to develop shared scenarios and transition pathways. The members of the group also help to move the project forward through written contributions, such as the factsheets in Module 1[9] (either directly written by them, or by drawing on expertise within their respective partner networks).

The foresight group comprises experts invited by the Plan Bleu team, between 2019 and 2021. These experts come from the three shores of the Mediterranean Basin in order to be as representative as possible of the diversity of the Mediterranean region. Some of the experts are permanent members of the Foresight Group, while others have intervened in support of the Foresight Group.

[9] More details on factsheets are provided in Section IV of this report.

Table 3. List of the permanent members of the MED 2050 Foresight Group

List of the Foresight Group permanent members	
Name and surname	**Organisation**
BERGERET Pascal	International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM)
BESSAOUD Omar	International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM)
BOERO Ferdinando	University of Naples Federico II
CAPPATO Alberto	Old Port of Genova
CRAMER Wolfgang	MedECC
De LATTRE-GASQUET Marie	Centre for International Cooperation in Agricultural Research for Development (CIRAD)
FOSSE Jérémie	ECO-Union, Global Eco Forum
GIER Güzel Yucel	Institute of Marine and Technological Sciences
GRIMES Samir	National School of Marine Sciences and Coastal Planning (ENSSMAL)
GUIOT Joël	MedECC
KRAEMER Andreas	Ecologic Institut gemeinnützige GmbH
LE TELLIER Julien	Coordination Unit MAP
LE VISAGE Christophe	Sea and Coastline strategies
MARKOVIC Marina	PAP/RAC
MENICHETTI Emanuela	OME
PARANT Alain	Mediterranean demographic observatory (Demomed), Futuribles International
PARIENTE DAVID Silvia	Consultant on energy (CMI, World Bank, ...)
RANDONE Mauro	WWF MedPO
RODDIER-QUEFELEC Cécile	European Environment Agency (EEA)
SPILANIS Ioannis	Aegean University, Sustainable Tourism Observatory, Insular Development Laboratory
TSANI Stella	University of Ioannina
UHEL Ronan	European Environment Agency (EEA)
VOIRON Christine	Nice University

Table 4. List of experts in support to the Foresight Group for the Module 1

Experts in support to the Foresight Group	
Name et surname	**Organisation**
ABIS Sébastien	Club DEMETER, IRIS, Futuribles
APPRIOUAL Antoine	European Institute of the Mediterranean (IEMED)
AROUA Najet	Polytechnic School of Architecture and Urbanism
ATTIA Khalil	UNEP/MAP-SPA/RAC
BABOCI Joni	Tirana City
BADUEL Marie	AViTeM
BENAÏSSA Amine	Sorbonne University
BEN CHARFI Khouloud	Water Youth Network
BEN JANNET ALLAL Houda	MEO (Mediterranean Energy Observatory)
BERTHOD Justine	LITTOCEAN
BEURRIER Anne Gaëlle	LITTOCEAN
BLANC Pierre	Sciences Po Bordeaux / Ecole Nationale des Sciences Agronomiques Bordeaux
BOCCI Martina	t-ELIKA
BOUT Céline	European Environment Agency (EEA)
BOUTRY Nolan	Tour du Valat
BRÉCHON Pierre	Sciences Po Grenoble
BRUNFAUT Victor	Université Libre de Bruxelles
BURDY Jean-Paul	Sciences Po Grenoble
CARIC Hrvoje	Tourism Institute, Zagreb
CASTILLO Paula	Eco-Union
CEBRIAN Daniel	UNEP/MAP-SPA/RAC

CHERKAOUI Hakim	ENA Rabat
COSTA SALAVEDRA Cristina	Eco-Union
CURY Philippe	IRD/Clora
DAGUZAN Jean-François	Stratégic Research Foundation
DE DINECHIN Frédéric	Banque de Développement du Conseil de l'Europe
DEL MAR OTERO Maria	IUCN Centre for Mediterranean Cooperation
DORANGRICCHIA Anna	Union for the Mediterranean
EL ASMI Souha	UNEP/MAP-SPA/RAC
EL ASRI Ouissame	Aix-Marseille University
EL BARDAOUI	Tunis University
FABIAN Lorenzo	University IUAV of Venice
FATOUX François	Senior Consultant in Diversity and Corporate Social Responsibility
FERNANDEZ BAYO Ignacio	Spanish Association of Scientific Communication
FERROUKHI Sid Ahmed	ENSA/CREAD
FOUCHIER Vincent	Métropole Aix-Marseille-Provence
FRANCESCUTTI Pablo	Rey Juan Carlos University
GALEWSKI Thomas	Tour du Valat
GONTHIER Frédéric	Sciences Po Grenoble - Pacte
GONZALEZ Gabino	REMPEC
GUTERMAN Ofer	BDO Consulting Group
GUZZON Claudia	CPMR
HASSOUNI Fatiha	Danish Human Rights Institute
HEMA Tatjana	PAM Coordination Unit
HODEBERT Laurent	ENSA Marseille
JARDINÉ Dominique	Région Sud - Provence Alpes Côte d'Azur
KHAMLICHI Hajar	Mediterranean Youth Climate Network
LAMINE Sihem	Harvard University
LAUWERS Franck	REMPEC
LAZARO Lourdes	IUCN Centre for Mediterranean Cooperation
LIMAM Atef	UNEP/MAP- SPA/RAC
LOURS Xavier	Métropole Aix-Marseille-Provence
MARINI Katarzyna	MedECC
MAROT Bruno	Sciences Po, Ecole d'Urbanisme de Paris
MARTIN Marianne	AViTeM
MATTEUDI Emmanuel	LIEU - Aix-Marseille University
MAZZUCCHI Nicolas	Foundation for Stratégic Research
MEUNIER Philippe	AViTeM
MONEER Aziza	American University of Cairo
NEGEV Maya	Haïfa University
NIKOPOULOU Konstantia	MEDCITIES
NUMA Catherine	IUCN Centre for Mediterranean Cooperation
OUDIN Stéphanie	Région Sud - Provence Alpes Côte d'Azur
OUERGHI Atef	UNEP/MAP-SPA/RAC
OUTTERS Magali	UNEP/MAP-SCP/RAC
PICART Anaïs	Eco-Union
QUERALT BASSA Arnau	Consultative Council for Catalonia Development
RAHMOUNI BENHIDA Bouchra	Africa Business School
RAMIERI Emiliano	Marine Spatial Planning Network
RODRIGUEZ Josep	Sustainable Tourism Community
SANALAN Teoman	European Environment Agency
SCHRÖDER Christoph	ETC-UMA
SCOULLOS Michael	Athens University, MAB/Unesco Greek National Committee
SEGHIRATE Yasmine	CIHEAM
SFEIR Christiane	Faculty of Fine Arts and Architecture - Lebanese University
SIMARD François	Consultant
SLAOUI Younès	Odyssey International

SMAOUI Malek	REMPEC
SOOS Timotej	Ministry of Foreign Affairs of Slovenia
SUAREZ de VIVERO Juan Luis	Seville University
TAJE Mehdi	Tunisian Institute of Strategic Studies
TALIOTIS Constantinos	Cyprus Institute
TEIXIDOR-COSTA Arnau	IUCN Centre for Mediterranean Cooperation
TROYA Antonio	IUCN Centre for Mediterranean Cooperation
TSAKAS Constantin	World Bank
TURKI Yassin	Carthage University
ULRICH Clara	IFREMER
VAUZELLE Sébastien	UNDP
VAZ Sandrine	IFREMER
VLACHOGIANNI Thomais	MIO-ECSDE
YAZIGI Serge	Yazigi Atelier
ZIMMER Daniel	Climate-KIC
ZOVIGHIAN Diane	World Bank

The members of the extended Foresight Group are academics, specialists in all the themes identified by the Plan Bleu team as key for the future of the Mediterranean Basin (economy, urban planning, coastline and sea, biodiversity, climate change, sociology, geopolitics, security, planning, youth, agriculture, water, etc.), experts from international organisations, representatives of stakeholder networks (e.g. youth networks). Other actors, such as those representing local authorities or authors of recent foresight studies, are also involved from time to time during foresight group meetings in order to contribute to exchanges and open up discussions.

An **Advisory Committee** was also created for the MED 2050 project. The main function of this Committee is to ensure that the MED 2050 project achieves the objectives set by the Contracting Parties and partners. The Advisory Committee is made up of people representing structuring organisations in the Mediterranean, on themes of the environment, development, and the organisation of civil society, as well as representatives of the Contracting Parties to the Barcelona Convention.

Table 5. List of the Advisory Committee members

Members of the Advisory Committee	
Name and surname	**Organisation**
ADLY Emad	Arab Network for Environment and Development (RAED)
BONNEL Alexis	Agence Française de Développement
CLAUDIUS-PETIT Anne	Région Sud
DE JOUVENEL Hugues	Futuribles International
DOMINATI Laurent	"Save the Mediterranean" Association
ESCODA Anna	Association of Mediterranean Chambers of Commerce and Industry (ASCAME)
EVANGELOU Ellada	Anna Lindh Foundation
GIDRON Tsafrir	Plan Bleu Focal Point for Israel
HAMIDI Samira	Plan Bleu Focal Point for Algeria
HEMA Tatjana	PAM Coordination Unit
HUBERT Bernard	Agropolis International
INSALACO Eleonora	Anna Lindh Foundation
KAHIL Taher	International Institute for Applied Systems Analysis (IIASA) (Austria)
KASTRINOS Nikos	European Commission
LEMAITRE CURRI Elen	International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM)
MASSET Philippe	Agency for the Environment and Energy Management (ADEME)
MAURIELLO Valentina	Country representative - Bureau of the Contracting Parties to the Barcelona Convention
MOUFARREH Amal, followed by BOUQARTACHA Farah	Plan Bleu Focal Point for Morocco
MONDIELLI Philippe	Prince Albert II of Monaco Foundation
MOULINE Mohammed Tawfiq	Royal Institute of Strategic Studies (IRES)

NUNES ELodie	Conference of Peripheral Maritime Regions (CPMR)
RODRIGUES Benoit, followed by ELKAÏM David	Plan Bleu Focal Point for France
ROQUE Maria-Angels	European Institute of the Mediterranean (IEMED)
SAMPSON Sonya	World Bank
STOJANOVIC Ivana	Plan Bleu Focal Point for Montenegro
TRUYOL Diana	Association of Mediterranean Chambers of Commerce and Industry (ASCAME)
TUNESI Leonardo	Higher Institute for Environmental Protection and Research (ISPRA Ambiente) and Intergovernmental science and policy platform on biodiversity and ecosystem services (IPBES)
UHEL Ronan	European Environment Agency

The Committee members have several roles. First, they have a role in guiding the project and discussing and approving its results. They particularly discuss the specific methodological aspects of each phase of the project, as well as the key conclusions expected from the project. In addition, the members have a role in disseminating the results throughout the Mediterranean Basin. They can serve as relays for dissemination within the Mediterranean sub-regions. Advisory Committee members may identify relay networks within their respective networks as needed. In a second phase, at the end of the project, the Committee will be able to propose national and thematic extensions to the foresight study, as well as transition strategies within countries, so that the transition pathways recommended by MED 2050 are implemented in the most operational and suitable way possible on the territories.

The MED 2050 Advisory Committee has met twice since the project began, in January 2021 and in November 2021.

B. METHODOLOGY

1. A five-phase approach

In line with the MAP project objectives outlined in the introduction, the approach adopted for MED 2050 has been divided into five main phases, or modules:

1. An initial quantitative and qualitative phase, designed to establish a basis for analysing the Mediterranean system; explore, in a preliminary manner, the trends, disruptions, or weak signals specific to the Mediterranean system; and prioritise the issues (risks or opportunities) for the environment and sustainable development in 2030 - 2050. At this stage, mainly the foresight group experts[10] and the Plan Bleu team are involved in working on general analyses and thematic approaches.
2. A second phase aims to consult stakeholders and co-develop differentiated outlooks for development and the environment in the Mediterranean - with players (representatives of the political, economic and scientific spheres, environmental associations, youth networks, etc.) and experts from the three Southern, Eastern and Northern sub-regions.
3. A third phase aims to develop several contrasting scenarios for 2030 - 2050, building on the previous work.
4. A fourth, more strategic phase focuses on consideration and comparison of possible transition pathways towards sustainable development based on the previous scenarios and involving both experts and stakeholders.
5. Finally, a last phase aims to promote the results, with several potential audiences: the UNEP/MAP-Barcelona Convention system, the countries concerned, the general public, the media and civil society, the scientific community, etc.

All the traditional foresight approaches - as explained in the following Table 6 - are being used for the MED 2050 project, linked together through the development and argumentation of scenarios.

[10] Members of the foresight group are detailed above.

Table 6. Four approaches to foresight

Articulation present/futur → Attitude/Uncertainty	EXPLORATORY FORESIGHT (present → future) What can happen?	NORMATIVE FORESIGHT (future → present) What to do in the future?
BUILDING CERTAINTIES OR STRONG PROBABILITIES ABOUT THE FUTURE	FORWARD-LOOKING FORESIGHT Possible and probable developments of problems already identified (and impacts) UNDERSTANDING, FORECASTING, RAISING AWARENESS	Confronting or co-constructing NORMATIVE VISIONS OF THE FUTURE Participatory foresight IMAGINING, DEBATING, MOBILISING
INTEGRATING THE UNCERTAIN, THE IMPROBABLE, THE DISRUPTIONS	DISRUPTION FORESIGHT Weak signals, "wild cards" (potential disruptions), fictions, opportunities, and emerging risks ANTICIPATING DISRUPTIONS – ALERTING – CHANGING REPRESENTATIONS	STRATEGIC FORESIGHT Backcasting scenarios, articulation of long and short terms DRIVING CHANGE IN THE SHORT AND LONG TERMS

Source: Jacques Theys, *Revue Technique Territoire, et Société* N° 37, Ministère du Développement Durable, 2010

2. Proposed foresight method

Each of the above-mentioned phases is designed as a module that leads to specific productions. However, the project can only be meaningful and coherent if these modules are structured around a common method in order to integrate the various results and work towards the final goal of recommending realistic transition pathways for achieving sustainable development in the Mediterranean by 2050.

The main goal is to develop robust, plausible and contrasting scenarios on the future of the Mediterranean Basin, including the marine domain, for 2050. Then, based on these scenarios, the aim is to propose transition pathways and recommendations for working towards one or more desirable scenarios and strengthening the resilience of the region in the face of likely future disturbances and major risks.

The essence of the approach is the standard scenario-based method[11], coupled with a system analysis framework derived from the DEGEST approach[12], and the implementation of a "backcasting" approach (i.e. working back from the future to the present) - in order to define and compare transition pathways[13].

Furthermore, the goal is to develop general foresight on a Mediterranean-wide scale and specific consultations and work on the scale of the Eastern, Northern and Southern sub-regions in order to clearly identify the different visions of stakeholders in these regions with regard to development and the environment. With the same aim of avoiding scenarios that are too abstract and general, the approach will also focus on basing the scenarios on a set minimum of required quantitative data, extensive consultation with experts or stakeholders and the production of analyses and assumptions at a relatively narrow thematic - and if possible according to geographical scale ("factsheets or thematic sheets").

Some of these tools are summarised in the following Box 2.

Box 2.Brief description of the main tools used in the MED 2050 approach

- **The scenario-based method** uses assumptions about variables or components of a system to develop representations of possible futures (exploratory scenarios) or desirable and undesirable futures (normative

[11] Source: Michel Godet, Philippe Durance, Strategic Foresight for corporate and regional development, DUNOD and UNESCO, April 2011.
[12] Source: E. Cornish, Futuring: the exploration of the future, World Future Society, 2006.
[13] This combination of the scenario-based method, the DEGEST approach and backcasting has already been tested in several countries, including the PEGASO project focused on integrated coastal zone management (ICZM, 2010-2013) and in several European and bilateral training programmes in North Africa, Morocco and Egypt (2013-2018).

scenarios or outlooks). It generally includes three phases: developing a database and analysis and identifying the essential variables and components of the system being studied; scanning the field of possibilities, first by variable and component and then, more globally, from a "composition" of these specific assumptions (i.e. "morphological analysis"); and finally developing the scenarios themselves - which may (or may not) include normative elements.

- **A system analysis framework: the DEGEST approach.** The DEGEST approach was proposed by the American futurist Cornish in 2004, and suggests structuring analysis of the variables and components of the system studied around six major aspects: Demography, Environment (and resources), Governance, Economy (and finance), Society, and Technology (and science). It offers a useful analytical framework for organising the classification of components, then variables and trends or disruptions specific to the chosen foresight theme, at a more detailed level - or for building scenarios.
- **Backcasting scenarios.** Unlike forecasting, which starts from the present to make projections or assumptions about the future, backcasting scenarios start from objectives or desired outlooks for a given timeframe and work back to the present. It involves imagining the pathways required to reach a desired future or to avoid a feared future.
- **Morphological analysis** explores possible futures in a systematic manner based on all the combinations from breaking down a given system. It is used to build scenarios, in a progressive process that breaks down the system into more or less detailed levels (in variables, components, subsystems), and then rebuilds it.

Based on the five main phases of the project, and by applying the major methodological principles presented above, **a 10-step methodological process is proposed**, from the creation of a framework database and documents useful for the entire process to the recommendations and promoting the project to different "audiences", ranging from MAP bodies and the general public, including states and the scientific community.

These ten steps are presented in the following Table 7, which details the objectives for each step, the method(s) proposed, the means, persons or groups to be involved and finally the expected final outputs. The steps described in the table are guidelines established at the start of the project. It has been followed to a large extent. However, the precise content of each step was adapted to the context, especially to the health context, which was a major constraint for holding public meetings and travelling, especially internationally.

Finally, it should be noted that the approach gives a central place to the creation of "factsheets" on the main components or variables of the Mediterranean system. It also focuses on involving players from the various sub-regions of the Mediterranean and MAP and perhaps beyond, in addition to the current foresight group, as well as the entire Plan Bleu team.

Table 7. Steps in the foresight analysis process, methods, means and expected outputs

Phase	Step	OBJECTIVES	METHODS	MEANS	OUTPUTS
I	1	Build a foresight **database**	Collect retrospective and foresight documents and statistics	Plan Bleu internal work and specific studies	A few monographs and projections for 2050. Analysis of 2005 project results. Comparison of 2005 project projections with current status. Major trend database.
I	2	Find consensus on **trends, disruptions, weak signals and major issues**	Expert consultation method (Régnier abacus, etc.) and discussions	Foresight group meetings and questionnaire analysis	List of trends, disruptions, weak signals and issues classified in several levels and qualified
I	3	**Break down the system** into major components and driving variables	Process the results from Steps 1 and 2 and use of the DEGEST framework	Foresight group meetings with the support of Plan Bleu	Production of a system framework and a list of components to be used as a basis for the scenarios

I	4	Analyse the components and **make assumptions** about their changes	Write factsheets on about thirty components	Involvement of the group, Plan Bleu and other experts	Approximately 30 sheets of about 10 pages each, concluding with 4 to 5 sets of assumptions for 2050
I and III	5	Produce **exploratory scenario** outlines based on the assumptions about the variables	One- and two-round morphological analysis (based on component assumptions)	Foresight group meetings with the support of the Plan Bleu team	10 to 12 scenarios from the morphological analysis - summarised in a few lines and key words
II	6	Produce contrasting **normative outlooks** of development and the environment **by sub-region: (Eastern - Northern - Southern)**	Prepare outlooks for the future of development and the environment by sub-region	Consultation of players or experts from the 3 zones OR work in workshops	Report on the differences in Eastern, Northern and Southern outlooks, and enrichment of exploratory scenarios
II and III	7	Production of **regional sub-scenarios** (Northern - Southern - Eastern)	One-round morphological analysis: 3 to 5 assumptions per sub-region.	Work in workshops with or without specific studies	4 to 6 scenarios "territorialising" those of step 5 with geopolitical aspects
III	8	Develop the **final scenarios** (4 to 6) by integrating the above-mentioned research	Group work	Foresight group meetings extended to other stakeholders with the support of Plan Bleu	4 to 6 scenarios integrating exploratory and normative dimensions and sub-regions
IV	9	Develop **transition pathways to achieve desirable scenarios** or prevent the major risks of others	Backcasting method on the scenarios considered the most useful in relation to sustainable development or crisis risks	Extended foresight group including experts and stakeholders	Production of strategies adapted to the different possible change scenarios for the Mediterranean
V	10	**Produce recommendations** and key messages for stakeholders and develop a strategy for promoting the work	Develop recommendations. Write the report. Choose promotional media and strategies by target group.	Ad hoc working group. MAP Steering Committee and bodies. Plan Bleu. Communication services	Complete final report Executive Summary Communication strategy and associated media. An effective communication strategy.

