Interreg Mediterranean

BLUE BIO MED

Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

ART-ER

ATTRACTIVENESS RESEARCH TERRITORY

Report