III. System analysis, trends, disruptions and weak signals

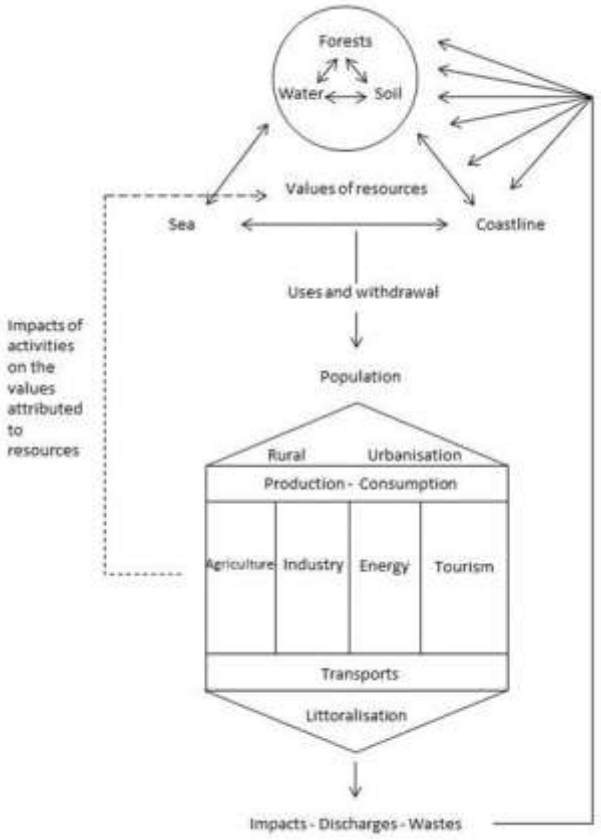
A. SYSTEM ANALYSIS

A key step in creating the foresight base for MED 2050 is preparing the systemic framework. The two foresight research projects which Plan Bleu conducted at the end of the 1980s and then in 2005 were also built on a similar systemic framework, and it is worthwhile looking back at it to see what differentiates them from the current project.

1. The Mediterranean system in the 1989 project:

For the 1989 project, the system is completely internal to the Mediterranean. The population and activities, distributed between urban and rural areas, and between the coast and inland, have impacts on the environment (forests, water, soil) that ultimately affect the sea and the coastline. This means fewer resources available for the population and the economy. In addition to this physical circle, there is an economic circle that concerns the economic valuation of resources and the impact of activities on these values. It is essentially an economy - population - environment interface model, with particular attention paid to the impacts on the sea and marine pollution.

Diagram 1. System analysis of the foresight report published by Plan Bleu in 1989, *Futures for the Mediterranean Basin: The Blue Plan*, 1989.

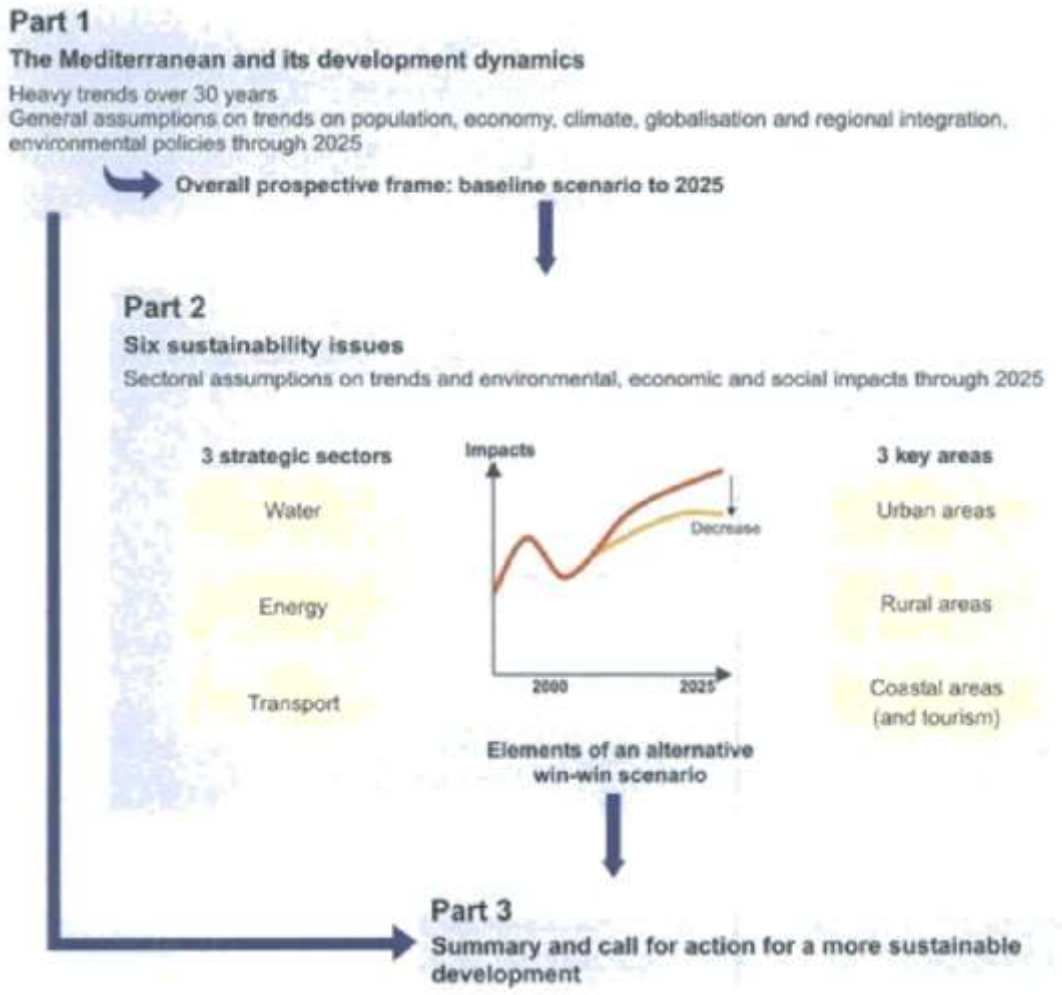


2. The system developed for the 2005 foresight project:

In 2005, the decision was made to focus on six sustainable development issues, three thematic issues (water, energy, transport) and three local issues (cities, rural areas and coastal areas, including tourism). The sea was not specifically addressed. The main purpose of the project was to see the impacts of a number of factors (population, climate, economy, globalisation, regional integration, and environmental policies) - on these six major issues over the next 20 years. The focus was on developing a quantified trend scenario - so as to identify the elements of an alternative scenario. The benefit of this approach is that work could be done with variables that are well identified from the start. Certain social or geopolitical aspects were not specifically developed (except under the theme of Mediterranean integration) and the emphasis was placed on trends rather than disruptions.

The structuring of the system around these six issues also inspired the Mediterranean Strategy for Sustainable Development 2005-2015 (MSSD 2005-2015), which covers water, energy, transport, urban areas, rural areas, coastal areas and tourism. The 2005 foresight project therefore had a significant influence on the development of the MSSD 2005-2015.

Diagram 2. System analysis of the foresight report published by Plan Bleu in 2005, A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook.



3. The system developed for the MED 2050 project

The system analysis for the MED 2050 project was mainly developed by Plan Bleu team experts at a workshop focused on the key variables of the Mediterranean system, in February 2020.

To produce the final framework, this workshop was based on the **DEGEST approach**. The DEGEST approach is described in Part II of this report, and suggests structuring analysis of the system variables and components around six major aspects: Demography, Environment (and resources), Governance, Economy (and finance), Society, and Technology (and science). It is a useful analytical framework for organising the classification of components, then variables and trends or disruptions specific to the chosen foresight theme at a more detailed level - or for building scenarios.

The workshop was conducted in three successive stages:

1. A first stage in which participants reflected individually on their vision of the "Mediterranean system", and ideas were then shared and discussed;
2. A second stage in which a general systemic framework was co-developed along with its main variables, followed by discussion on its adaptation to the Mediterranean region;
3. And a final stage involving individually ranking priorities, followed by pooling of the main factors or possible changes that could have an impact on the Mediterranean system by 2050.

During the first stage, the participants focused their visions of the Mediterranean on different determinants. Some were more interested in natural resources and ecosystems, whilst others in the problems of civil peace in the Mediterranean, and others in the land-sea interface, consumption and production patterns, and major stakeholders.

Based on a more general framework model, several significant variables emerged, depending on the participants:

- in the "social" category: demographics, aspirations, lifestyles and consumption patterns, spatial planning;
- in the "political" category: political stability and crises (e.g. migration), institutions and law, governance;
- in the "external" category (external/exogenous factors): climate change, migration, future of tourism, geopolitical disruptions, investment approaches and crisis risks;
- in the "economy" category: new economic or financial models and innovations;
- in the "environment" category: biodiversity, climate, water, resources, and marine ecosystems.

It should be noted that two additional categories were added at the end of this second phase:

- the interface between the coastal area and the sea;
- vulnerability and resilience.

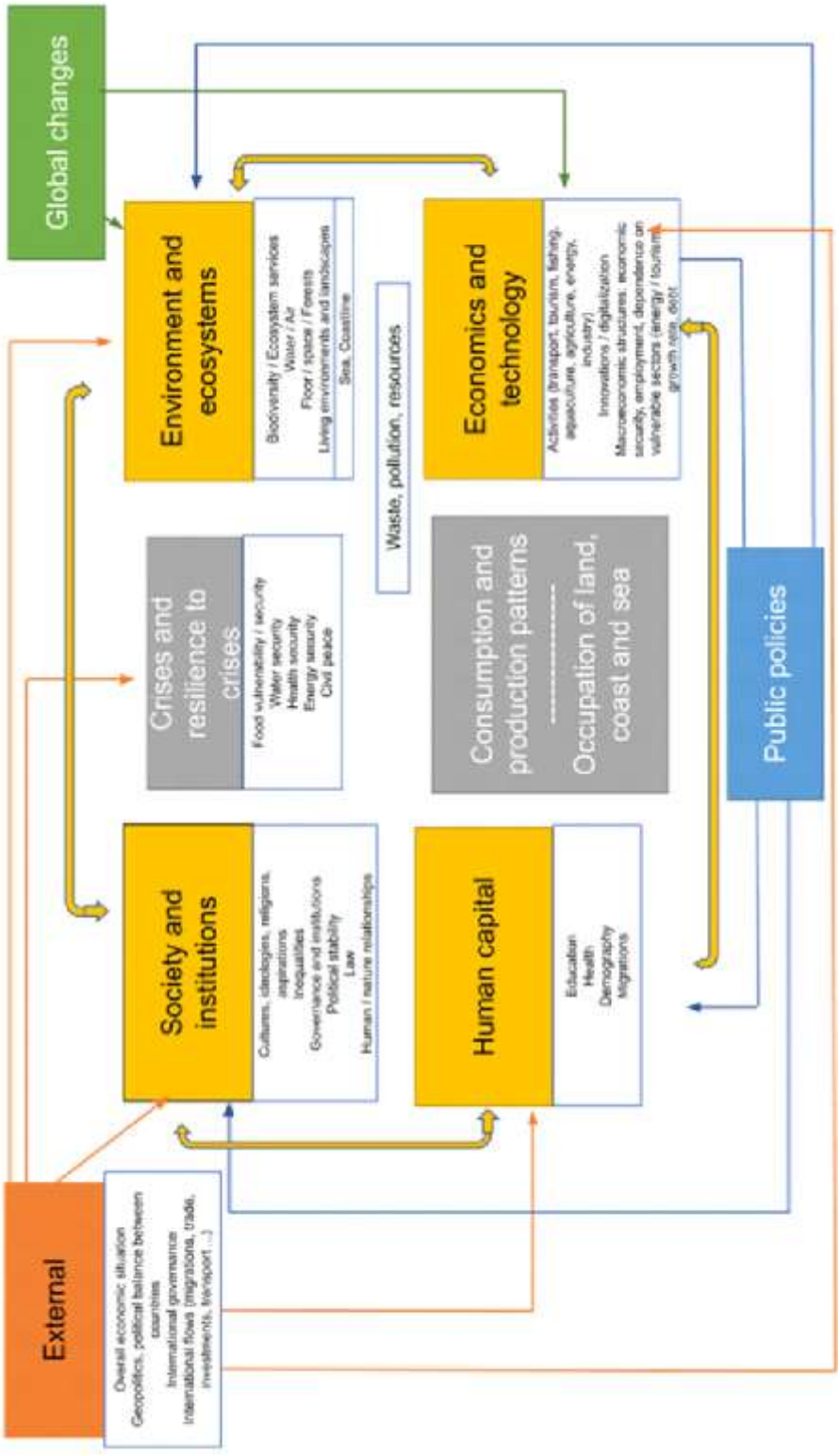
After the third pooling stage of the workshop, major "categories" of determinants and disruptions that could have a major impact on the Mediterranean system by 2050 emerged, including the following themes (in order of importance, according to the participants' ranking of priorities):

- The new consumption and production patterns, and changes to societal and social aspirations;
- Governance issues, level of political engagement and compliance with legal obligations (at all scales);
- Political and geopolitical stability or instability (including the possibility of alliances and integrations);
- Climate change and response;
- Major crisis risks and vulnerability or resilience to crises;
- Innovations or new economic and financing models, including for the environment, and the development of digital society;
- Resource scarcity and the risks of economic, energy or food collapse;
- The development of economic activities at sea and their connection with coastal development;
- Management of marine and coastal areas (including the land-sea interface);
- Migration;
- And finally, demographics (North-South imbalances, demographic boom in Africa, ageing, etc.).

Finally, after consultation and presenting this reflection to the foresight group experts, a first overall systemic framework was developed to serve as a basis for the whole MED 2050 project. This is shown schematically in the following Diagram 3.

While this diagram shows that the relationship between the economy and the environment, were very present in the previous systems, other dimensions appear to have an equally important role to play, in particular the global dimension (the impact of the outside world on the Mediterranean in all its forms - economic, geopolitical, financial, technological, etc.), societal and educational changes, the quality of governance systems, or even lifestyles and spatial planning. Another very important specificity is that an entire subset of the system is focused on planning for and managing crises, on the assumption that they will become more frequent in the coming decades. Finally, there is a strong desire to make a clearer distinction between land and marine environments, even if the diagram does not fully reflect this.

Diagram 3. The systemic framework of the MED 2050 foresight project



B. MAJOR TRENDS

From September 2020, the experts of the MED 2050 foresight group were asked to reflect on the major trends likely to affect the future of the Mediterranean Basin by 2050.

The Plan Bleu team submitted a **questionnaire** to the members of the foresight group and to the Plan Bleu experts, giving the respondents the opportunity to **propose several structuring trends that, in their opinion, are likely to determine the future of the Mediterranean region over the next thirty years**. This questionnaire was sent to 48 people, and 25 responded.

A major trend can be defined as a major and very probable evolution affecting the studied system in a sufficiently significant way and over a sufficiently long period of time so that its evolution could be predicted over time.

From the responses collected, **a list of 195 major trends, divided into 13 categories, was jointly established**. This list contributes to the foresight base, and has notably served as a framework document for reflections on the factsheets. The comprehensive list of major trends is as follows:

1. Exhaustive list of major trends

Box 3. List of 195 major trends broken down by category, after the first survey of the Foresight Group

1. GLOBAL CONTEXT

1. Global acceleration of climate change and biodiversity loss.
2. Rise of ecological concerns and environmental standards.
3. Transition to a new economy dominated by digital technology, artificial intelligence, life sciences technologies and non-fossil fuels.
4. Continued general trend towards globalisation and liberalisation. Intensification of trade in goods, capital, skills, information, tourism and acceleration of migration (linked, in particular, to climate).
5. Permanence of the major role of finance and the business world in the fundamental dynamics leading to increased globalisation, interdependence, consumption and deregulation. Pressure on governments caused by debt.
6. Growing investment of finance and international financial or development aid organisations in the ecological and energy transition.
7. Growing role of the Big Tech players and platforms (Amazon, Google, etc.) in the direction of development and the homogenisation of cultures at the global level. Impact of social media networks and new media.
8. Declining geopolitical role of oil and gas (energy transition), but potential of new impacts linked to energy investment cycles.
9. The power shift to Asia and the growing role of China, competing with the United States for the position of the world's leading power (in 2040?).
10. Rise of new centres of power linked to resources (e.g. ownership of rare-earth elements -, China, Latin America, etc.).
11. Isolationism of the United States.
12. Doubling of Africa's population by 2050 and its increasing integration into the global economy.
13. Rise in inequalities between countries with wealth concentrated in a small minority of them - Increase in the number of "failed" states.
14. Concentration of capital ownership (particularly to the advantage of digital players) and Big Tech control of global/information flows and networks.
15. Increasing opposition to globalisation and the temptation to turn to isolationist policy. Rise of populism, nationalist ideologies and protectionism.
16. New configuration of globalisation post COVID. Willingness to reduce dependencies, relocation of activities, reduction of mobility (air travel, etc.).
17. Increased conflicts related to access to scarce resources, nationalism, or as a means to resolve internal problems.

18. A more multipolar organisation of world governance with the increased role of Europe, China, India, the Middle East and Russia alongside the United States.
19. Possibility of strong destabilisation of existing political and trade blocs (ASEAN, NAFTA, MERCOSUR, African Union, Arab League, European Union, Commonwealth, etc.).
20. Loss of influence and unravelling of multilateralism and decline of international organisations. Disregard or non-application of international agreements. Loss of influence of the UN as a result of isolationism, clientelism and lack of efficiency.
21. Replacement of institutional cooperation mechanisms (UN, public development aid, etc.) with private players (such as the Bill Gates Foundation) or international civil society (large NGOs).
22. Increased role of local players and regions in international cooperation.
23. Risks of states breaking up (Great Britain, Spain, etc.) and tendencies towards weakened centralised governments.
24. Challenges to the rule of law and democracy in many countries.
25. Emergence of civil society and the desire for democracy. Role of social media networks in citizen movements.
26. Rise of new informal institutions and "common identity" groups linked to the digital society (e.g. Anonymous, Qanon).

2. GEOPOLITICS ON A MEDITERRANEAN (AND EUROPEAN) SCALE

27. Continued geopolitical instability in the region - especially in the East. Tensions in the Levantine Sea (especially over gas).
28. The three issues of fragmentation, inequality and migration continue to be interconnected.
29. The growing influence of foreign pressures and powers and the importance of centrifugal forces (China, Russia, Persian Gulf states, Turkey, African states, etc.).
30. Arrival of new investors who settle permanently - with political, economic and social consequences (e.g.: Qatar, United Arab Emirates, China, Brazil, India, etc.)
31. Impact of the European Green Deal and the progressive assertion of European foreign policy on the entire Mediterranean.
32. Increasingly strong segmentation of the Mediterranean into large sub-regions (Northern, Eastern, Southern) with diverging geopolitical interests.
33. Relations between Europe, Africa, and the Middle East are increasingly dependent and determined on migration, security or religious issues.
34. Growing differences in growth rates between the countries of the "North" and the "South", making it increasingly difficult to achieve convergence goals.
35. Stagnation of economic and environmental cooperation due to persistent instabilities, migration issues and conflicts of interest. Weakened integrated governance mechanisms.
36. Decreased influence of international conventions (including the Barcelona Convention). Poor compliance with agreements.
37. Lack of recognition of the specific nature of the Mediterranean in the implementation of European policies - particularly on the environment and climate.
38. Risk of the break-up and proliferation of states around the Mediterranean. Desire for regional autonomy. Increasing rejection of central authorities.
39. Emancipation of civil society and new urban elites in the South. Opposition to authoritarian regimes leading to internal conflicts.
40. Increasing division of the Mediterranean Sea into exclusive economic zones raises tensions.

3. DEMOGRAPHICS, MIGRATION, LOCATION OF POPULATIONS

41. Approximately 20% increase of the Mediterranean population by 2050.
42. Increase in the differences in demographic dynamics between the North (-5% by 2050) and the South and East (+ 30 to 40%).
43. Significant population decline in the Balkans.
44. Population growth in some countries leading to major problems related to unsustainable development (shortage of resources, food, environmental carrying capacity, etc.).

45. Transformation of family structures in the South and East, leading to a gradual shift from traditional extended families to nuclear families.
46. Significant acceleration of population ageing in the North. Changes in the age pyramid and increased ageing in the South and East as well, raising the problem of relations between generations. Risks and opportunities related to the growing number of seniors in society.
47. Chronic youth training and employment problems.
48. Increasing North-South and South-East migratory movements due to political instabilities, youth unemployment, climate, declining resources and social aspirations. Increasing difficulty in controlling illegal migration.
49. Concentration of populations and activities in coastal areas and deltas leading to increasing artificialisation and risks of vulnerability.
50. Significant loss of agricultural and natural land in coastal areas and increased conflicts related to water.
51. Expansion of sea and offshore claims near coasts.
52. End of the urban transition - including in the East and the South: urbanisation rates exceeding 70-80% in most countries. Technological and lifestyle changes (e.g., teleworking, distance learning) that may reverse urbanisation or even lead to population shifts from North to South in Europe.
53. Continued massive rural exodus in the South and East. Progressive marginalisation of the traditional rural world and its social structures, culture, and practices.
54. Strong attraction of large cities and declining fabric of medium-sized cities in the interior.
55. Uncontrollable rampant urbanisation and urban sprawl. Increasingly difficult to regulate tensions over land.

4. CLIMATE CHANGE AND GLOBAL WARMING

56. Overall increase in regional GHG emissions until 2050 despite a strong decrease in European Community member states.
57. Temperature increase by 2.5 degrees (1.3 in 2020) in 2050.
58. General increase in heatwaves and doubling of the number of days above 37 degrees (more than 60) from Spain to Turkey.
59. Sea level rise of around 50 cm in 2050 (25 cm in 2020) and increasing impacts on natural environments, populations, activities, etc.
60. Increased frequency of extreme weather events and flooding.
61. The majority of countries are under extreme water stress by 2030-2040. Doubling of drought periods.
62. Shift of activities to the coast and cities in the South and impacts on economic and human activities.
63. Priority given to adaptation policies, but problems in implementing them.
64. Significant seasonality of climate change impacts.

5. SEA AND COASTAL AREAS

65. Development of knowledge on the sea: observation techniques, 3D modelling, etc. so that it can be managed more sustainably. However, there are still major gaps (i.e. lack of global diagnostics).
66. Effects of accelerated climate change on the temperature of marine water masses and their distribution as well as on marine ecological balances at the surface.
67. Poorly anticipated growing impacts of sea level rise on coastal areas and islands: acceleration of erosion, damaging effects on port structures, infrastructure, habitat, natural areas.
68. Continued overfishing of endangered species despite the massive shift from sea fishing to aquaculture. General decline in marine biodiversity.
69. Increasing development of aquaculture (more than 50% of fish production) leading to growing ecological and health problems. Balance to be found with fishing and transition to be managed.
70. Jellyfish invasion and proliferation of invasive alien species.
71. Increasing use of the sea as a space for energy production.
72. Serious medium-term prospects for seabed mining and offshore expansion with their ecological impacts.
73. Increased plastics production before a potential peak between 2030 and 2040. Impacts on the Mediterranean from increased plastic pollution.
74. Continued marine pollution from spills, chemicals, heavy metals and endocrine disruptors.
75. Better control of air pollution from shipping. Increased sensitivity to air pollution and CO_2 emissions from ships.

76. Progressive cadastral mapping of the Mediterranean (surface and underwater) with increased territorialisation and appropriation of maritime resources for different uses (including protected areas). Potential for increasing conflict over the delineation and use of these spaces.
77. Inadequate maritime planning policies.
78. Development of important economic perspectives related to the blue economy, leading to debate about its long-term sustainability.

6. RENEWABLE RESOURCES (EXCLUDING ENERGY) AND LAND BIODIVERSITY

79. Accelerated land biodiversity loss.
80. Overall decline in per capita resources due to the demographic growth in some countries, due to their overexploitation and harsher climate conditions. Carrying capacity limits in a majority of Mediterranean areas will be reached, especially in coastal areas. Possibility of major disruptions.
81. Critical scarcity of water resources. Extreme water stress.
82. Decrease in forest biomass and increase in fires.
83. Loss of agricultural land.
84. Fewer carbon sinks.
85. Continued drying of wetlands.
86. The European Green Deal brings the environment to the centre of future development processes - with a paradigm shift (taking into account natural capital).
87. Increase in international biodiversity targets - e.g. 30% of land and marine biodiversity under long-term regulatory protection.
88. Advances in the green economy which could lead to a qualitative leap in the efficient use of resources.
89. Expected development of nature-based solutions and biomimetics.
90. Lack of governance on biodiversity issues.
91. New technological tools will increasingly change the perception of decision-makers with regard to measuring the impacts of their decisions.

7. ENVIRONMENT - EXCLUDING RESOURCES

92. Increased awareness of the cocktail and synergy effects of pollutants and exposed areas (cumulative impacts of pollutants on a given area).
93. Increasing attention on the effects of pollution on health.
94. Continued slow progress in monitoring river and stream quality.
95. Non-compliance with international air pollution standards in many Mediterranean cities.
96. Increased sensitivity of port populations to pollution from ships.
97. Persistent delays in the development of environmental infrastructure and services (water and waste treatment). Lack of funding and higher risks of corruption.
98. Poor knowledge of industrial risks, especially in ports.

8. ENERGY AND NON-RENEWABLE RESOURCES

99. Continued increase in energy demand despite some decoupling from population or activity growth.
100. Scarcity of fossil resources in the former oil- and gas-producing countries of the Mediterranean region and the impacts of the instability of global prices on producing and consuming countries.
101. New gas and oil drilling in the Eastern Mediterranean.
102. Completion of pipelines from Russia or the Middle East.
103. Unequal and intermittent access to energy in many countries due to a lack of infrastructure. Burden of import costs.
104. Slow continuation of the energy transition to carbon-free energies, with the target of 40% renewable energies by 2050. Gap between potential and actual use due to a lack of investment.
105. Development of offshore energies: wind, wave, tidal, offshore drilling - with profitability problems.
106. Transition to more decentralised energy (production and distribution networks).
107. Significant gap between the North, South and East of the Mediterranean in terms of the energy transition, with the East progressing more slowly with the replacement of fossil fuels.
108. Slow emergence of circular economy in some cities.

109. Possibility of synergies between conventional and renewable energy infrastructure.
110. Appeal to civil society to take responsibility for its energy consumption behaviour.
111. Increased investment in renewable energies in the South, particularly in solar energy.
112. Slow development of green technologies in the Mediterranean due to high costs and lack of services and infrastructure (e.g. electric cars with high purchase and maintenance costs and the need for specific technical expertise and skills).

9. ECONOMIC DEVELOPMENT

113. Greater integration of the Mediterranean economy into the global market with multiple extra-regional free trade agreements.
114. Relative de-globalisation of economies with intensified intra-Mediterranean trade and emphasis on local trade. New geographies of value chains and intra-regional industrial restructuring.
115. Share of Mediterranean countries in global trade remains low.
116. Continued constraints on development (at least until 2030) due to increasing debt, especially as a result of COVID 19.
117. Slowed growth for the majority of the Mediterranean economies compared to the last thirty years (1 to 2% in the North, 3 to 4% in the South) making it impossible to avoid mass unemployment in the South and the East, and social difficulties in the North. The Mediterranean is on the fringe of the major global growth hubs, with some exceptions (Israel, Turkey, etc.).
118. Continued low productivity and competitiveness and insufficient research and innovation - with some exceptions.
119. Potential collapse of some economies after the COVID 19 crisis.
120. Major role of the informal and underground economy (drugs, smuggling, human trafficking).
121. Digitalisation of economies and internet access hampered by a lack of infrastructure. The rise of remote working and digital services.
122. Insufficient growth to create enough jobs, especially in countries with high population growth, leading to massive youth unemployment and significant migration.
123. Mobility of human capital to meet the needs of the North and South. Skills exodus to the North and settlement of elderly people in the South which creates the need to develop sectors and services for the elderly in Mediterranean countries (e.g., nursing, healthcare for the elderly and residential care).
124. Economic growth continues to be accompanied by significant environmental degradation. No significant decoupling before 2030. Slow adoption of the circular economy model and sustainable consumption and production patterns.
125. Dominant growth models that continue without major change, leading to inequalities, exclusion and environmental impacts.
126. Progressive adaptation of the most dynamic Mediterranean economies to the greening of the global market (stricter standards, ecological products).
127. Outside of the international market, green economies broadly remain mere rhetoric in the Southern and Eastern Mediterranean.
128. Progressive growth of the blue economy linked to innovation in new economic models of consumption and production.
129. Emergence of new forms of local development or community solidarities. Grassroots development.
130. Unsustainable development in many countries due to resource scarcity, growing inequalities and political or financial instability.
131. Changes in the world of finance that encourage green growth and renewable energies and a decrease in investments in fossil fuels.
132. High youth unemployment, especially in the Southern and Eastern Mediterranean.

10. AGRICULTURE - FOOD

133. Changes in demand for agricultural products worldwide (vegetarianism, product quality, organic, etc.). Possible promotion of the Mediterranean diet. Higher health and environmental standards.
134. Growing food dependency in the South, especially for cereals.

135. More difficult production conditions (soil, water, climate, agricultural employment, etc.) which modify the competitiveness of exports and dependency on foreign markets.
136. Continued obstacles to the modernisation of agrarian structures.
137. Extreme competition for access to water in relation to other uses. Conflict on an inter-state scale, while access to resources (water, land, etc.) is becoming a major limiting factor for the sustainability of farms and agricultural models.
138. Decline in the share of agriculture in GDP.
139. Conflicts of interest between farmers and urban classes related to food autonomy and prices of agricultural products.
140. Emergence of new agricultural models that enhance the ecological contributions of agriculture (carbon sinks, landscapes, etc.). Agroforestry.
141. Strong development of aquaculture gradually replacing fishing and enabling a change in diets in the Mediterranean.

11. TRANSPORT AND TOURISM

142. Demand for transportation and mobility continues to grow within countries at a rapid rate.
143. Transport transition in Southern Mediterranean countries slower than in Northern Mediterranean countries - continued strong dependence on internal combustion vehicles.
144. Growth of transit traffic threatened in the long term (after 2030) by the decline in fossil fuel production (oil and gas from the Middle East).
145. Major uncertainties about the resumption of growth in air transport at previous levels following the COVID crisis and ecological constraints.
146. Continued growth in container transport with cyclical changes in maritime freight prices.
147. Persistent weakness of intra-Mediterranean land transport networks and dependence on aviation and maritime transport. Potential for developing cabotage.
148. Marginalisation of Mediterranean ports on a European or global scale, despite traffic growth.
149. Progressive shift of ports towards more sustainability.
150. Energy change in maritime transport (less pollution, new standards) and the trend towards using cleaner ships. Target of a 50% reduction in CO_2 emissions by 2050 from 2008 levels.
151. Continued increase in recreational boating.
152. Saturation of the cruise market.
153. Development of coastal tourism, which is picking up after the COVID crisis. Mass tourism continues to grow.
154. Increasing barriers to mass tourism. Awareness of its unsustainable nature ("too much tourism kills tourism") and impacts.
155. Local development of more sustainable and less concentrated forms of tourism. Tourism spread over the whole year. Development of new tourism models.
156. Emerging possibility of tracking pollution from transport, thanks to technological developments. Long-term possibility of banning the most polluting ships from ports, before switching completely to hydrogen by 2040-2050.

12. SOCIAL AND SOCIETAL CHANGES - VALUES - LIFESTYLES

157. Growing inequalities and continued high levels of poverty, even in the North.
158. Tendency for a narrowing divide between poor populations and elites. Weakened middle classes.
159. Divides between urban and rural areas - which have little involvement in development. Loss of small-scale farming.
160. Gradually closing gaps between cities and the countryside (access to housing, education, services, etc.).
161. Rapid change to family structures and increasing complexity of life paths (single parenthood, refocus on nuclear families, etc.).
162. Ageing societies and impacts on the work-retirement balance. Growing market for goods and services for seniors (including in the health sector).
163. Tensions or solidarities between generations and demands from young people in a context of ageing.
164. Divides that prevent the inclusion of young people in society (employment, education) as a result of inadequate economic or educational strategies.

165. Increased representation of women in all sectors of society, more notably in urban settings.
166. Changing values related to urbanisation, education, and digital technology hindered by economic conditions and social inequalities. Slow progress towards "intangible" values.
167. Increasing dominance of individualistic values in cities.
168. Continued rise of religious and identity-based values.
169. Ongoing process of discussion on the role and status of religion in many countries. Waning radicalism and cultural modernisation.
170. Societies fractured into archipelagos and communities. Trend towards social disintegration at a country level.
171. Massive development of knowledge and information as a vector of social change and emancipation.
172. Ideological divide between "technophiles" and "degrowth supporters".
173. Massive impact of digital technology on lifestyles and activities.
174. Very slow change in interest for the environment linked to economic difficulties in a long-term context of increased ecological emergencies.
175. Pressure for more restrained and efficient use of resources.
176. Increase in sedentary lifestyles, obesity and nutritional deficiencies.
177. There are still very few urban dwellers who are adopting new lifestyles adapted to climate change and concerns about health and nature. Strong North-South, rural-urban, rich-poor differences.
178. Development of civil societies and self-organisation capacities.
179. Challenge to the monopoly of experts and emergence of participatory science.
180. Increased demand for participation in decision-making in all institutions (families, businesses, governments, etc.).

13. POLICIES AND INSTITUTIONS

181. Dual shift on a global scale in favour of democratisation and authoritarianism. Impact on Mediterranean countries.
182. Growing political instability in many countries.
183. Reduced room for manoeuvre due to increased debt.
184. Major governance problems (weak institutions, poor public governance, lack of democracy, corruption, etc.).
185. Poor application of the law (e.g. spatial planning or Law of the Sea).
186. Increased political violence due to ineffective democracy and inequalities.
187. Emergence of civil society and strong demand for democratic participation of citizens in political life and decision-making.
188. Gaps remain in the participation of marginalised groups (based on gender, age, race, class), with low representation of these groups in decision-making bodies.
189. Increased role of decentralised authorities and territories.
190. Continued limited importance of the environment in the political agenda and national budgets.
191. Permanent gap between "strategic" environmental commitments and their actual implementation on the ground.
192. Poor evaluation and planning tools for public policies.
193. General lack of coherence in public action, and "siloing" of policies by institutions.
194. Increased multi-stakeholder governance, based on public-private partnerships.
195. Impact of the rise of voices from under-represented groups (e.g. women, gender minorities, LGBTQIA+ community, immigrants, people of colour, living with disabilities etc.).

Once this list was finalised, the Plan Bleu coordinating team submitted another **questionnaire** to the members of the MED 2050 foresight group and to the Plan Bleu experts in November 2020. The questionnaire was sent to 48 people, and 20 responded.

This questionnaire asked respondents to **comment on two points:**

- Agreeing or disagreeing with the major trend (with seven different levels of agreement);
- On the importance of the trend for the future for the Mediterranean basin.

2. 2/ Agreement or disagreement on the different trends

Seven different levels of agreement were given:

The responses to this questionnaire were processed by the Plan Bleu coordinating team using a Régnier Abacus, a visual tool consisting of a grid of coloured boxes for quicker and more efficient visualisation of responses. This tool is used to identify the broad consensus and divergence in the degree of agreement with the major trends.

a) Consensus on the trends

The trends with **strong consensus** are as follows (a percentage greater than or equal to 70% of respondents either "strongly agree" or "generally agree", and at least 40% of respondents "strongly agree" with the trend):

Table 8. Trends with a strong consensus

T1 - Global acceleration of climate change and biodiversity loss. **T50** - Significant loss of agricultural and natural land in coastal areas and increased conflicts related to water. **T132** - High youth unemployment, especially in the Southern and Eastern Mediterranean. **T28** - The three issues of fragmentation, inequality and migration continue to be interconnected. **T49** - Concentration of populations and activities in coastal areas and deltas leading to increasing built up areas and risks of vulnerability. **T13** - Rise in inequalities between countries with wealth concentrated in a small minority of them - Increase in the number of "failed" states. **T67** - Poorly anticipated growing impacts of sea level rise on coastal areas and islands: acceleration of erosion, damaging effects on port structures, infrastructure, habitat, natural areas. **T60** - Increased frequency of extreme weather events and flooding. **T193** - General lack of coherence in public action, and “siloing” of policies by institutions. **T79** - Accelerated land biodiversity loss. **T137** - Extreme competition for access to water in relation to other uses. Conflict on an inter-state scale, while access to resources (water, land, etc.) is becoming a major limiting factor for the sustainability of farms and agricultural models.	

T14 - Concentration of capital ownership (particularly to the advantage of digital players) and Big Tech control of global/information flows and networks.

T81 - Critical scarcity of water resources. Extreme water stress.

T184 - Major governance problems (weak institutions, poor public governance, lack of democracy, corruption, etc.).

T90 - Lack of governance on biodiversity issues.

T99 - Continued increase in energy demand despite some decoupling from population or activity growth.

T66 - Effects of accelerated climate change on the temperature of marine water masses and their distribution as well as on marine ecological balances at the surface.

T57 - Temperature increase in 2050 close to 2.5 degrees (1.3 in 2020).

T162 - Ageing societies and impacts on the work-retirement balance. Growing market for goods and services for seniors (including in the health sector).

T80 - Overall decline in per capita resources due to the demographic growth in some countries, overexploitation and harsher climate conditions. Carrying capacity limits in a majority of Mediterranean areas will be reached, especially in coastal areas. Possibility of major disruptions.

T61 - The majority of countries under extreme water stress by 2030-2040. Doubling of drought periods.

T185 - Poor application of the law (e.g. spatial planning or Law of the Sea).

T44 - Population growth in some countries leading to major problems related to unsustainable development (shortage of resources, food, environmental carrying capacity, etc.).

T83 - Loss of agricultural land.

T124 - Economic growth continues to be accompanied by significant environmental degradation. No significant decoupling before 2030. Slow adoption of the circular economy model and sustainable consumption and production patterns.

T6 - Growing investment of finance and international financial or development aid organisations in the ecological and energy transition.

T192 - Poor evaluation and planning tools for public policies.

T59 - Sea level rise of around 50 cm in 2050 (25 cm in 2020) and increasing impacts on natural environments, populations, activities, etc.

T68 - Continued overfishing of endangered species despite the massive shift from sea fishing to aquaculture. General decline in marine biodiversity.

T55 - Rampant urbanisation and urban sprawl. Increasingly difficult to regulate tensions over land.

T134 - Growing food dependency in the South, especially for cereals.

T164 - Divides that prevent the inclusion of young people in society (employment, education) as a result of inadequate economic or educational strategies.

Among the around 30 trends with **strong consensus**, four subsets stand out. First, those related to climate change and its impacts (sea level rise, droughts, extreme events, etc.), which alone account for a quarter of the statements. Then the pressures of all kinds on coastal areas, linked to urban concentration and poorly controlled activities in these areas - with impacts on the disappearance of land resources for agriculture and increasing

exposure to climate risks. There is then a third category relating more generally to resource scarcity, linked in part to demographics - first water resources, followed by land resources and biodiversity (including the effects of overfishing). Finally, and probably more surprising, are the problems related to a lack governance which represent more than 20% of the trends cited - the compartmentalisation of policies into silos, failure to apply the law (including of international law), lack of policy planning and evaluation, the weakness of institutions or their lack of democracy, etc.

In addition, there are more isolated but equally important trends - mainly concerning social and economic issues. Firstly, youth unemployment and growing inequalities, linked both to increasing gaps between the North and South and the concentration of income and wealth within each country. Also cited are the growing food dependency of Mediterranean countries, particularly in the Southern and Eastern Mediterranean, ageing societies, the growing investment of finance and international aid in the ecological or energy transition, and the difficulties in reducing energy demand or decoupling growth and resource use. There is very strong consensus on all these subjects.

b) Disagreement on the trends

In contrast to these consensus trends are those that generated **significant disagreement or dissensus** (defined as a percentage greater than or equal to 60% of respondents who either "somewhat agreed", "neither agreed nor disagreed", "disagreed", "strongly disagreed", or did not give an answer):

Table 9. Trends where there is significant dissensus

T145 - Major uncertainties about the resumption of growth in air transport at previous levels following the COVID crisis and ecological constraints.	
T26 - Rise of new informal institutions and "common identity" groups linked to the digital society (e.g. Anonymous, Qanon)	
T38 - Risk of the break-up and proliferation of states around the Mediterranean. Desire for regional autonomy. Increasing rejection of central authorities.	
T138 - Decline in the share of agriculture in GDP.	
T170 - Societies fractured into archipelagos and communities. Trend towards social disintegration at a country level.	
T136 - Continued obstacles to the modernisation of agrarian structures.	
T91 - New technological tools will increasingly change the perception of decision-makers with regard to measuring the impacts of their decisions.	
T148 - Marginalisation of Mediterranean ports on a European or global scale, despite traffic growth.	
T154 - Increasing barriers to mass tourism. Awareness of its unsustainable nature ("too much tourism kills tourism") and impacts.	
T131 - Changes in the world of finance that encourage green growth and renewable energies and a decrease in investments in fossil fuels.	
T128 - Progressive growth of the blue economy linked to innovation in new economic models of consumption and production.	
T40 - Increasing division of the Mediterranean Sea into exclusive economic zones raises tensions.	
T151 - Continued increase in recreational boating.	
T11 - Isolationism of the United States.	
T113 - Greater integration of the Mediterranean economy into the global market with multiple extra-regional free trade agreements.	

T139 - Conflicts of interest between farmers and urban classes related to food autonomy and prices of agricultural products.

T114 - Relative de-globalisation of economies with intensified intra-Mediterranean trade and emphasis on local trade. New geographies of value chains and intra-regional industrial restructuring.

T174 - Very slow change in interest for the environment linked to economic difficulties in a long-term context of increased ecological emergencies.

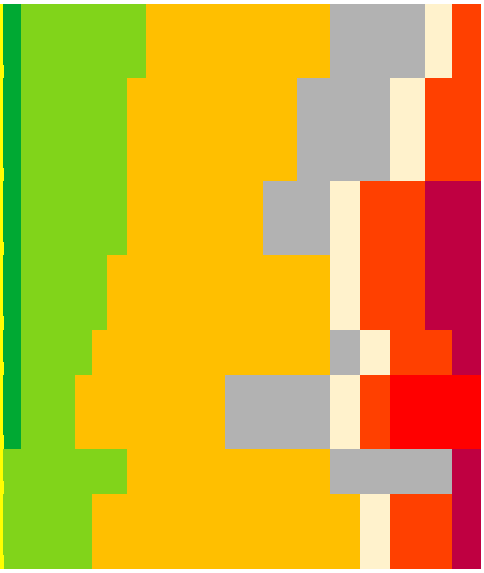
T160 - Gradually closing gaps between cities and the countryside (access to housing, education, services, etc.).

T119 - Potential collapse of some economies after the COVID crisis.

T169 - Ongoing process of discussion on the role and status of religion in many countries. Waning radicalism and cultural modernisation.

T43 - Significant population decline in the Balkans.

T180 - Increased demand for participation in decision-making in all institutions (families, businesses, governments, etc.).



While there is a strong consensus on environmental developments - such as on governance issues or on the persistence of chronic imbalances in development and employment (especially for young people) - there are significant disagreements in other areas, such as the future prospects of a number of economic activities, including those related to the green or blue economy, geopolitical trends and cultural or social changes. In economic matters, there is no clear-cut position on a large number of issues: the impacts of COVID, the decrease in mass tourism and air transport, the marginalisation of Mediterranean ports, de-globalisation and the relocation of industries, the rise of the blue economy, the rate at which new technologies will be integrated into the management of living land and sea resources. There are also disagreements about changes to agriculture and the goal of food self-sufficiency - given the possible conflicts of interest between rural and urban people, the rate of urbanisation and environmental changes. In geopolitical matters in the broad sense, different positions are also expressed on keeping an American presence in the Mediterranean, changes in the Balkans (in connection with demographics), the public or private appropriation of the sea ("fragmentation" of the Mediterranean), and the possible break-up of states. Finally, there is little consensus on a few global and domestic social and cultural changes - the risks of social disintegration, the change in religious sentiment, and environmental awareness. It is clear that on many issues of great importance for the future, the experts are either in strong disagreement with each other or do not have a clear-cut opinion.

3. Ranking the trends

The trends were ranked based on the results of the questionnaire submitted to the members of the foresight group on the importance of the trend for the future of the Mediterranean Basin. Respondents had 3 options:

The trend is decisive for the future of the Mediterranean Basin.

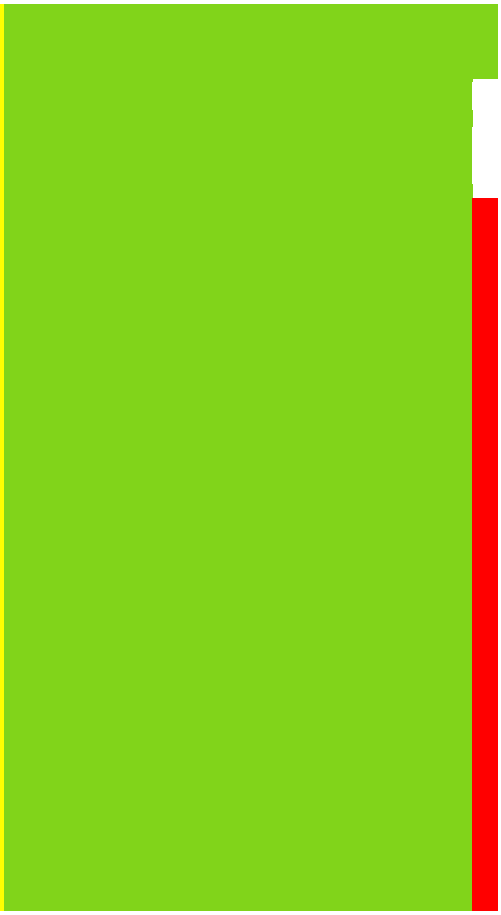
The trend is not decisive for the future of the Mediterranean Basin.

Don't know.

a) The most decisive trends for the future

The **most decisive trends for the future of the Mediterranean Basin**, according to the respondents, are as follows (at least 90% of the respondents considered these trends as decisive for the future of the Mediterranean Basin):

Table 10. Trends considered most decisive for the future of the Mediterranean basin

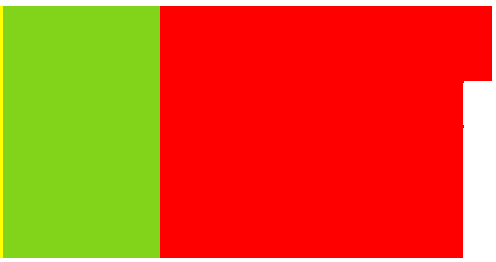
T49 - Concentration of populations and activities in coastal areas and deltas leading to increasing artificialisation and risks of vulnerability.	
T81 - Critical scarcity of water resources. Extreme water stress.	
T184 - Major governance problems (weak institutions, poor public governance, lack of democracy, corruption, etc.).	
T1 - Global acceleration of climate change and biodiversity loss.	
T4 - Continued general trend towards globalisation and liberalisation. Intensification of trade in goods, capital, skills, information, tourism and acceleration of migration (linked, in particular, to climate).	
T17 - Increased conflicts related to access to scarce resources, nationalism, or as a means to resolve internal problems.	
T12 - Doubling of Africa's population by 2050 and its increasing integration into the global economy.	
T13 - Rise in inequalities between countries with wealth concentrated in a small minority of them - Increase in the number of "failed" States.	
T42 - Increase in the differences in demographic dynamics between the North (-5% by 2050) and the South and East (+ 30 to 40%).	
T50 - Significant loss of agricultural and natural land in coastal areas and increased conflicts related to water.	
T57 - Temperature increase in 2050 close to 2.5 degrees (1.3 in 2020).	
T61 - The majority of countries under extreme water stress by 2030-2040. Doubling of drought periods.	
T63 - Priority given to adaptation policies, but problems in implementing them.	

In this ranking of the most important trends (considered as decisive), four garnered the most consensus - climate change and its impacts, including political impacts (shift towards adaptation policies) - with its impacts in the area of water, governance problems, the concentration of activities in coastal areas and the increase in inequalities. Two demographic trends can be added: the increase in demographic imbalances between the North and South of the Mediterranean and the population growth of the African continent. Finally, the continuation of economic globalisation and its impacts, with a shift of economic power to Asia. All of these trends will be further analysed in the course of the project.

b) The least decisive trends for the future

The **least decisive trends for the future of the Mediterranean Basin**, according to the respondents, are as follows (at least 60% of the respondents considered these trends as not decisive for the future of the Mediterranean Basin):

Table 11. Trends considered the least decisive for the future of the Mediterranean basin

T26 - Rise of new informal institutions and "common identity" groups linked to the digital society (e.g. Anonymous, Qanon).	
T96 - Increased sensitivity of port populations to pollution from ships.	
T112 - Slow development of green technologies in the Mediterranean due to high costs and lack of services and infrastructure (e.g. electric cars with high purchase and maintenance costs and the need for specific technical expertise and skills).	

T143 - Transport transition in Southern Mediterranean countries - strong dependence slower than in Northern Mediterranean countries - continued strong dependence on internal combustion vehicles.

T146 - Continued growth in container transport with cyclical changes in freight prices.

T151 - Continued increase in recreational boating.

T176 - Increase in sedentary lifestyles, obesity and nutritional deficiencies.

T10 - Rise of new centres of power linked to resources (e.g. ownership of rare-earth elements - China, Latin America, etc.).

T21 - Replacement of institutional cooperation mechanisms (UN, public development aid, etc.) with private players (such as the Bill Gates Foundation) or international civil society (large NGOs).

T23 - Risks of states breaking up (Great Britain, Spain, etc.) and tendencies towards weakened centralised governments.

T38 - Risk of the break-up and proliferation of states around the Mediterranean. Desire for regional autonomy. Increasing rejection of central authorities.

T84 - Fewer carbon sinks.

T98 - Poor knowledge of industrial risks, especially in ports.

T109 - Possibility of synergies between conventional and renewable energy infrastructure.

T161 - Rapid change to family structures and increasing complexity of life paths (single parenthood, refocus on the nuclear family, etc.).

T167 - Increasing dominance of individualistic values in cities.

T179 - Challenge to the monopoly of experts and emergence of participatory science.

T172 - Ideological divide between "technophiles" and "degrowth supporters".

T45 - Transformation of family structures in the South and East, leading to a gradual shift from traditional extended families to nuclear families.

T43 - Significant population decline in the Balkans.

In contrast with the previous trends considered as decisive for the future, such as climate, demographics, governance or globalisation, the list of trends considered to be the least decisive concerns much more specific or sectoral changes such as the increase in recreational boating, the increase of sedentary lifestyles and the impacts on obesity, the sensitivity of port populations to pollution from ships, or contestations of experts. They operate on a different scale, which does not mean that they should be ignored.

C. DISRUPTIONS

In September 2020, the experts of the MED 2050 foresight group were asked to reflect on **disruptions** likely to affect the future of the Mediterranean Basin by 2050.

The Plan Bleu team submitted a **questionnaire** to the members of the foresight group and to the Plan Bleu experts, giving the respondents the opportunity to **propose several disruptions that they believe could impact the future of the Mediterranean region by 2050**. The questionnaire was sent to 48 people, and 25 responded.

> A disruption can be defined as a sudden or progressive phenomenon affecting a dimension or a factor of evolution of the studied system and which can make it change more or less quickly (new regulation, conflicts,...).

From the responses collected, **a list of 159 disruptions, divided into 13 categories, was jointly established**. This list contributes to the foresight base, and has served as a framework document for the reflections on the factsheets. The complete list of disruptions is as follows:

1. Full list of disruptions

Box 4. List of 159 disruptions broken down by category, after the first survey of the foresight group

1. GLOBAL CONTEXT

1. Systematic international deregulation. Fresh wave of neoliberalism.
2. Isolationism, massive protectionism and collapse of the WTO system.
3. De-globalization and reconfiguration of value chains around local trade. New economic opportunities at the regional level.
4. “Invasive” Silk Roads. The Mediterranean, China's gateway to Europe.
5. Global political recognition of Europe as a model for sustainable development.
6. End of the European Union in its current configuration. Dislocation.
7. Failure of the European Green Deal.
8. Integration of Turkey and the Balkans into the European Union.
9. Emergence of Africa as a major economic centre and coupling of the Mediterranean to Africa.
10. Hegemonic influence of China in Africa and particularly in North Africa: Tangier, Mers el Kebir, Bizerte, Tripoli, Port Said: new Chinese naval bases.
11. New maritime routes (Arctic Northeast Passage) which marginalise the Mediterranean.
12. Health crises (pandemics, etc.) or security crises (terrorism) that permanently restrict business and mobility on a global scale.
13. Conversion of oil companies. Rapid transition to renewable energy.

2. GEOPOLITICS ON A MEDITERRANEAN (AND EUROPEAN) SCALE

14. Major crisis in the Eastern Mediterranean - with risks of new conflicts or wars.
15. Irreversible differences in Mediterranean interests, increasing fragmentation or partition into two East-West blocs.
16. Isolationism of Southern Mediterranean societies. Closure of North-South trade.
17. Increased economic integration between Europe and the Mediterranean with extensions into Africa. Transition from neighbourhood policies to a Mediterranean common market.
18. North-South disparities perceived as unbearable.
19. Strengthened regional governance and regional conflicts ended (Libya, Lebanon, etc.).
20. Positive regional trade or resource agreements.
21. Strong Mediterranean political and technological cooperation on climate. The Mediterranean is exemplary.
22. Questioning or abandonment of the Barcelona Convention.
23. Israel-Palestine agreement that is effective enough to ward off prospects of war and terrorism.
24. End of the Arab Spring and acceleration of the shift towards authoritarian regimes.
25. Second wave of the Arab Spring with some success stories, thanks to the emergence of new economic models and efficient democratic processes.
26. Increasing interference from major international players (China, Russia, etc.).

3. DEMOGRAPHY, MIGRATION, URBANISATION, SETTLEMENT

27. Faster than expected decline in fertility where it remains high.
28. Potential periods of "migratory chaos". Social or economic disruptions linked to the massive influx of displaced persons, which may or may not be linked to climate change.
29. Sudden acceleration of the rural exodus to cities and the coast due to climate change.
30. Redevelopment of rural areas and medium-sized towns. Urban exodus due to poverty or environmental deterioration in cities. The rapid development of remote working.
31. Secure and easier access to land, especially for young people and women.
32. Effectively implemented land planning.
33. Total cadastral mapping of the sea so that there is no longer any "high sea" (but international routes are maintained).
34. Exile of the ultra-rich to autonomous floating cities on the high seas under international status.
35. Unanticipated increase in mortality, related to living conditions, the environment, addictions, epidemics or decreased drugs effectiveness.

4. CLIMATE CHANGE

36. Much faster acceleration of climate change than expected (+ 2 degrees before 2050). First impacts of sea level rise and disruption to major ocean currents.
37. Very frequent extreme events creating major social, economic and political instabilities or disturbances.
38. Increasingly frequent lethal temperatures.
39. Mega fires (e.g. Australia).
40. Massive flooding.
41. Much more rapid expansion of deserts and periods of drought.
42. Growing awareness among young people of climate change - including in the South.
43. Development of new technologies or practices to improve adaptation and resilience.
44. Geoengineering of technical solutions that could reduce greenhouse gases.

5. SEA

45. Unilateral extension of exclusive economic zones.
46. Regional management of the Mediterranean.
47. Private appropriation of maritime spaces.
48. New status for common zones. New legal status for the Mediterranean Sea.
49. Political agreement on offshore fossil fuel extraction rights.
50. Moratorium on offshore fossil fuel extraction activities.
51. Large-scale deep-sea mining.
52. Uncontrolled invasive species.
53. "Explosion" of toxic algae, especially in the Eastern Mediterranean.
54. "Plastic peak" in 2030.
55. Radical decrease in gas and oil transport after 2030 due to climate constraints.
56. Disappearance of emblematic species.
57. Overall collapse of marine biodiversity in the Mediterranean.
58. Collapse of fish stocks.
59. Almost complete replacement of fishing with aquaculture by 2050.
60. Scarcity of spaces suitable for aquaculture and strong ecological or health constraints limiting its development.
61. Irreversible change in marine and coastal areas under the influence of climate and resource extraction.
62. Rebuilding of fish stocks in the Mediterranean Sea by 2050 through sustainable fisheries management.
63. Increased frequency of major accidents at sea and impacts on habitats.
64. Establishment of networks of marine protected areas of Mediterranean importance beyond the objectives of the CBD and throughout the Mediterranean Basin.
65. Major transformation of the Mediterranean marine ecosystem linked to climate. In particular, disruptions in the regulation of the upper and lower layers and currents of the Mediterranean (MED mega-ecosystem).
66. Nutrient inputs at sea lead to the massive proliferation of jellyfish and plankton, making certain human activities impossible (swimming in the sea, aquaculture) in certain places.

6. ENVIRONMENT AND ENVIRONMENTAL POLICIES

67. Domino effects from the various economic, environmental and health crises. Local collapses due to system effects. Systemic risks.
68. Irreversible asphyxiation of the Mediterranean Sea due to the accumulation of pollution from plastic, marine and municipal waste.
69. New forms of pollution or environmental damage, particularly linked to new technologies (accumulative effects of multiple contaminants, wind turbines, digital technologies, etc.).
70. Increased awareness of the watershed-coastal area-sea continuum and coordinated and planned watershed management.
71. Fewer obstacles to the use of economic instruments for environmental protection (taxes, enforcement of the polluter-pays principle, compensation for ecosystem services, etc.). Extension of environmental taxation (including carbon taxes).
72. Awareness of the need to protect beaches and lagoons for biodiversity management.
73. Implementation of socially just environmental transition policies in Southern and Eastern Mediterranean countries.
74. Mothballing of environmental law for economic and social reasons.

7. ECONOMY AND TECHNOLOGY

75. Economic collapse of some countries due to debt, insecurity, decline in tourism or fossil fuels, etc.
76. Global economic collapse destabilising all Mediterranean countries.
77. Large-scale arrival of Industry 4.0 (artificial intelligence, robotics, biotechnologies, Internet of things, etc.) in the Mediterranean.
78. Establishment of a common space for sharing patents and technologies between the North and South of the Mediterranean.
79. Increasing consumption and demand for natural resources, which is gradually encountering limits in terms of the planet's carrying capacity, leading to the emergence of more responsible models. Awareness of global and local limits.
80. Change in value chains favouring local trade and local production.
81. Economic revival of the Mediterranean linked to digital technologies, solar power, the blue economy, the agri-food transition and the emergence of the African economy.
82. Innovations and new economic and ecological models for sustainable development of the blue economy.
83. Strong growth in economic activities linked to the environment and climate change mitigation, and incorporation of ecological criteria into development strategies.
84. Strong growth in the Eastern Mediterranean thanks to oil and gas, regional financing (Middle East) and the new silk roads. Massive reconstruction plan for Syria and Lebanon.
85. Abandonment of GDP as the main macroeconomic indicator.
86. Inclusion of natural and human capital in national accounting.

8. ENERGY AND RAW MATERIALS

87. Important discovery of oil and gas reserves in the Eastern Mediterranean (onshore and offshore) and much faster extraction of these new resources.
88. Reduced fossil fuel use and lower prices due to climate policies. Difficulties for oil-producing countries.
89. Development of energy interconnections between Europe and the Mediterranean and opening of the European renewable energy market.
90. New Russia - Middle East - Mediterranean pipelines modifying oil and gas shipping in the Mediterranean.
91. Development of hydrogen and other energy storage and transport options.
92. Innovations enabling much faster and less expensive development of renewable and carbon-free technologies (including electric vehicles, carbon-free aircraft, solar power, etc.).
93. Elimination of fossil fuel subsidies and high carbon tax, including on imports.
94. International financing of large investments in solar and wind power.
95. Massive international investments in offshore and onshore renewable energies.

96. Development of an area of highly controlled maritime emissions and related impacts (propulsion systems, port infrastructure, etc.).

9. AGRICULTURE AND FOOD

97. New technologies or infrastructure to reduce water stress.
98. Periodic surge in agricultural prices due to climate change and commodity market pressures.
99. Decrease in the quantities available on the global agricultural products market leading to food crises and significant price fluctuations or increases.
100. Solvency and financial viability issues to meet the rapidly growing needs for agricultural goods.
101. Technological changes that facilitate the transition to more sustainable agricultural models (soil and waterless crops, etc.).
102. Massive change in agricultural production and distribution systems: agroforestry, permaculture, short food supply chains, etc.
103. Adoption of new regional diets.
104. Peak meat consumption in 2025.
105. Rural exodus massively decreasing farmed land. Massive abandonment of farmland.
106. Massive development of brackish water aquaculture in land-based ponds in large deltas salinized by rising sea levels and declining freshwater supplies.
107. Closed loop water recycling.

10. TRANSPORT - TOURISM

108. Peak in aviation and international tourism in 2020 (post COVID).
109. Questioning of the current global tourism model. Mutation of mass tourism into more qualitative tourism based on a range of different activities (culture, heritage, nature, etc.) and on domestic tourism.
110. New international transport routes (Arctic, etc.) marginalising transit via the Mediterranean.
111. Logistics revolution linked, in particular, to digital technology.
112. Sudden de-globalisation and regionalisation of maritime flows - End of hubs... Re-regionalisation of traffic (increase in cabotage, etc.).
113. Major infrastructure projects (Morocco-Spain tunnel, new widening of the Suez Canal, trans-Balkan speed train, etc.).

11. SOCIETIES - VALUES - LIFESTYLES

114. Internal revolts or massive migration due to the despair of young people (new waves of revolutions in Arab countries).
115. Disintegration, breakdown of community-based societies, loss of identity, instability of religious sentiment.
116. General rise of religious fundamentalism.
117. Rise of radical Islam in all Mediterranean countries.
118. Widespread rise of social violence.
119. Major crisis of school and university systems and progressive disconnection from the education-success model.
120. Ethical or ecological "communitarianism".
121. Rise of racism, communitarianism and nationalism.
122. Empowerment and increasing role of women.
123. Much greater awareness of the environment among the general public, especially among young people, and pressure on policymakers to act.
124. Dissemination of information via social networks, replacement of centralised communication channels (press, TV, radio, etc.) with networks, and the internet, with a strong impact on values, behaviour and perceptions.
125. Growing demands for more equality and better distribution of wealth.
126. Greater structuring of civil societies. Major development of civil societies, including in the Southern Mediterranean, giving them a major role in public decision-making.
127. Even more intrusive and manipulative Big Tech, with relativisation of scientific discourse.
128. Rise of charlatanism and conspiracy theories. Significant erosion of rationality.

12. POLICIES AND INSTITUTIONS

129. Emergence of new leadership (e.g. more or less totalitarian hybrid states-Big Tech).
130. Rapid urbanisation of values that promote democracy, reduce corruption and resolve conflicts peacefully.
131. Rise in demands favoured by structuring of civil society.
132. Increased involvement of civil society in governance processes.
133. Strengthening of the rule of law and extensive democratisation in Eastern and Southern Mediterranean countries.
134. De-siloing and better synergy between public policy fields. More cross-cutting approaches, less siloed policies.
135. Loss of trust in the political elites. Crisis of democracy.
136. A series of crises leading to the collapse of certain political systems and institutions. Political collapses.
137. Chronic political instability. Continuation of revolutions in Arab countries, new destabilisation of existing regimes and cycles of revolt and authoritarianism.
138. Growing regional demands. Internal break-up of Mediterranean states.
139. Increasing difficulty of states to contain pressure from lobbies, creating a major hindrance to transition policies.
140. Resurgence of the State in regulating the economy and as a player in production (national companies). Increasing intervention, return to indicative planning.
141. Privatisation of entire public policy sectors, including environmental (NGOs) and social (religious groups) sectors, and not just the economic sector (water, energy, transportation, food, etc.).

13. CRISES AND RESILIENCE

142. Succession of major ecological crises with cascading effects on socio-economic and political systems.
143. Major climate crisis before 2050.
144. New pandemics and health crises.
145. New wars bordering the Mediterranean region with major and lasting impacts on the whole region. More frequent civil wars and internal revolutions.
146. Major migration crises accelerated by climate change.
147. Massacre and internment of migrants from the South.
148. Chronic food insecurity in Southern and Eastern Mediterranean countries.
149. Water crises and wars.
150. Regional economic collapses causing unemployment and mass migration.
151. Massive population displacements within countries due to climate.
152. Rapid implementation of crisis prevention and adaptation policies in each country.
153. Collective mechanism for crisis prevention and management in the Mediterranean. Organised solidarity between countries.
154. Public policies focused on resilience (see the framework recently defined by Europe).
155. Reconstruction plans for affected countries.
156. Self-organisation of civil societies to develop resilience.
157. General development - including among the population - of a culture of major risks and disaster prevention and management.
158. Increased competition for access to maritime resources and associated crises.
159. Massive financial crises and new financial bubbles.

2. Ranking the disruptions

Once this list of disruptions was finalised, the coordinating team submitted another **questionnaire** to the members of the MED 2050 foresight group and to the Plan Bleu experts. The questionnaire asked respondents to give their opinion on the following:

- The likelihood that the disruption will occur, with 3 possible options:

"The disruption is...
1. ... unlikely or very unlikely";
2. ... possible.";

3. ... very likely."

- The impact that the disruption could have on the future of the Mediterranean region, should the disruption occur, again, with 3 possible options:

"If it occurs, the disruption...

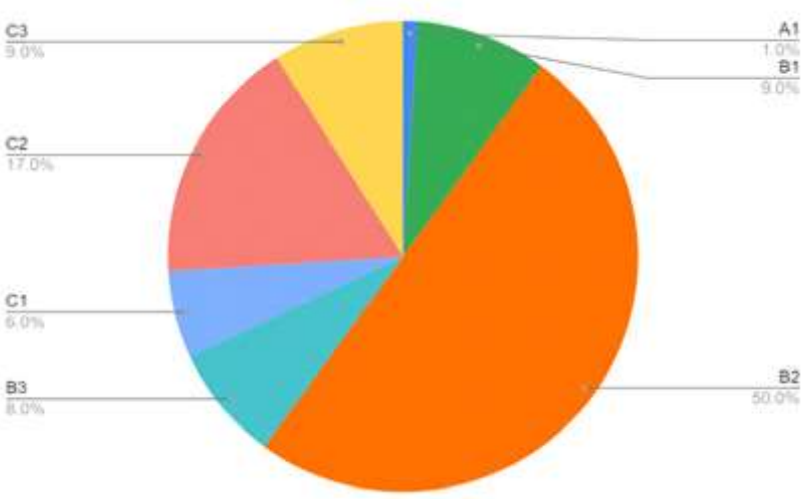
A. ... will have a moderate impact."
B. ... will have very significant (positive or negative) impacts for certain countries, sectors, social groups or ecosystems";
C. ... is likely to radically change the course or situation of the entire Mediterranean region by 2050."

In total, 9 "likelihood-impact combinations" from the responses were possible: 1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C. To place each disruption in the 9 categories, the project team looked at the most featured combinations in the responses.

Table 12. Ranking of disruptions according to their impact and probability (refer to the list of disruptions to identify the corresponding disruption).

Impact / Probability	A	B	C
1	34;84;102	1;16;23;31;32;44;47;50;85;94;111; 137;144;154	6;8;22;54;76;110;113;115; 145
2		4;5;7;10;11;15;17;19;20;21;24;27;30;35;39;40;43;45; 46;49;51;55;59;60;62;63;66;67;69;70;71;72;73;74;77; 79;81;82;83;86;87;88;89;90;91;93;96;100;101;103; 104;105;106;107;108;109;117;119;121;125;127;128; 129;130;131;134;135;136;139;141;142;147;148;150; 151;152;153;157;158	2;3;9;14;25;33;48;53;57;58;61;64;68; 75;80;92;95;99;116;118;132;133;138; 140;149;156; 159
3		13;18;26;38;42;56;97;98;120; 122;123;124	12;28;29;36;37;41;52;65;78;112;114; 126;143;146;155

Graph 1. Distribution of disruptions probability/impact combinations, according to the respondents



3. General remarks on the disruptions ranking (Table 12)

- A large proportion of the disruptions (50%) are classified in category 2B: disruptions considered possible and which, if they occur, will have significant impacts on the development of the region.
- Very few disruptions were considered to have a moderate impact on the future of the region (category A, 1%).
- 32% of the disruptions are considered by the respondents to have a significant impact on the future of the Mediterranean region (category C).

The latter category deserves more detailed analysis, particularly for two specific groups of particularly important disruptions: those that are unlikely but could cause major disruption if they occur, and those that are highly likely and would also have major impacts.

a) The disruptions considered by the majority of the respondents as unlikely or very unlikely, but which, if they occur, would radically modify the course or situation of the entire Mediterranean region by 2050, are as follows:

Table 13. Disruptions considered as unlikely or very unlikely but which, if they occur, will radically modify the whole Mediterranean basin by 2050

6	End of the European Union in its current configuration. Dislocation.
8	Integration of Turkey and the Balkans into the European Union.
22	Questioning or abandonment of the Barcelona Convention.
54	Plastic peak" in 2030.
76	Global economic collapse destabilising all Mediterranean countries.
110	New international transport routes (Arctic, etc.) marginalising transit through the Mediterranean.
113	Major infrastructure projects (Morocco-Spain tunnel, new widening of the Suez Canal, trans-Balkan speed train, etc.).
115	Disintegration, breakdown of community-based societies, loss of identity, collapse of religious sentiment.
145	New wars bordering the Mediterranean region with major and lasting impacts on this area.

Three main categories of disruptions fall into this first group: firstly, major geopolitical disruptions, including those linked to wars on the periphery of the Mediterranean area, to the dislocation of the European Union or to the questioning of the Barcelona Convention; secondly, major changes in infrastructures or transport routes; and thirdly, economic or social disruptions linked to major economic crises or a dislocation of Mediterranean societies.

b) The disruptions considered by the majority of respondents **as very likely, and which, if they occur**, would radically modify the course or the situation of the entire Mediterranean region by 2050, are as follows:

Table 14. Disruptions considered as very likely, and which, if they occur, will radically modify the whole Mediterranean basin by 2050

12	Health crises (pandemics, etc.) or security crises (terrorism) that permanently restrict business and mobility on a global scale.
28	Potential periods of "migratory chaos". Social or economic disruptions linked to the massive influx of displaced persons, which may or may not be linked to climate.
29	Sudden acceleration of the rural exodus to cities and the coast due to climate change.

36	Much faster acceleration of climate change than expected (+ 2 degrees before 2050). First impacts of sea level rise and disruption to major ocean currents.
37	Very frequent extreme events creating major social, economic and political instabilities or disturbances.
41	Much more rapid expansion of deserts and periods of drought.
52	Uncontrolled invasive species.
65	Major transformation of the Mediterranean marine ecosystem linked to climate. In particular, disruptions in the regulation of the upper and lower layers and currents of the Mediterranean (MED mega-ecosystem).
78	Establishment of a common space for sharing patents and technologies between the North and South of the Mediterranean.
112	Sudden de-globalisation and regionalisation of maritime flows - End of hubs... Re-regionalisation of traffic (increase in cabotage, etc.).
114	Internal revolts or massive migration due to the despair of young people (new waves of revolutions in Arab countries).
126	Greater structuring of civil societies. Major development of civil societies, including in the Southern Mediterranean, giving them a major role in public decision-making.
143	Major climate crisis before 2050.
146	Major migration crises accelerated by climate change.
155	Reconstruction plans for affected countries.

Half of this second category includes disruptions linked to climate change - including their consequences on migration and the oceans. This confirms the undeniably major role that climate change will play in the next 30 years. Added to this, is a more disparate set of possible upheavals: repeated health crises, economic de-globalisation, the establishment of a technological innovation area common to the whole of the Mediterranean - with free sharing of patents, massive reconstruction plans for disaster-stricken countries - either now or after future crises, internal revolts or exoduses that are also massive and linked to the despair of young people, and a strong social structuring around civil societies.

D. WEAK SIGNALS

In addition to the major trends and disruptions, the questionnaire submitted by the Plan Bleu team to the members of the foresight group and to the Plan Bleu experts in September 2020 also asked the respondents to identify 5 weak signals that could cause changes in the Mediterranean region in the next thirty years.

A weak signal is an embryonic and overlooked reality, the importance of which should not take long to assert itself, resulting in profound and widespread repercussions for the system under study.

Based on the responses collected, **a list of 95 weak signals, divided into 6 categories, was jointly established**. This list contributes to the foresight base, and has served as a framework document for the work on the factsheets. The list is as follows:

Box 5. List of 95 weak signals broken down by category, after the first survey of the foresight group.

1. GEOPOLITICS

1. China's involvement in the Mediterranean with the Silk Roads.

2. Political tensions in the Eastern Mediterranean related to offshore gas resources. Coordination of East Med Gas Forum countries at the Cairo meeting, January 2020.
3. Partial detachment of the Arab countries from oil-producing monarchies as they lose influence.
4. Increased Sahelian and Saharan turmoil in the Mediterranean region, but the beginning of a national reconciliation process in Libya.
5. 5+5 dialogue in the western Mediterranean. However, there is no equivalent in the Eastern Mediterranean.
6. Increasing interaction between economic or environmental dialogue and security (terrorism, etc.) and migration issues.
7. Conflicts over the definition of national maritime zones and tensions over non-territorial waters.
8. European Green Deal and implications for countries inside and outside the European Community.
9. Loss of confidence in the effectiveness of global environmental negotiations (COPs, etc.).
10. A new step in 2021 in the European Neighbourhood Policy with the 2022-2027 Agenda for the Mediterranean structured around six themes: good governance, digital transition, resilience, peace and security, migration and mobility, and green transition.

2. ENVIRONMENT AND CLIMATE

11. Increase in extreme weather events (wildfires, floods, heatwaves, etc.) and accelerated melting of ice fields.
12. Development of offshore projects (gas, aquaculture, pipelines, real estate, artificial ports, wind farms, airports, etc.).
13. Initiation of strategies for deep sea mining - Increase in the number of mining permits.
14. Repeated and increased severity of droughts.
15. Major solar projects in some Arab countries (Morocco, Gulf States, etc.).
16. Installation of first offshore wind farms in 2022 (Italy, Morocco, etc.).
17. Increase in soil salinity, particularly in all the deltas (Ebro, Rhone, Po, Nile, etc.).
18. Change in the primary composition of the sea: phytoplankton, micro-algae, etc.
19. Development of invasive species and algae.
20. New emerging pollutants, including microplastics - and implementation of programmes by 2030 for the reduction of plastics in the Mediterranean and on a global scale.
21. First serious measures to reduce air pollution from ships (sulphur, CO2, - 40% reduction in carbon intensity between 2008 and 2030 according to the IMO).
22. Attempts to regulate the use of pesticides, antibiotics, endocrine disruptors, fertilisers, etc. and difficulty in reducing them.
23. "Case of the century" and legal actions against states failing to follow through on their international climate commitments. Pressure for the recognition of the concept of ecocide.
24. Implementation of the European Green Deal, greening of the CAP and impacts on the Mediterranean region.
25. Development of sustainable finance (EIB, EU, WB, etc.).
26. Increasing treatment of water as a commodity (creation of a market for water in the event of crises and serious shortages).
27. Development of electric land and sea transport solutions.
28. Since 2021, global investments in renewable energies have exceeded investments in fossil fuels.
29. Experimentation with alternative solutions in agriculture (agroecology, agroforestry, permaculture, etc.).
30. Development of "conservative" agriculture and agroforestry.
31. Ecology associated with privileged urban social categories in the North: short supply chains, organic products, simple living, alternative transportation, veganism, low tech, etc.
32. Successful experiments and innovations in the blue economy (cleaner ships, sustainable fishing, aquaculture, etc.).
33. Focus on environment-health and environment-biodiversity relationships (post COVID).
34. Emergence of the circular economy and questioning of waste exports.
35. Municipal waste crisis in large cities around the Mediterranean.
36. Slow progress towards environmental awareness, including in the South, starting from a position of low awareness.
37. Connection made between post-Covid recovery and investment in the environment.

38. With the risk of sea level rise and increased severity of extreme weather events, decision-makers at the local level have progressively shifted from a coastal protection strategy (dykes) to a strategy of progressive strategic withdrawal.

3. DEMOGRAPHY - HEALTH - FOOD

39. Halt to the decline in fertility in some Southern countries.
40. Inability to implement coordinated migration management or prevention policies.
41. Awareness of public health problems linked to poor nutrition and relationships between health and the environment (obesity, cardiovascular diseases, diabetes, etc.).
42. Health problems due to malnutrition and pollution (pesticides, endocrine disruptors, plastics, etc.).
43. Traces of microplastics discovered widely in the human body.
44. High food imports in recent years - with some exceptions. Growing dependencies and rising food prices.
45. Gaps between countries are progressively narrowing in the areas of health, but from a base that remains extremely unequal. Healthcare inequalities.
46. Rapidly developing resistance to antimicrobial treatments.
47. Profound and lasting impacts of COVID on the economy, public priorities and social behaviours. High likelihood of repeated or new viruses, trends toward less movement of people and health-related border closures.
48. In the North, reduced meat consumption, regional and global adjustments.
49. Emergence of "smart farming" and "climate smart agriculture" and progressive implementation of these concepts in the Mediterranean.

4. EDUCATION - SCIENCE - KNOWLEDGE SOCIETY

50. Exponential growth and extremely rapid dissemination of new digital knowledge and information tools. Obsolescence of traditional knowledge tools.
51. Changes to cognitive and decision-making processes due to the widespread development of distance learning and digital learning systems (VR headsets, early highly-specialised learning, lack of ethics and synthesis skills, etc.).
52. General crisis in school and university systems.
53. Acceleration of the brain drain from the South to the North.
54. Decline in the global sharing of patents in Northern Mediterranean countries.
55. Major imbalance between training of young people and new professions.
56. Lack of correlation between lessons-learnt from science and policy.
57. Weakened relationship between education and success, on which the stability of the system partly depends.
58. Emergence of new scientific and political elites.
59. Challenge to institutional expertise and demand for scientific debates to be opened to civil society and the public.
60. Widespread relativisation of science ("one opinion among others..."), pressure from lobbies of all kinds, conspiracy theories.

5. ECONOMY - TECHNOLOGY

61. Rapid emergence of a new economy (Industry 4.0) based on artificial intelligence, Big Data, robotisation, platforms, the Internet of Things, etc. Is the Mediterranean being marginalised?
62. Robotisation of industrial production: what is at stake for Mediterranean countries and impacts on employment?
63. Development of new maritime routes between Europe and Asia, linked to melting ice fields.
64. Partial questioning of current globalisation - prospects of relocation of part of Asian industry to the Mediterranean.
65. Development of new economic models based on proximity and functionality, and on use rather than possession.
66. Local creation of multiple start-ups in the Southern Mediterranean.
67. Explosion of remote working and business in many fields.
68. Increasingly prominent role of women in entrepreneurship.
69. Offshore gas projects in the Eastern Mediterranean: a development opportunity for the whole region?

70. Rising oil prices: transitory or structural?
71. Doubling of the global market share of electric vehicles between 2020 and 2021.
72. Withdrawal from fossil fuel finance and a shift towards green investments.
73. Energy coalitions (East Med Gas Forum) for the concerted extraction of gas in the East.
74. Will decline in mass tourism and related revenue linked to COVID lead to expansion of domestic tourism in the Southern Mediterranean, which was previously poorly developed?
75. Strong reconsideration of global mass tourism (impacts, health and safety risks, benefits achieved elsewhere): are we heading for a collapse or a long-term reduction?
76. Following COVID, emergence of the issue of foreign dependency and the repatriation of some economic activities.
77. Expanded use of blockchain and private currencies (bitcoin, etc.) transforming the form and transparency of transactions.
78. Return of inflation and rising interest rates.
79. Sharp drop in international investments in the Southern and Eastern Mediterranean in 2020-2021: circumstantial (linked to COVID) or structural?

6. SOCIAL AND POLITICAL CHANGES

80. Breakdown and impoverishment of the middle classes.
81. New increase in poverty, linked to increased political, security, health, economic, and other crises.
82. Growing demand of young people for more freedom, equality and democracy.
83. More environmentally aware and interconnected youth. Strong advocacy to address climate change.
84. Progress in the status and education of women.
85. Greater consideration of gender issues.
86. Joint progress of the secularisation process (including in Southern and Eastern Mediterranean countries) and of radicalisation in return.
87. Initiatives for more peaceful inter-religious dialogue.
88. Increasing generational gaps - emergence of the notion of "aliens generation", linked in particular to digital uses.
89. Self-organisation of civil societies around an increasing number of local, environmental, economic and community themes and other issues.
90. Communitarian tendencies and reduced inter-community solidarity. Weakened democracy and collective goals.
91. Significant rejection of existing governance frameworks.
92. Growing distrust towards the ruling classes and politics. Growing conflicts between ruling elites and the people.
93. Increasing risks of political violence and civil wars.
94. Increased demand for authority.
95. Growing demand for more direct democracy and participation.

It should be noted that this list of 'weak signals' includes both fairly specific information or findings related to current events during the period of the questionnaire (2020-2021), and much more general perceptions of ongoing changes - as is the case, in particular, for those cited in the category of socio-political changes. While the list is interesting, it is difficult to draw general conclusions from it - because of this heterogeneity. While there are signs of important changes in the geopolitical, environmental and health fields, the direction of the developments mentioned in the economic or socio-political fields is not clear - with many more questions than certainties. The context of the study itself, marked by consecutive crises, is one of the possible explanations.

IV. Factsheets

A. OBJECTIVES AND METHODOLOGY

As a result of the work carried out both on the system analysis and on the trends, disruptions and weak signals, it was possible to identify a certain number of structuring variables enabling the analysis of the situation and evolution of the Mediterranean both as a region and as an ecosystem. These “structuring variables" (or components of the system) - grouped into major dimensions (corresponding to those of the DEGEST structure) - were then the topics of "factsheets". **The factsheets are part of the foresight base and constitute an objective study led by experts on the state and possible changes of the Mediterranean system.** There are 36 factsheets and the themes were chosen collectively by the Foresight Group. Although the different factsheets contain common issues and cross-cutting themes, at this stage of the programme, the authors were asked to work in isolation, as bringing together information is part of the third phase of the programme: the development of contrasting scenarios on the future of the Mediterranean system.

As the MED 2050 programme is developed in view of informing the MSSD, which itself aligns with the Sustainable Development Goals (SDGs), the factsheets are based on the issues identified by the SDGs, with a view to supporting Mediterranean decision-makers towards the sustainable development of the Mediterranean.

All the factsheets follow the same template to guarantee the coherence and uniformity of the analyses. The aim of the factsheets is to produce objective and robust information on the past and current state of the components in the Mediterranean system and to develop assumptions on potential future trajectories (micro-scenarios). The factsheets are structured around 5 sub-sections:

I. **Definition of the variable**: the authors establish the scope of the factsheet. This first step is essential to avoid repetition between the various factsheets and to ensure that all dimensions of the chosen theme are covered. It should be noted, however, that consistency was favoured over exhaustiveness in the factsheets.
II. **Retrospective**: the authors trace how the variable has developed in the past, based on quantitative or qualitative data available in the scientific literature. It is using this objective basis that the authors can then develop the trends and disruptions imagined for 2050.
III. **Stakes**: the authors present issues related to the variable in a structured and hierarchical manner (risks and threats to be avoided, obstacles to be overcome and objectives to be achieved). Some issues overlap with the SDGs.
IV. **Trends up to 2050**: on the basis of the previous sections and the foresight base, the authors determine potential major trends and disruptions in the variable studied by 2050. This section is based on objective, robust and scientific information.
V. **Contrasting scenarios for 2050:** based on the study as a whole, the authors develop and imagine potential scenarios of how the variable will change (4 to 5 micro-scenarios). These are intentionally contrasting in order to anticipate all possible changes, even if they are unlikely.

The factsheets were mainly written by members of the MED 2050 Foresight Group, on a voluntary basis. The Plan Bleu Secretariat also contacted experts from outside the group for certain themes. When a factsheet has multiple authors, the coordinators are the main authors, responsible for ensuring cooperation between the various experts involved in writing the factsheet, while the co-authors intervene at different stages of the factsheets’ elaboration, mainly to propose comments and additions, and to proofread. Each factsheet is then submitted to the Foresight Group for discussion (during the group’s meetings) and validated by the group. After final proofreading by a member of the Plan Bleu Secretariat, the factsheets are translated (in English and French) and published on the MED 2050 platform.

B. FACTSHEET SUMMARY TABLES

In order to provide a brief overview of the factsheets' content, the tables below summarise Sections 3 (issues) and 5 (assumptions/micro-scenarios) for each of the factsheets. This summary was carried out by the Plan Bleu team. It does not reflect the comprehensive content of the factsheets developed by the teams listed below, to keep this summary brief. The factsheets are an essential working tool for the Foresight Group and provide information for MED 2050 Modules 3 (scenario building) and 4 (defining transition pathways). The opinions expressed in the factsheets do not necessarily reflect the views of Plan Bleu or the contributing organisations. The purpose of the assumptions developed in this work is not to plan for or promote any future development, but to produce a range of possible futures that allow free foresight reasoning to generate contrasting and "innovative" scenarios - Module 3.

<table>
<tr><td colspan="2">Factsheet 1: Major global trends (Megatrends) up to 2050 and their consequences for the Mediterranean</td></tr>
<tr><td colspan="2">Coordinator
● Jacques Theys</td></tr>
<tr><td colspan="2">Co-authors
● Marie de Lattre-Gasquet
● Jean de Montgolfier
● Antoine Dolez
● Christophe Le Visage
● Stella Tsani
● Ronan Uhel</td></tr>
<tr><td colspan="2">Themes: External influences on the Mediterranean system, and the place of the Mediterranean in the global system</td></tr>
<tr><td>Issues
1/ Contribute to the production of global public goods (nature, people, international agreements) in a context of planetary sustainability (SDGs, etc.).
2/ Reduce the region's dependencies (tourism, energy, food) and vulnerabilities (risks: climate change, terrorism, health, etc.).
3/ Avoid the fragmentation of the Mediterranean (North-South inequalities, role of the European Union) and the marginalisation of the region in the global landscape.
4/ Reconcile Mediterranean identities and the globalisation process.</td><td>Micro-scenarios

5 global scenarios:

1.A. The Sino-American Dyarchy: global demographics and the economy dominated by the US and China.
1.B. "Open World 4.0": global competition dominated by transnational firms and non-state actors (GAFAM; etc.).
1.C. "Fortress" states: anti-globalisation isolationism characterised by conflicts and local collapses.
1.D. A multipolar world where different development models coexist.
1.E. Worldwide mobilisation for global sustainable development.

5 Mediterranean scenarios:

2.A. The "Battlefield": the Mediterranean is the theatre of clashes between economies, ideologies, and major global powers: national isolationism and stagnation of the region.
2.B. Crises and profound destabilisation: the Mediterranean exposed to recurrent risks (climate, political instabilities, economic crises, etc.).
2.C. A recomposition into sub-regions and a North-South rebalancing: the Mediterranean is divided into various integrated areas: the European Union, the Balkans, the South, Africa and the Arab countries, etc.
2.D. Successful (technological, ecological) adaptation to globalisation, but societies are dualised.
2.E. A new model of specific mediterranean sustainable development based on North-South and South-South cooperation and on reduction of vulnerabilities.</td></tr>
</table>

<table>
<tr><th colspan="2">Factsheet 2: Mediterranean identities</th></tr>
<tr><td colspan="2">Coordinator
● Bouchra Rahmouni</td></tr>
<tr><td colspan="2">Co-authors
● Omar Bessaoud
● Jean de Montgolfier
● Denis Lacroix</td></tr>
<tr><td colspan="2">Themes: Religious and cultural heritage, cultural identity/identities, nation-states</td></tr>
<tr><td>Issues
1/ Understand the Mediterranean space on the basis of a common identity.
2/ Take back ownership of the multiple Mediterranean civilisational heritages.
3/ Overcome identity differences.</td><td>Micro-scenarios
1/ Dialogue and understanding: inter-cultural dialogue and economic co-development around the enhancement of Mediterranean heritage with high economic potential.
2/ A Euro-African space: a Europe-Mediterranean-Africa axis focused on the movement of capital and people. Reduction in nationalist movements and isolationism.
3/ Nationalist isolationism: the conflictual past (colonisation, crusades, wars of independence) leads to isolationist geopolitics, with a culture of mistrust and fear in the North, and a culture of anger and frustration in the South.
4/ A constantly-evolving composite identity: as trends change, Mediterranean citizens create constantly-evolving different and composite identities.
5/ Dilution of identity within a “globish” culture: country specifics become diluted within a common global culture, the Mediterranean identity loses its roots, keeping only a veneer of folklore.</td></tr>
</table>

<table>
<tr><th colspan="2">Factsheet 3: Geopolitics and security in the Mediterranean</th></tr>
<tr><td colspan="2">Coordinators
● Nicolas Mazzucchi
● Younes Slaoui</td></tr>
<tr><td colspan="2">Co-authors
● Ofer Guterman</td></tr>
<tr><td colspan="2">Themes: Influence of world powers and intermediary powers on the Mediterranean. Geopolitics of energy, natural and strategic resources, and international trade. Relationship between the Mediterranean and Sub-Saharan Africa.</td></tr>
<tr><td>Issues
1/ Conflicts, security and environmental resilience (around water and the fight against climate change).
2/ Geopolitical changes and the role of powers such as the United States, China, the European Union or Russia.
3/ Geopolitics of fossil fuels.
4/ Geopolitics of world supply chains and trade (“containerization” initiated by China).
5/ Economic and social models (in the South) and political models (in the North).</td><td>Micro-scenarios
1/ A multi-tier Euro-Mediterranean: EuroMed cooperation with the Atlantic: political integration with NATO, partial economic integration of sub-regional agreements (UMA, Arab League). The Mediterranean powers are split between the American, Chinese and Russian poles.
2/ Transitions in the Mediterranean allow for new development: economic, energy and digital interconnection projects where China and the United States play a major role (common interest in the prosperity of the Mediterranean by limiting conflicts and ensuring environmental security).
3/ A lasting weakening of State power: national and sub-national rationales are instrumentalised by external actors, leading to the weakening</td></tr>
</table>

	of States and local collapses, alongside a strengthening of the power of cities and local micro-powers. Weak power of the European Union to manage these recurring crises and the emergence of criminal political actors. 4/ **A conflictual and authoritarian Mediterranean**: competing systems of alliances under American, Chinese and Russian influence. The Mediterranean is the scene of strategic confrontations (hybrid conflicts, cyberattacks). Mass investments in defence technologies and sovereigntist movements leads to the emergence of authoritarian regimes.

Factsheet 4: The place of the Mediterranean in European policies and the Green Deal	
Coordinator ● Stella Tsani	
Co-authors ● Cécile Roddier-Quefelec ● Silvia Pariente-David	
Themes: Cooperation and integration policies of the Mediterranean and Europe, environmental transition and the Green Deal.	
Issues 1/ Initiate political integration beyond economic integration policies. 2/ Put the energy transition at the heart of partnership policies, especially for countries that are heavily dependent on fossil fuels. 3/ Support the energy transition by a labour market transition (in trades and skills). 4/ Implement environmental policies that go beyond national interests. 5/ Reduce the Mediterranean's carbon footprint, the Mediterranean being a climate change hotspot.	**Micro-scenarios** Two variables were used: A/ the sustainability of policies and investments, and B/ the strength of cooperation between the European Union and the Mediterranean. 1/ The **"Happy Marriage"**: strong EU-Med cooperation and integration, coordinated and multilateral action between the North and South on adaptation and mitigation policies. 2/ The **"Weak Duo"**: strong cooperation but environmental transitions struggle to take place. The focus remains on economic growth policies while climate change strongly affects the region. 3/ The **"Islands of Glory"**: failure of integration policies. A successful environmental transition in the North. In the South, a continuation of national environmental policies. 4/ The **pessimistic scenario**: weak integration and the environmental transition is not undertaken.

Factsheet 5: Public and private financing of development in the Mediterranean. What role for Green Finance?	
Coordinator ● Jérémie Fosse	
Co-authors ● Cristina Costa ● Antoine Apprioual	
Themes: decarbonised economy, climate finance, reduction of pollution, waste and carbon footprint.	
Issues 1/ Increase the level of green funding to initiate a green transition in the Mediterranean as quickly as possible (climate finance, fight against environmental degradation).	**Micro-scenarios** 1/ **"All green" scenario**: new green financial mechanisms in line with the Paris Agreements and the 2030 Agenda. An increasingly engaged private sector. Members of the European Union comply with their financial

2/ Mobilise private finance, particularly in the SEMCs. 3/ Reduce funding disparities: European countries are pioneers in green finance while SEMCs are lagging behind. 4/ In order to meet the challenge of access to green funding, more specifically in the SEMCs, all financial system actors must commit to an effort to make green funding more inclusive, affordable, available, innovative and flexible, while developing instruments to remove the risk surrounding investments in the green sector (guarantees, public capital). 5/ "Technical" obstacles: a common taxonomy is lacking to define "green investment". 6/ Produce transparent data to monitor green finance.	commitments, the SEMCs develop their Green Deal. Development of a Euro-Mediterranean strategy: Mediterranean coalition gaining weight in international negotiations. Increase in innovative financial mechanisms. Large-scale transformation projects in the energy and transport sectors. Small projects in agriculture, water and biodiversity. Green finance has a strong social component for a fair transition. 2/ **"Shades of green" scenario**: slow paradigm shift with regional disparities (North-South and South-South). The EU responds to the need for funding but is behind schedule with the Paris Agreement. For SEMCs: slow pace. With no real common strategy, the Mediterranean has little weight in international negotiations. Green investments prove to be profitable in the long term and therefore attract increasing interest from investors. Efforts to involve the private sector continue. Green finance focuses on large projects. 3/ **Brown scenario: "finance as usual"**: no major transformation of the sustainable finance market, which is largely driven by the public sector. The market remains at a superficial stage of development in the SEMCs. The green transition is a serious threat to rentier states which delay reforms. Tensions at the regional level hamper efforts for effective cooperation. The Mediterranean fails to form a coalition at international climate negotiations. No common standards in the region. Greenwashing is still strong. The needs of SEMCs are misunderstood leading to low investments. Green investments are still seen as risky and finance remains focused on large-scale infrastructure projects. 4/ **Crisis scenario**: climate targets are not a priority due to several plausible disruptions (pandemics, armed conflicts), mainly in the SEMCs. The level of green funding provided by the EU and its Member States shifts towards short-term needs, namely humanitarian aid to SEMCs affected by conflict. The green transition is a serious threat to rentier states which delay reforms and position fossil fuels as a necessity in this time of crisis. There is too much tension to cooperate. Greenwashing practices take place with no solid data to monitor green funding. Green investments are not seen as a priority. The focus is on funding for mitigation measures. There is little or no green funding available for small and community-based projects.

Factsheet 6: International governance of the marine environment in the Mediterranean between crisis, continuity and transformation. Evolution and application of the law of the sea and national ownership of maritime spaces	
Coordinators ● Maria del Mar Otero ● François Simard	
Co-authors ● Yves Henocque ● Christophe Le Visage ● Juan Luis Suarez de Vivero	
Themes: Maritime planning, geopolitics of the maritime space, international Mediterranean governance.	
Issues	**Micro-scenarios**
1/ The geopolitical effects of marine governance. 2/ Establish multilateral and cooperative governance. 3/ The role of the European Union in governance. 4/ Mobilise civil society and NGOs in governance.	1/ **Regression**: the state of the marine environment deteriorates along with cooperation policies. Tensions and conflicts are increasing. 2/ **Status Quo**: the situation changes slowly. 3/ **Sustainable development and cooperation**: multilateral governance

5/ Strengthen law enforcement and sanctions. 6/ Implement science-based decisions. 7/ Strengthen the ecosystem approach and its operationality.	replaces national interests. Civil society and NGOs participate in governance. 4/ **A new system of governance**: multilateral agreements transform the Mediterranean into a "common good" where sovereignty is shared and participation is extended to the stakeholders. 5/ **Regionalisation of the Mediterranean**: governance based on various sub-regional institutions: the "New Western Mediterranean Sea" / "New Eastern Mediterranean Sea".

Factsheet 7: Population growth in the Mediterranean	
Coordinator ● Alain Parant	
Co-author ● Arnaud Comolet	
Themes: Fertility, age distribution and population ageing.	
Issues 1/ Population ageing which affects all countries with the following consequences: ¤ difficulty taking care of the elderly ¤ a smaller skills base in countries that are ageing strongly. 2/ Demographic pressures on the environment. 3/ Uneven population growth and a shift in the demographic epicentre towards the Levantine Basin.	**Micro-scenarios** Two "business-as-usual" scenarios: 1/ **High assumption** (increase of ½ child per woman): fertility rises in most countries, and declines slightly in others (Egypt, Algeria, Syrian Republic). 2/ **Low assumption** (decline of ½ child per woman): quick fall in fertility. In both cases, population ageing is expected. 2050 seems too close to envisage significant demographic upheaval.

Factsheet 8: Presence, origin and destination of migrants in the Mediterranean. Trends and perspectives	
Coordinator ● Alain Parant	
Co-authors ● Jean De Montgolfier ● Denis Lacroix ● Jacques Theys	
Themes: Demographic (generational imbalances) and migratory dynamics, conjunctural factors (conflicts, access to water, climate change)	
Issues 1/ Migration is influenced by generational disparities and imbalances: an increasing young population in the South and East, an increasing ageing population in the North. 2/ The decline in the population in the North and its ageing population could legitimise a proactive approach towards immigrant populations (especially in the South and sub-Saharan Africa, whose population will increase sharply).	**Micro-scenarios** **1/ Action at the source of migration:** Action on the driving forces to reduce migration - stronger cooperation between Mediterranean countries. Conflict reduction. Climate and environmental change mitigation and adaptation policies. Resilience policies. Conflict prevention in countries of origin. **2/ Chaos:** We exceed everything previously. Significant increase in migration needs. Little cooperation between countries. Closure of countries. Rapid growth of unregulated migration. Consolidation of

3/ In the South, an anticipated decline in living space due to the increase in population and the intensification of climate change and desertification. 4/ In the East, population growth that may not be sustainable due to uninhabitable areas and conflicts over water.	militarised, radical, non-democratic regimes. **3/ Optimism:** Increase in migration needs. Need for arrivals in northern countries. More recognition and protection of migrant status. More secure migration routes, less irregular migration. Good perception of migration by public and political opinion in destination countries. **4/ Regulation/control:** Rationality. Immigration criteria based on demographics and economy. Quantification of migrations (quotas). **5/ Status quo:** Principles of acceptance of migration but great discrepancy between principles and reality. Containment and barriers. Ambiguity and double political discourse.

Factsheet 9: Urban transitions in the Mediterranean and their consequences on the environment: urbanisation, urban-rural balance, effects on waste, land ownership, pollution and resources

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- Marie Baduel
- Antoine Dolez

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- Amine Benaissa
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- Ouissame El Asri
- Israe El Bardaoui
- Lorenzo Fabian
- Vincent Fouchier
- Laurent Hodebert
- Sihem Lamine
- Xavier Lours Bruno Marot
- Marianne Martin
- Emmanuel Matteudi
- Philippe Meunier
- Konstantia Nikopoulou
- Alain Parant
- Christiane Sfeir
- Stella Tsani
- Yassin Turki
- Serge Yazigi

Themes: Three scales: 1/ the constituted city (dense, urban production model, informal city, pollution and waste), 2/ the metropolitan scale (territory, city-countryside relationship), and 3/ the Mediterranean (and international) scale.

Issues	**Micro-scenarios**
4 issues expressed in the form of 4 contradictions: 1/ **The urban development model**: urban growth, urban sprawl, increased flows OR ecological transition, thrifty management of a limited resource and zero carbon to curb the risks (climate change, etc.). 2/ **The urban production model**: attractiveness of a global city, global integration OR social and territorial cohesion, local development. 3/ **The forms of internationalisation of the city**: globalisation, standardisation, privatisation OR identities, heritage, collective spaces. 4/ **Forms of governance**: centralised and top-down government OR decentralisation, inter-institutional cooperation, participatory democracy.	The variables cross reference the 4 contradictions, in addition to the environmental variable (climate change, carbon footprint, pollution and waste). 1/ **Financialised (or neoliberal) city-territory and fragmented Mediterranean basin**: international financial networks govern cities. Increased inequality and pollution. Global and uniform cities subject to real estate speculation. Climate change is mitigated defensively by large and expensive infrastructure. 2/ **Collaborative territories and collaborations on a Mediterranean scale**: cities focused on the general interest (social, economic, ecological and political), co-construction of the territory. The rise of local authorities and civil society: top-down and bottom-up approaches are mutually beneficial in the fight against climate change. An open space for cooperation. 3/ **Forced adaptation, collapse of governance and cooperation models**: failure of public action and return to decentralised models and patchy collective action. Prospects for self-organisation but with strong risks of conflicts and loss of common meaning. A moderate carbon footprint due to the economic downturn.

Factsheet 10: Concentration of human activities in coastal and sea areas: competition, cumulative effects and risks	
Coordinator ● Antoine Lafitte	
Co-authors ● Antoine Dolez ● Samir Grimes ● Yves Henocque ● Christophe Le Visage ● Ioannis Spilanis	
Themes: Traditional coastal human activities (tourism, fishing, energy production, transport), new human activities (wind turbines, exploration, biotechnology), land use planning, regulation, natural areas.	
Issues 1/ Increased pressure on coastal areas (population, tourism, economic activities). 2/ Strengthen risk anticipation (sea level rise, extreme events) and governance models. 3/ Reduce pollution through new production and consumption models. 4/ Reduce the ecological impact of traditional maritime activities. 5/ New activities (wind power, exploration, biotechnologies) require a new monitoring and regulation system. 6/ Displacement of coastal activities to the hinterland or to the sea.	**Micro-scenarios** 1/ The **"Path of control: towards Agenda 2030"**: control of traditional activities through more prescriptive regulations, adaptation to local constraints and an effective political and legal arsenal (taxes, bans on individual ownership, avoid-reduce-offset). 2/ **Strategic and coordinated retreat**: only activities requiring access to the sea remain in that area, while others move to the hinterland (the remote areas of a country away from the coast). Preservation of natural areas, role as a buffer against flooding. A decrease in pressure on the coastline and a shift of populations and activities to the hinterland. 3/ **"Non-control of the coastal area"**: a worsening business-as-usual scenario. The coastline is reserved for an elite and it is a totally artificial coastline. End of coastal sustainability regulations. 4/ **Unprepared and anarchic partial retreat**: the coastline becomes uninhabitable. The failure of regulation policies leads to conflicts over land use.

Factsheet 11: Climate change and its impacts on land and sea	
Coordinator ● Joël Guiot	
Co-author ● Jean de Montgolfier	
Themes: Agriculture, environmental education, coastlines, urbanisation, health.	
Issues 1/ Preserve Mediterranean ecosystem services. 2/ Anticipate changes to currents (cold engines). 3/ Contribute to climate change mitigation and reduce the imbalance between emissions from Northern and Southern countries: target of 55% reduction in GHGs by 2050. 4/ Act quickly (2040) to avoid an irremediable situation (2100) 5/ Initiate adaptation policies (see Factsheet 12). 6/ Increase the use of nature-based solutions.	**Micro-scenarios** Assumptions built around two dimensions: adaptation and mitigation policies (1) and governance and regional and international cooperation (2). 9 variables were used for the assumptions: 1/ international cooperation, 2/ funding (whether green or not), 3/ national contributions, 4/ climate impacts, 5/ sustainability of development policies, 6/ inequalities, 7/ lifestyles (level of individualism), 8/ education, 9/ adaptation. 1/ **Good mitigation and good adaptation** (optimal scenario): Green Deal, funding mechanisms support the investments required by Southern countries. Despite mitigation, adaptation is necessary (+1.5 - 2°C). Political instability declines and significant investment is made in education to reduce inequalities.

	2/ **Fairly good mitigation, uneven adaptation**: while the vast majority of EU countries meet their reduction commitments, the situation is uneven in the SEMCs. Carbon neutrality is not achieved in 2050. Too many obstacles to adaptation policies: economic and political crises, deficit in food production. 3/ **Poor mitigation, as much local adaptation as possible** (status quo): failure to meet reduction commitments: 2 - 3°C by 2100 with systemic consequences in all areas. But national adaptation policies: strong level of cooperation at local level but not at international level. The migration trend increases with a surge of fascism and racism in the North. 4/ **Poor mitigation, poor adaptation** (disengagement): succession of serious crises in the SEMCs: the environment is not a priority. No effort to adapt. All countries are heavily impacted by multiple environmental, social and political disasters.

Factsheet 12: Adaptation issues and policies, between vulnerability and resilience	
Coordinator ● Katarzyna Marin	
Co-authors ● Maya Negev ● Cécile Roddier-Quefelec ● Ronan Uhel	
Themes: Climate change risks (forest fires, droughts, desertification, floods, etc.), migration, health, Green Deal, European and regional climate change adaptation strategies, nature-based solutions, public participation.	
Issues 1/ Initiate a coordinated and multilateral adaptation strategy, especially to reduce the carbon footprint gap between the North and the SEMCs: develop funding mechanisms. 2/ Initiate national adaptation policies. 3/ Base adaptation policies and sea. management on the ecosystem approach 4/ Increase knowledge of vulnerabilities (monitoring). 5/ Develop nature-based solutions, low tech and low-cost technologies. 6/ Enable public participation in adaptation policies. 7/ Incorporate the legal and social dimensions in adaptation policies: human rights, social justice, fight against poverty.	**Micro-scenarios** 1/ **Status quo** (pessimistic scenario): inequalities between the North and the SEMCs increase in terms of climate change adaptation policies. Repeated crises. Gloomy scenario with irreversible damage. 2/ **Heterogeneous** adaptation policies: good adaptation in the North under the impetus of Europe, but weak adaptation in the South. Unsustainable investments continue in some countries and make the situation worse. 3/ **"Policy implementation"**: adaptation policies are initiated in most countries. Europe becomes a model for Southern countries. Inequalities are reduced in and/or between the 3 shores, end of unsustainable projects. But political and economic crises still persist in some countries (SEMCs). 4/ "**New priorities**" (utopian scenario): green solutions are prioritised in all sectors and sufficient funding is dedicated to these issues. Society rethinks consumption and economic growth: sobriety and collaboration are at the heart of its values. Stable political situation and governance that treats sustainable development as a top priority.

Factsheet 13: Changes to greenhouse gas emissions and mitigation policies

Coordinator
- Emmanuella Menichetti

Co-authors
- Silvia Pariente-David
- Constantinos Taliotis
- Lina Tode

Themes: Focus on energy, strengthening integration and cooperation in this sector

Issues	Micro-scenarios
1/ Regional cooperation is crucial to achieve the targets of the Paris Agreement: organise synergies between Northern and Southern countries. 2/ Environmental issues (climate change hotspot, acidification, sea level rise) require stronger mitigation policies. 3/ In this context (Paris Agreement and Green Deal): reduce net carbon emissions to zero by 2050, with -55% by 2030	1) A status quo scenario (or **baseline scenario**), which assumes that only the unconditional targets set in the NDCs of Mediterranean countries will be met. 2) A **proactive scenario**, which is consistent with the full achievement of conditional targets under the Paris Agreement. 3) An **energy transition scenario** (known as ProMed), developed in cooperation with the energy platforms of the Union for the Mediterranean and the EC, which assumes carbon neutrality for EU Member States by 2050, and by 2060 for other Mediterranean countries. Primary energy demand in 2050 would be 40% lower than in the baseline scenario (BaU). In 2050, fossil fuel savings would be 440 Mtoe above 2018 levels, and the share of renewable energies in primary energy demand in 2050 would be 48%, up from 11% in 2018.

Factsheet 14: Transformations of the Mediterranean ecosystem and its impact on marine and coastal biodiversity

Coordinators
- Samir Grimes
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Co-authors
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- Daniel Cebrian
- Maria Del Mar Otero
- Souha El Asmi
- Atef Limam
- Atef Ouerghi
- Mauro Randone

Themes: Marine Protected Areas (MPAs), social and cultural visions of biodiversity, scientific knowledge of biodiversity and monitoring, new marine activities (exploration, wind power, biotechnologies).

Issues	Micro-scenarios
1/ Improve knowledge of marine biodiversity, how it functions and its evolution, invasive species, and unequal knowledge depending on the shores and countries. 2/ Assess the impact of new marine activities on biodiversity (mining, wind power). 3/ Assess and reduce pollution. 4/ Compare restoration, conservation and wilding approaches (and the associated cultural and social values of biodiversity). 5/ Reform MPAs: from preserving the structure to preserving the function of ecosystems.	Variables: knowledge, pollution, monitoring, biological invasions, climate change, exploitation, preservation, maritime spatial planning, awareness. 1/ **Biodiversity and ecosystems in crisis**: all ecosystems affected, ecosystem processes affected, mass mortality and disturbances in food chains. 2/ **Biodiversity and ecosystems under pressure** (business-as-usual): policies and strategies fail to halt the decline of biodiversity. MPA measures focus on emblematic species, habitat restoration does not prevent the decline of biodiversity. 3/ **The sea is getting warmer, non-native species are spreading**: new

	ecosystems, adaptation measures do not prevent these changes. 4/ **Ecological transition**: Significant results and progress have been achieved through national strategies/regulations and cross-border cooperation. Regeneration of the main characteristics of Mediterranean biodiversity can be observed, with integration between non-native and native species. 5/ **Good ecological status scenario**: all requirements have been met to preserve good ecological status. Although it will be very difficult to return to past conditions, the new ecosystems will be extremely diverse and productive.

Factsheet 15: Exploitation and ownership of Mediterranean marine mineral and energy resources (gas exploitation, deep sea mineral resources, renewable energies, etc.). The consequences of offshore expansion.	
Coordinator ● Stella Tsani	
Co-author ● Christophe Le Visage	
Themes: Maritime transport, fossil fuels and renewable energies, offshoring of human activities, exclusive economic zones, Euro-Mediterranean cooperation.	
Issues 1/ Transport in the Mediterranean is likely to increase although this sector produces the majority of GHGs (18% of global transport). 2/ 44% of the sea is either contracted or designated for oil or gas exploitation (pollution, accidents). 3/ New technologies (renewable energies, mining) would allow exploitation without technological limitations. The limitations are economic and legal. 4/ New maritime activities generate new territorial competition, alongside old activities (fisheries, tourism): jurisdiction is the number one issue (EEZ) which threatens the Mediterranean as an "open sea". 5/ The environmental effects of new extraction activities are unknown.	**Micro-scenarios** Variables: A/ sustainable maritime development in the Mediterranean, and B/ Euro-Med integration and cooperation. 1/ **Both strong**: strong cooperation between the European Union and the Mediterranean enables maritime planning and sustainable cohabitation of the various activities (economic, social, etc.). Strong investment in RE (Renewable Energies), and Euro-Med financing partnership. Control of deep sea desalination and mining technologies. Euro-Med cooperation: strong investment in environmental transition. The Mediterranean becomes the paradigm of green/blue growth. 2/ **Strong cooperation but weak sustainability**: good integration and cooperation between the European Union and the Mediterranean, but this fails to develop a framework for sustainable activities (mining, desalination, offshore wind power). Slow development of new technologies, poor cohabitation between different activities, weak socio-economic development. 3/ **Weak cooperation but strong sustainability**: in the North of the Mediterranean, strong investment in and development of marine RE; desalination activities and mining are developed in a significant and sustainable way. Fragmentation and patchy development of sustainable activities in Southern countries. Gas and oil therefore continue to be exploited. Southern and Eastern countries do not benefit from the technological transfer in the North. 4/ **Both weak**: weak cooperation in the West, conflicts in the South over EEZs. Strong environmental impacts of RE, desalination and deep sea mining, oil-producing countries continue to increase greenhouse gases. Weak cooperation between countries and between shores.

Factsheet 16: The future of fisheries and aquaculture in the Mediterranean and its impacts (ecological and social impacts, etc.)

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Co-authors

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- Sid Ahmed Ferroukhi
- François Simard
- Antonio Troya
- Clara Ulrich
- Sandrine Vaz

Themes: Food security and diet, ecosystem services, diversity and functions of marine ecosystems, the ocean economy, governance of marine activities, pollution linked to human activities.

Issues	**Micro-scenarios**
1/ Ensure food security in a context of population growth and meat alternatives. 2/ Halt the decline of fisheries: adapted and sustainable management, stock monitoring and control system. 3/ Enable sustainable aquaculture development. 4/ Ensure integrated ecosystem. management of these two practices: eco-design. 5/ Ensure the governance of marine technologies (such as wind power). 6/ Effect of climate change on the future of these activities. 7/ Possible disruption of food chains 8/ Anthropogenic impacts (microplastics, habitat degradation). 9/ Governance under strain + problem with maritime traffic safety. 10/ Social criticism of fish consumption + production of "fake fish" = FoodTech.	Main variable: the environment. Secondary variables: governance, economy, society. 1/ **Business as usual scenario**: weak growth in both sectors as climate change in 2050 is not yet a major constraint. Imports increase and consumption stabilises in both the North and the South. 2/ **Disruptive scenario**: climate change triggers ecosystem disruption: slowdown in production, conflicts of use at sea and growing consumer mistrust of aquatic products. 3/ **Adaptation**: climate change in line with predictions but without ecosystem disruption: both sectors adapt (sustainable fishing, development of salinized land). Fishing / aquaculture production increases to 5.5 million tonnes. 4/ **Anticipation**: Climate change accelerates. Despite anticipation, production reaches its limits and growth slows. However the demand remains high, as anticipation reduces fluctuations in market supply.

Factsheet 17: The evolution of "living" resources and natural biodiversity on land

Coordinator

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Co-authors

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- Jean de Montgolfier
- Nolan Boutry
- Thomas Galewski
- Jacques Theys

Themes: "One health", biodiversity preservation / conservation policies, monitoring, threats to biodiversity: urbanisation, climate change, irrigation.

Issues	**Micro-scenarios**
1/ Many activities are threatened by the destruction of natural resources. (agriculture, aquaculture, fisheries) 2/ "One Health" approach at the heart of regulatory policies.	Topics: public policies, business models, social demands, vision of biodiversity (protection, monitoring, optimisation). Two variables: A) a regionalised OR globalised world, B) biodiversity conservation OR exploitation of natural resources. 1/ **Regional competition without biodiversity conservation**: society is

3/ Multiple threats to biodiversity and ecosystems: urbanisation, intensive agriculture and aquaculture, irrigation, climate change. 4/ Initiate mass actions to promote adaptation. 5/The environmental effects of new extraction activities are unknown.	more concerned with personal safety and wealth than with biodiversity protection. Inequalities are growing. Conservation policies are fragmented and occur without public consultation or science-based decisions. 2/ **Globalisation without prioritising conservation**,**economic opportunism**: economic cooperation is focused on economic growth, not sustainability. Increased pressure on habitats (trade, infrastructure). Conservation behaviour remains unchanged, biodiversity loss increases. 3/ **Regionalisation that prioritises biodiversity conservation**, **regional sustainability**: citizen behaviour (dietary changes) contributes to reducing the erosion of biodiversity. Decisions are more local in the face of weakening international institutions. Reduction in pollution and the rate of climate change, but some habitats remain fragmented in the absence of comprehensive and coordinated actions. 4/ **Globalisation that prioritises biodiversity conservation**, **global sustainable development**: multi-scale and multi-actor collaborations to reduce and mitigate negative impacts on biodiversity. Soil management focused on socio-ecological connectivity, sustainable agriculture (end of irrigation), resource resilience. Transparent and constantly updated information to evaluate conservation strategies.

Factsheet 18: The water-soil-agriculture-environment nexus

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Co-authors

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- Marie de Lattre-Gasquet
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- Cécile Roddier-Quefelec
- Antonio Troya
- Ronan Uhel Jacques Theys

Themes: Food security and sovereignty, agricultural models, migration, conflicts, water stress, diet, climate regimes, woodlands.

Issues	Micro-scenarios
1/ A major trend: soil and water degradation. 2/ North/South disparity: cultivable land is scarce in the South. 3/ Water stress (Indicator 12 of the MSSD) and climate crises will lead to food crises and impact global commodity markets. 4/ Integrate social sustainability into climate change mitigation and adaptation policies. 5/ Develop new modes of agricultural production (agroecology). 6/ Ensure food sovereignty and security, in a context of increasing demand and a decrease in arable surface area and production. 7/ Conflicts over resources meaning that arbitration by public authorities is necessary.	1/ **Food, agricultural and environmental crisis in the South**: environmental degradation continues, global food transition that puts an end to the Mediterranean diet. Scenario of decline and prolonged crises, social instabilities and migrations in the South. In the North, soil degradation continues. High level of food imports. 2/ **Territorialisation of food**: soil conservation and regeneration practices in the North and South. Regulation of water prices (unsustainable) and water quality observatory. Diversification of food production, with an increase in the overall quality, despite ongoing disparities between territories. 3/ **Technological revolution and inclusive development**: precision and vertical agriculture, water desalination and re-use of treated wastewater. Agriculture turns towards high value-added agricultural products. Almost all basic commodities are imported. These imports are financed, for example, by renewable electricity exports in the South. Inclusive policies that reduce unemployment, poverty and inequality, and access to healthier, higher quality food. Dietary pathologies decrease and life expectancy increases. 4/ **Agricultural and food dualism**: urbanisation and artificialisation continue. Agricultural and water treatment technologies available to a

	minority elite. The majority of farmers are marginalised and struggle to make a living. A minority of consumers can afford low-processed food products with high nutritional value, while the majority consume ultra-processed products with low nutritional value.

Factsheet 19: Energy transition in the Mediterranean region - towards climate neutrality	
Coordinator ● Houda Ben Jannet	
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Themes: Energy security, path to carbon neutrality, regional cooperation.	
Issues 1/ Growing energy demand in the South and East, in line with socio-economic development. 2/ Climate change and the challenge of decarbonisation (with the energy sector as the main contributor to CO_2 emissions). 3/ Energy security, especially in the Southern Mediterranean: diversifying energy sources. 4/ Adaptation of infrastructure. 5/ Financing of energy services at all levels 6/ Continued geopolitical tensions and their effects on oil and gas markets. 7/ Recent offshore gas discoveries in the Eastern Basin. 8/ Need to regulate both energy demand and supply. 9/ Emergence of multiple innovative energy production technologies. 10/ Ambition of the European Union to play a leading role.	**Micro-scenarios** 1/ The P**roactive scenario**: implementation of reliable energy efficiency programmes and increased diversification of sources of energy production based on the NDCs submitted by each country. Increase in clean fuels and technologies replacing oil and coal in the power generation capacity. 2/ The **ProMED "Near Zero Carbon" scenario**: more ambitious measures for energy efficiency, significant technological development to further reduce CO_2 emissions, increased diversification of the energy mix, adapted to each country. Considerable increase in renewable energy. Significant increase in building retrofitting and more stringent efficiency standards for new builds. 3/ The **ZERO-2050 scenario**: based on the Paris Agreement and the EU Green Deal, the results of COP 26 and the ambitions for COP 27, and on recognition of the fact that the Mediterranean region is a focal point for climate change.

Factsheet 20: Growth dynamics	
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Themes: Paradigm shift, human development, debt, inequality, employment, values, GDP	
Issues 1) Trade-offs between contradictory objectives on the way to a resilient economy that reduces inequalities. 2) The necessary generalised change of economic paradigm which takes note of the inability of the mainstream economy to take into account social and environmental objectives.	**Micro-scenarios** **1) Cupidity, deception and mistrust**. An individualistic society in search of maximising gains. Avoiding and recovering from financial crises has become the central objective, without worrying about systemic crises. Distrust in political decision makers. Technology has failed in greening the economy. Inequalities are increasing. Lobbies take over.

3) Achieving both a high human development and a low ecological footprint. 4) Taking into account the rebound effect (more resource efficiency leads to more consumption) and the spillover effect (exporting of pollution). 5) The carbonised economy will encounter physical limits of resource availability. 6) The weight of the informal economy. 7) The weight of debt. 8) The unequal distribution of wealth. 9) The (in)adequacy of the education system and the labour market to train for the jobs and functions necessary for the change of economic paradigm. 10) Redefining what society means by "growth".	2) **Emergency room.** All efforts are aimed at recovery from multiple chronic and systemic crises. A totally unstable economy. Lack of long-term planning, due to a focus on how to reach the pre-crisis level of GDP. Conflicts between countries, but the emergence of mutual aid systems within civil society. 3) **Contrasts**. The North-South contrasts are exacerbated. An economy with strong environmental regulations in the North and unambitious ones in the South. The North dumps its pollution to the South. In the North, the ECB is cancelling the debt of EU countries on the conditionality of a paradigm shift, while the South is drowning in debt, further increasing the difficulties. Emergence of small-scale islands of resilience isolated from the "system" in certain places in the South. 4) **The well-being society**. Regionalised and regulated markets. Effective implementation of GHG reduction and resilience objectives. A new G20 based on a new sustainability indicator (abandonment of GDP). Profound changes of values allowing to co-construct and arbitrate trade-offs between contradictory objectives. Abandonment of certain economic activities deemed non-essential to collective well-being. Sanctions for countries that make choices that are inconsistent with common sustainability goals. Tax reform, taxonomy and central bank buy-back of "non-sustainable" assets allow the mobilisation of funds for the transition. With the scarcity of resources (rare earths, metals, energy), high-tech is reserved for a few priority uses.

Factsheet 21: The knowledge society	
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Co-authors ● Jean de Montgolfier ● Antoine Dolez ● Denis Lacroix ● Jacques Theys	
Themes: New information and communication technologies (NTIC), education, research, innovation, globalised economy, start-ups.	
Issues 1/ Train citizens for better integration into a society that values acquiring knowledge. 2/ Cooperation or competition? Towards innovation at the service of common, sustainable and inclusive projects or capturing innovation for the benefit of a few? Frugal scientific research serving the needs of society or innovation serving endless economic growth? 3/ A horizontal and democratic society or a society of surveillance and constraint? 4/ The place of the Mediterranean in a globalised and technological economy.	**Micro-scenarios** **1/ Towards a happy transhumanism?** The growth of digital technology remains exponential, and humanity knows how to work together to master it. All the current systems, economic, social, cultural, political, and even ecological are strongly impacted, but the whole remains under control. Nevertheless, no democratisation of research and innovation. Investments are always motivated by the search for profit for the lucky few (GAFAM etc.). **2/ Towards a collapse of world civilization?** The growth of digital capacity remains exponential, and humanity is unable to unite to master it. Conflicts, including cyberconflicts, are increasingly violent and destructive. Economic, social and environmental systems are collapsing. **3/ Towards a totalitarian technological dictatorship?** The growth of digital technology remains exponential, and only a very small number of actors (even, in an extreme variant of this scenario, artificial intelligence) manage to control it. **4/ Finally Sustainable Development!** Digital capacity growth is slowing down, and humanity is working together to reap all the benefits. All

	economic, social and environmental systems are managed well, and in a fair and inclusive manner. **5/ A succession of badly managed crises.** The growth of digital capacity is slowing down, humanity remains in a general framework of very strong competition. The Covid crisis provides a good model of this scenario. Digital technology has offered solutions that were unimaginable 30 years ago: widespread teleworking; massive replication and rapid analysis of RNA and DNA sequences. Nevertheless, global inequalities are growing rapidly.

Factsheet 22: The blue economy: opportunities, obstacles and risks

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- Stella Tsani

Themes: Energy, tourism, economic activities, transport, biotechnologies

Issues

1/ Role of the sea in economic and environmental security (food, energy, ecosystem services).
2/ Move from a traditional maritime economy to a blue economy with strong sustainability.
3/ Resolve conflicts between uses, particularly those involving oil extraction
4/ Create jobs and ensure the fair redistribution of products and services from the sea.
5/ Fair ownership mechanisms for maritime space.
6/ Regulate the activities of the Blue Economy.
7/ "Zero emission" targets, particularly in the transport sector.

Micro-scenarios

1/ **Birth of a blue (sustainable) economy based on the European model**: EU and Mediterranean partnership (Green Deal, green finance), sustainable tourism. Mass support for co-development. All this is made possible by political stability in the region.

2/ **Tensions, crises, powerlessness**: instability in the region leads to tensions and struggles for influence over the marine territory. Decline in the attractiveness of the Mediterranean. Uneven efforts to establish the blue economy.

3/ **Heterogeneity, competition and "pale blue" economy**: strong contrasts due to widespread competition. Mass tourism declines, but high-end tourism flourishes. Lack of cooperation on decarbonisation, low attractiveness and slow development of the blue economy.

4/ **Power plays between the major players, the blue economy as a soft power**: China continues its influence with the Silk Roads and takes control of strategic ports. Environmental issues are not a priority.

5/ **Weak dynamics and "soft" decline without room for the blue economy**: decline of traditional resources (fisheries, tourism, oil, etc.). Spiral of decline that reduces the attractiveness of the region.

Factsheet 23: Maritime transport, port infrastructure in the Mediterranean, international trade and pollution related to these activities

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- Lina Tode

Themes: Port infrastructure, pressure of maritime traffic on the environment (pollution).

Issues

Maritime transport is influenced by:
- international trade, which itself is driven by the globalisation process - geopolitical events and crises (e.g. Covid-19)
- maritime security (piracy, terrorist activities)
- technology development (AI, machine learning, Internet of Things, robotics)
- evolution of social factors (improved working and employment conditions for seafarers)
- global warming (opening of alternative and competing waterways due to melting ice)

Maritime transport has influence on:
- marine pollution (marine waste, chemical and oil pollution, etc.)
- air pollution (ships calling at ports)
- introduction of non-indigenous species (via ballast water, fouling of ship hulls, etc.)
- noise pollution.

Challenges: sustainable transportation and decarbonisation.

Micro-scenarios

1 / The Blue and Green Mediterranean: development of sustainable maritime transport in the Med. Mediterranean consumers are willing to buy high-quality local products and services. Change in the cruise industry (sustainable and small-scale design, reduction in the number of passengers and size of ships). Traffic linked to Mediterranean transit decreases (because of de-globalisation). Short-sea shipping increases. Maritime transport of hydrocarbons reaches its peak in 2030 and then decreases. The use of biofuels and green ammonia increases.

2 / **A congested highway**: maritime transport in the Mediterranean develops rapidly. Maritime safety is not optimal. Slow and fragmented implementation of environmental policies. Transition to renewable energies is almost non-existent. Technological innovations are installed in ships and in port infrastructure/processes/facilities, however, advances relating to the environmental sustainability of the sector are sidelined. Working conditions get worse.

3 / **A marginal sea**: maritime transport in the Mediterranean falls gradually. Technological progress is non-existent or very low and is accompanied by the overall deterioration of Mediterranean port infrastructure. Fossil fuels are still used and the transition to renewable energies is weak. Working conditions cannot improve in a context of widespread unemployment. Consumers turn to low-cost products made far from home.

4 / **The Sea of Differences:** development of maritime traffic in the Mediterranean is impacted by pronounced differences between the North and South shores. Working conditions remain very different between the North and South shores. Consumer behaviour on both sides of the Mediterranean remains very different. Short-sea shipping mainly increases in the northern part of the basin. Giant foreign-controlled ports in the South continue to serve the needs of global trade and do not produce the desired economic effects at the local level.

Factsheet 24: Tourism and tourist mobility: future prospects and impacts of these activities on the environment and coastal and regional economies

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Themes: Impact on the environment and the economy, new modes of mobility and consumption, governance, attractiveness of the Mediterranean for tourism.

Issues	**Micro-scenarios**
1 / SDG 12: "ensure sustainable consumption and production patterns". 2/ Tourism attractiveness of the Mediterranean. 3/ Global tourism: a driver of growth for the Mediterranean? and for sustainable development? 4/ The governance of tourism. 5/ Pollution. 6/ Social inequalities (precariousness, etc.). 7/ Loss of cultural heritage and identity: standardisation. 8/ Dependence on tourism compared to resilience (e.g. Covid and the Greek islands in the Aegean Sea). 9/ Fragility of the coastline and land artificialisation.	Variables: sustainability, mobility and consumption patterns, external drivers. **1/ Covid is forgotten, carbon savings and more ecology:** tourism is regulated to manage energy pressures, mainly due to long-distance transport. Nevertheless, there are **limited changes in production and consumption patterns**. Relocation of tourism, which adapts to weak sustainable development. 2/ **Strong sustainable development**: pressure on the coastline decreases and the hinterland attracts heritage and ecological tourism. Tourism in line with the SDGs. 3/ **Tourism dualism, increasing pressures and socio-economic disparities**: in a context of increased globalisation, the elites benefit from tourist destinations with high economic and cultural value, the impoverished middle classes visit low-cost destinations. 4/ **"MED Disney"**: historic tourist sites are artificially recreated, even though they meet strict environmental standards. 5/ **Declining tourism:** loss of attractiveness of the region due to climate change (heat waves and high temperatures), increase in conflicts and limited access to urban sites. Some tourism is transferred to the off-peak season. This decline causes socio-economic problems.

Factsheet 25: Inequalities, poverty, changes to social mobility, informal economy and solidarity system: towards an increase in social divisions?

Coordinator

- Sébastien Vauzelle

Themes: Social protection, tax system, labour market

Issues	**Micro-scenarios**
1/ The role of social protection in the fight against poverty and in resilience. 2/ The effects of pollution and climate change (drought, desertification, flooding, water acidification) on vulnerable habitats and precarious populations. 3/ Energy crises.	1/ **"Maelstrom"**: climate, economic and energy crises strongly affect the most precarious populations. The Mediterranean is isolated, which prevents investment in sustainable projects. Social divisions between: a) the super-rich, b) the middle classes whose standard of living is falling and who are driven by a fear of falling into a lower class. This is a breeding ground for populist voting that increases conflicts within societies and between countries, and c) an increasingly vulnerable and precarious

4/ Labour market crises. 5/ Inflation. 6/ Tax system and public financing. 7/ The demographic transition. 8/ Gender equality. 9/ Digital transformation. 10/ Formal labour, informal labour. 11/ Democratisation of societies and political regimes, particularly with regard to the tax system.	population that fights to survive but whose demands are not taken into account. 2/ **"Boomerang"**: backlash from social and environmental externalities produced over several decades: social unrest, environmental and economic vulnerabilities. Protests, boycotts, and cyberattacks against governments and private actors. Governments launch tax policies to initiate an environmental transition, but these changes come too late to address environmental crises and growing poverty. The world looks like 2020 but with a little less hope. 3/ **"Stupor Mundi"**: tipping point in 2030 after a turbulent decade, and realisation that "business-as-usual" is a dead end. In response to this, democratisation, a progressive tax system, and international cooperation create a new Mediterranean business model. Low salaries are raised and wealth is heavily taxed. The blue and green economies create jobs. These economic advances and the reduction of inequalities put the Mediterranean back in a central global position, with a new and robust social contract to reduce inequalities.

Factsheet 26: Changes to the value system and religiosities

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Co-authors
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- Jean-Paul Burdy
- Jean de Montgolfier
- Frédéric Gonthier

Themes: Gender, religion, family structures, values.

Issues	Micro-scenarios
1/ The Mediterranean is an area of major tension and conflict. 2/ Value systems are very different between Mediterranean countries (role of economic development, standards of living and education, family structures). 3/ Demands for order and authority in the public space. 4/ Democratic aspirations. 5/ Desire for migration (South to North).	1/ **Gradual transition of traditional countries towards more individualisation and moral liberalism:** more individualised family, greater gender equality, withdrawal of religious powers, reinforcement of democratic aspirations, growing challenge to authoritarian powers, defence of the environment, reinforcement of civil society, increase in political participation. 2/ **Maintenance of traditional cultures with strong religiosity:** populations strongly governed by family, clan and societal structures, maintenance of illiberal tendencies that limit democracy to a simulacrum, without many free elections nor respect for human rights. 3/ **Rise of populism in Western countries**: greater marginalisation of the working classes, continued strong criticism of the elites in power and a desire to "overthrow" the political elites who are incapable of solving problems. Very nationalist and anti-immigration populism preventing the development of friendship and mutual aid between Mediterranean countries.

Factsheet 27: The place of young people in society and intergenerational relationship, youth employment and care for the elderly.

Coordinator

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Themes: Employment, intergenerational relationships, migration, demography, education and training.

Issues

People under 30 make up 60% of the Mediterranean population: increase in the South, decrease in the North. Youth will increase in the coming years. Youth unemployment in MENA is the highest in the world.

1/ Employment: demographic pressure and no. 1 political demand in the South. Women are the most affected by unemployment.

2/ Necessary changes in education and training, as well as increased transparency in labour market recruitment processes.

3/ Economic migration requires regional coordination.

4/ Forced displacement (within countries themselves and externally).

5/ Youth inclusion.

6/ Intergenerational relationships and care for the elderly.

7/ Socio-economic instability and conflicts, increasing climate change.

8/ The loss of traditional knowledge.

Micro-scenarios

Six variables: employment, education, economic migration, forced displacement, political inclusion and activism, demographics and the place of the elderly.

1/ **Revolution (secession of young people)**: the economic and political situation means that young people "trace" their own path (self-organisation) but migration to the North remains high. Protests sometimes turn violent. Failure to care for the elderly.

2/ **The economic imperative**: young people are a solution to the problem of the elderly in the North, but young people in the South remain without employment prospects. A generational gap is created.

3/ "**No Future**": young people are the first victims of climate change. Strengthening of authoritarian regimes, conflicts and the generational gap. Disparities between the shores increase, with no international cooperation. Migration saturation creates isolationist countries.

4/ **Youth left to their own devices**: the civic and political isolation of young people who do not get involved in the political and social spheres; the generational gap is widening. A loss of knowledge transfer leads to a loss of identity. Unemployment rates and disparities between the North and South are reduced as education and training programmes gradually align with labour market needs. New migration routes open up.

5/ **Renewal from young people**: youth as a driving force in the region. Unemployment rates decline due to strategies that improve the education system (alignment with the labour market). Reduction in disparities between countries. Organised and innovative young people contribute to climate change adaptation actions. Decision-makers rely on young people to launch a positive dynamic in the region (solidarity, mutual support, innovation and sustainable development).

Factsheet 28: The situation of women in the Mediterranean

Coordinator

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- François Fatoux
- Fatiha Hassouni
- Diane Zovighian

Themes: Education and training, labour market, gender, religion.

Issues

1/ Strengthen equal access to work for women in Mediterranean societies and economies

2/ Take into account the voices of women in the prevention and management of crises that are likely to increase in number (health, food, climate, conflicts, etc.)

3/ Revise governance models to ensure the effective participation and representation of women in decision-making spheres

4/ Renewed political interest in the "women's issue" by conservative and/or extreme currents

Micro-scenarios

1 / **Growing tensions in relations between men and women.** Multiplication of crises and deterioration of the situation for most women. Families' investment in girls' schooling declines and girls turn away from higher education, which is no longer able to guarantee them a job. Growth of female rural exodus and migration. More women work in the sectors of new technologies, the digital economy and AI but few have access to high managerial levels and in decision-making positions. Public intervention in favour of women lacks consistency and is not planned for the long term.

2 / **Ambitious policies reduce inequalities**. Ambitious policies at the national and regional levels are particularly inclusive of women. The differences between the situation of women in the North and the South are declining. Public/private investment policies and gender-based tax policies create incentives for investors and employers to be more inclusive. Quota policies are applied in various institutions.

3 / **False parity between men and women.** There are more women at higher management levels thanks to quotas, inclusion and empowerment policies, etc. The transition to digital economies has benefited educated women in cities. While some of them are truly committed to progress for women, others practise "pink-washing". Despite the strong rhetoric, little change has taken place. The same goes for public or civil society organisations whose internal organisation is at odds with their stated commitments to equality.

4 / **Radical movements dominate the political scene in some Mediterranean countries.** Several countries in the region are ruled by conservative, religious or right-wing parties, where mobility, access to education and health facilities,are severely compromised. The exercise of women's human rights is limited, while any cultural opposition is crushed. Some social rights and gains are challenged or overturned. Violence against women (harassment on the street, honour killings, etc.) increases notably due to the isolationism and radicalisation of certain movements. Young women in Europe join conservative movements (salafism), or break with the system by joining feminist movements. Increasing gaps of women's experiences between states.

Factsheet 29 : Modifications in production and consumption patterns

Coordinators
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Co-author
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Themes: Production and consumption models, price and funding for sustainability, international trade, consumption socio-cultural norms, economic growth, sobriety.

Issues

1/ Socio-cultural aspects: difficulty in changing consumption patterns, linked to socio-economic aspects, socio-cultural norms (ownership), lack of awareness and education.
2/ Financing: the low price of raw materials, no internalisation of the environmental cost, lack of financial resources to achieve sustainable consumption and production. Conservative financial sector.
3/ The role of trade in achieving SCP (sustainable consumption and production). Lack of awareness of the global value chain.
4/ Monitoring: Measurement issues: GDP as main indicator. Lack of SCP indicators, especially for sustainable consumption patterns and green products.
5/ Priority sectors: Tackle the sectors with the highest footprint.
6/ Regulations: Lack of application of regulations + hindering regulations.
7/ Coordination: Difficulties integrating SCP and multi-stakeholder participation/collaboration within the supply chain.
8/ Population growth, combined with a higher standard of living, leads to an increase in consumption levels and the ecological footprint.

Micro-scenarios

1/ Economic growth at the expense of sustainable lifestyles: Social and cultural norms are still tied to a capitalist paradigm that values property as an important social goal. Lack of investment to fund environmental awareness education programs. Prices are set by the market without taking externalities into account. No state intervention to regulate the market. No cooperation or common indicators of sustainable production and consumption.

2/ Imposed sustainability (due to major crises) and green-washing production and consumption models: Imposed sobriety for the most vulnerable populations in the Mediterranean. Informal economies thrive. Even if they have a lower carbon footprint, they hamper the establishment of a sustainable price and taxation system. Development of a Mediterranean monitoring and taxonomy system to assess progress towards SCP, but at the initiative of industrial actors and lobbies: greenwashing.

3/ Green capitalist consumption and production: social disparities of SCP: Change of mentality of young people who adopt sustainable behaviours: rent rather than purchase, recycling, co-ownership, sobriety. For older generations and poor people, attachment to capitalist consumption still takes precedence and sustainable lifestyles are not a priority. The internalisation of environmental externalities is put in place by market-oriented mechanisms such as the green tax, the incentive for recycling, etc. A common system of monitoring and sustainable taxonomy at the initiative of international institutions (Barcelona Convention, MSSD) and NGOs but without effective legal tools to sanction countries that do not respect the regulatory system.

4/ Ambitious and coordinated policies in favour of SCP: sobriety rather than economic growth: Thanks to educational programs and state intervention through public campaigns, we are witnessing a socio-cultural shift towards SCP in the North and in the South. Economic cooperation between the North and the South makes it possible to finance education programs for sustainable consumption and green infrastructures such as public transport, recycling, etc. SCP is introduced as a cross-cutting subject in all education systems. The offer of universities is enriched, new skills are created. Complete change in the tax system, taxes are on resources rather than labour. A common monitoring and sustainable taxonomy system at the initiative of international institutions (Barcelona Convention, MSSD) and NGOs. This constrains countries insofar as Mediterranean funding depends on compliance with the SCP scoreboard.

Factsheet 31: Risk and crisis prevention: anticipation, public action and collective resilience	
Coordinators 96. Antoine Dolez 97. Maya Negev	
Co-authors ● Jean de Montgolfier ● Jacques Theys ● Ronan Uhel ● Christine Voiron	
Themes: International cooperation, risk culture, training and education, inequalities, resilience.	
Issues 1/ How will Mediterranean countries manage new emerging risks (cyber security and mental health)? 2/ How can global and coordinated resilience policies be put in place in a context of national isolationism and weakened international institutions? 3/ How can risk reduction and resilience be organised in a fair and just way in the Mediterranean? How can strengthening resilience include reducing social disparities? 4/ Will Mediterranean countries succeed in mitigating climate change in order to prevent its harmful consequences? 5/ From technocratic risk policies to democratic and participatory policies? How can we educate people about risk culture? How can we involve citizens in the design and implementation of risk reduction and resilience-building policies?	**Micro-scenarios** Two variables divided into several sub-variables: 1/ The design of national risk policies: a) level of risk culture and education, b) risk information, c) public participation in risk management, d) investments in infrastructure and resilience policies. 2/ Cooperation in risk policies: coordinated and multilateral risk mitigation and resilience policies OR national isolationism where inter-state competition outweighs cooperation. Scenarios: 1/ Ambitious multilateral risk reduction and resilience policies based on a risk culture and the democratisation of risk management. 2/ Technocratic and private risk management: preventive measures have failed, emergency measures are necessary 3/ The most vulnerable territories are abandoned: isolated and nationalist risk policies lead to the isolationism of states: risk fortresses. 4/ Risks as geopolitical weapons: every man for himself, disasters for all.

Factsheet 33: Environmental awareness: the role of the media and civil society organisations	
Coordinator ● Lourdes Lázaro	
Co-authors ● Ignacio Fernández Bayo ● Pablo Francescutti ● Thomais Vlachogianni	
Themes: Environmental awareness: the role of the media and civil society (role of the media and civil society organisations, in particular environmental NGOs, in public awareness-raising and disseminating environmental information).	
Issues 1/ **Main challenges faced by environmental NGOs** in environmental reporting: - The cumulative effects of socio-economic inequalities, political instability, climate change and emerging health threats; - The accelerating pace of ICT development, which offers new opportunities but also additional challenges related to knowledge management	**Micro-scenarios** 1/ **Realistic scenario with a mix of progress and setbacks**: environmental communication gains momentum due to the ecological crisis and the accelerated efforts of environmental NGOs. In the Northern Mediterranean, mainstream media give it a lot of coverage. In the Southern and Eastern Mediterranean, environmental issues receive intermittent coverage in mainstream media, under the watchful eye of political authorities. Journalism cooperatives denounce environmental degradation, with the support of foundations, international organisations and

issues; - The increasing complexity of environmental challenges and associated scientific uncertainties, which require ever-changing skills and abilities to communicate in a scientifically sound manner; - The spread of digital media outlets on social media, leading to the dissemination of "fake news"; - The need to go beyond public awareness-raising for the environmental problems of our time and to improve communication on the science-policy-society interface to achieve effective societal responses. 2/ **Main challenges facing the media** in communicating environmental information: - In North Africa, the environment is not considered a priority, but seen as a luxury + the political dimension of certain subjects can prevent their coverage (potential censorship). - Global media crisis: closure of newspapers, budget cuts, loss of confidence in journalists, etc. - Competition with social media and new platforms. - Restrictions imposed on journalists to cover certain stories (sometimes through physical violence and limitation of freedom of expression).	environmental NGOs, along with local entities. 2/ **Optimal improvement scenario**: environmental communication is at the top of the public agenda, due to a combination of enabling conditions: increased public control of the media; expansion of the role, representativeness, legitimacy and specialisation/professionalism of environmental NGOs, etc. Regional governments in the Mediterranean practice a policy of transparency and are receptive to public participation. Historic change in terms of sustainability and nature protection, by bringing the North and South shores together to solve common problems. 3/ **Moderate awareness scenario**: populist (deniers) and nationalist parties occasionally come to power and measures against climate change swing between rigour and tolerance. The European Union's capacity to steer environmental policies has not improved. Environmental NGOs are weakened. Rigorous information coexists with misinformation, and new unreliable digital media are spreading, using artificial intelligence mechanisms to create and disseminate information. 4/ **Disruptive and gloomy scenario**: climate change has catastrophic consequences. In the Northern Mediterranean, environmental communication focuses on identifying and mobilising resources for mitigation; in the Southern and Eastern Mediterranean, ecological collapse is much more serious. The efforts of environmental NGOs are very fragmented and weakened. In Europe, freedom of expression is maintained, but in Africa and the Middle East, environmental information is politicised, censored and monitored via the Internet, and journalists and communicators committed to the environment are persecuted and punished. Illegal information mechanisms emerge, but do not reach the general population.

Factsheet 34: Policy coherence and regional cooperation for sustainable development	
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Co-authors ● Paula Castillo ● Arnaud Comolet ● Samir Grimes ● Anaïs Picart ● Stella Tsani ● Ronan Uhel	
Themes: Environmental policies, international cooperation, inter-sectoral coordination, governance indicators.	
Issues 1/ Policy coordination: ensure coherence between the different policy areas of EPI (Environmental Policy Integration) in countries and international institutions. 2/ International cooperation and commitment of stakeholders, international institutions and public and private actors.	**Micro-scenarios** 1/ "**Status quo 2021"**: moderate coordination of national/internal policies and "medium" level of international policy coordination and cooperation. 2/ **Collapse of governance**: deterioration of policy coordination within and between countries (international). Scenario not compatible with the sustainability of the region. 3/ **Policy conflicts and failures**: failure of international procedures and institutions. Despite the conflicting nature of national policymaking, there is strong coordination and cooperation in areas such as energy, transport, fisheries and agriculture. This leads to policy conflicts between international sectoral organisations. Very unlikely scenario. 4/ **Nationalist competition**: high levels of national and local policy coordination in (almost) all countries. Most countries are well governed, but

	there is no strong coordination and cooperation between countries, making the EU logically obsolete. The results agreed at the international level cannot be achieved. Scenario incompatible with sustainable development of the Mediterranean. 5/ **Mediterranean policy and state power**: national and international coordination and cooperation will improve sufficiently to make a difference in the region's development drivers and facilitate the necessary transformations in virtually all economic sectors. This is a realistic scenario, which nevertheless requires a great deal of effort on the part of the actors involved. The only scenario compatible with sustainability.

Factsheet 35: Water resource management	
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Themes: State of water resources (surface water, groundwater, sanitation), demand/pressure on water availability (agriculture, industry, human consumption), responses/governance (demand management, water storage, wetlands, nature-based solutions, non-conventional water resources).	
Issues	**Micro-scenarios**
1/ Overexploitation of groundwater and water stress caused by human activities. 2/ Deterioration of water quality (due to pollution). 3/ Lack of appropriate governance. 4/ pressures due to climate change. Responses to these issues: 1/ Develop better water demand management. 2/ Develop non-conventional water resources (desalination, re-use of treated wastewater or brackish water). 3/ Manage "virtual water" resources (rainfall water that infiltrates into the soil, irrigation, and freshwater pollution). 4/ Nature-based solutions.	1/ **Innovation/efficiency**: technology enables sustainable water management, also through strict environmental regulation and better efficiency in water use. Water demand decreases in the most industrialised countries. Reusing water becomes widespread. Water pressures are reduced thanks to technology. Fewer populations face water stress. No change in behaviour, thanks to technology. 2/ **Sustainable behaviour**: awareness of the problems leads to profound changes in consumption and production patterns in the North and South. Policies for economic stability and social fairness and "green actions" (nature-based solutions, ecosystem services) preserve natural water resources. Investments in green technologies and "blue" and "green" infrastructure. River restoration projects. Sustainable agriculture becomes the norm, with the maintenance of the Mediterranean diet and the relocation of production with a reduction of waste, chemical inputs and water use. 3/ **Business-as-usual** (uncontrolled demand, economic growth comes first): pressures on water resources increase. Significant social and economic disparities between the North and South, which accentuate migration and conflicts. Tourist pressure on the coastline. Productivist agriculture. No change in the production and consumption system. The quality of water resources is deteriorating. Competition for resources is increasing. 4/ **Isolationism / local resilience**: local priorities determine national policy agendas. Poor economic situation in the SEMCs with little international cooperation. Limited investment in research and development, and in agriculture or water management infrastructure. Increased pressures and inequalities. Small-scale local subsistence farming.

Factsheet 36: Observation, monitoring and warning systems in the Mediterranean

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Themes: Observation, monitoring, Big Data, biodiversity, indicators.

Issues

1/ Interoperability and integration of observation and information systems in decision-making processes.
2/ Availability and quality of data: human and financial resources for data sharing, implementation of a regional network of environmental indicators linked to the MSSD, multi-scale indicators, new sources of information, developing partnerships for data and indicator production.
3/ Investments in institutional arrangements.
4/ Evaluate policies and measures after application and monitoring.

Micro-scenarios

1 / **Total fragmentation of observation systems.** Continuation and amplification of the inflation of observation systems, without anticipating new problems. Poorly targeted funding continues to foster the fragmentation of observation systems. The gap between the North and the South widens.

2 / **Inflation of observation methods and tools**. Citizen science makes a significant contribution to the coastal observation system through real-time, hyper-connected information systems. Decentralisation of monitoring and reporting protocols and participatory monitoring becomes a "counter-power" where citizens can alert on environmental problems not taken into account by governments. But data is not very standardised, so integration is complex.

3/ **An era of shared and connected Big Data 2.0.** New technologies allow us to better protect the environment. Regional strategic framework with recognised and shared models and standards, and sustainable strategic funding, regular knowledge sharing and networked observation.

4 / **High-performance observation and monitoring systems generating increased pressure on species and ecosystems.** The scientific interests of observation give way to political interests (monitoring only to decide and act) and economic interests, co-opted by large corporations. Economic competition hinders networking.

5 / **Versatile, optimised and networked observation systems.** New systems develop efficiently, new data (on the economy, environment and society). New data producers: corporations, associations, the general public, which help formulate new problems. The gap between North and South is reduced, towards the homogenisation of skills and resources.

Conclusion

Plan Bleu has built up its third foresight exercise, MED 2050, by focusing on major issues:

MED 2050 makes **climate change a central and systemic issue**, as one of the main drivers of change in the Mediterranean system. The acceleration of climate change is one of the trends on which the Foresight Group agrees unanimously.

MED 2050 integrates and compares fundamental uncertainties linked to environmental, political and socio-economic changes by imagining possible (and even improbable) disruptions and by integrating them into the scenarios. The systemic crisis linked to COVID-19 has recently shown the importance of anticipating disruptions, even if they are unlikely, as they can destabilise the entire Mediterranean regional system.

The sea and its associated activities have been placed at the heart of considerations, as demonstrated by the number of factsheets that tackle this topic (10 out of 36 factsheets).

This Module 1 summary report also highlights the following issues, based on the study of trends, disruptions and factsheets:

Along with the acceleration of climate change, the Mediterranean system is likely to face a mass decline in biodiversity and the scarcity of natural resources in general and water resources in particular. Faced with these systemic risks and irreversible consequences, Mediterranean countries must launch multilateral, sustainable, integrated and democratic policies to minimise these risks and build their capacity for adaptation and resilience.

Economic and technological developments are also important drivers of change in the Mediterranean system. They can support sustainable policies but can also be an obstacle.

These issues will be built upon with the visions collected during individual interviews and collective workshops (module 2). They will also be at the heart of the construction of scenarios (module 3) and transition paths (module 4), which will constitute the next stages of MED 2050 in 2022 and 2023. Modules 3 and 4 will be built by the MED 2050 Foresight Group on the basis of the foresight base, which the present report summarises.

Plan Bleu would like to warmly thank all those that have contributed to the foresight exercise elaborated in the Module 1, notably the volunteer members and experts of the Foresight Group and of the Steering Committee.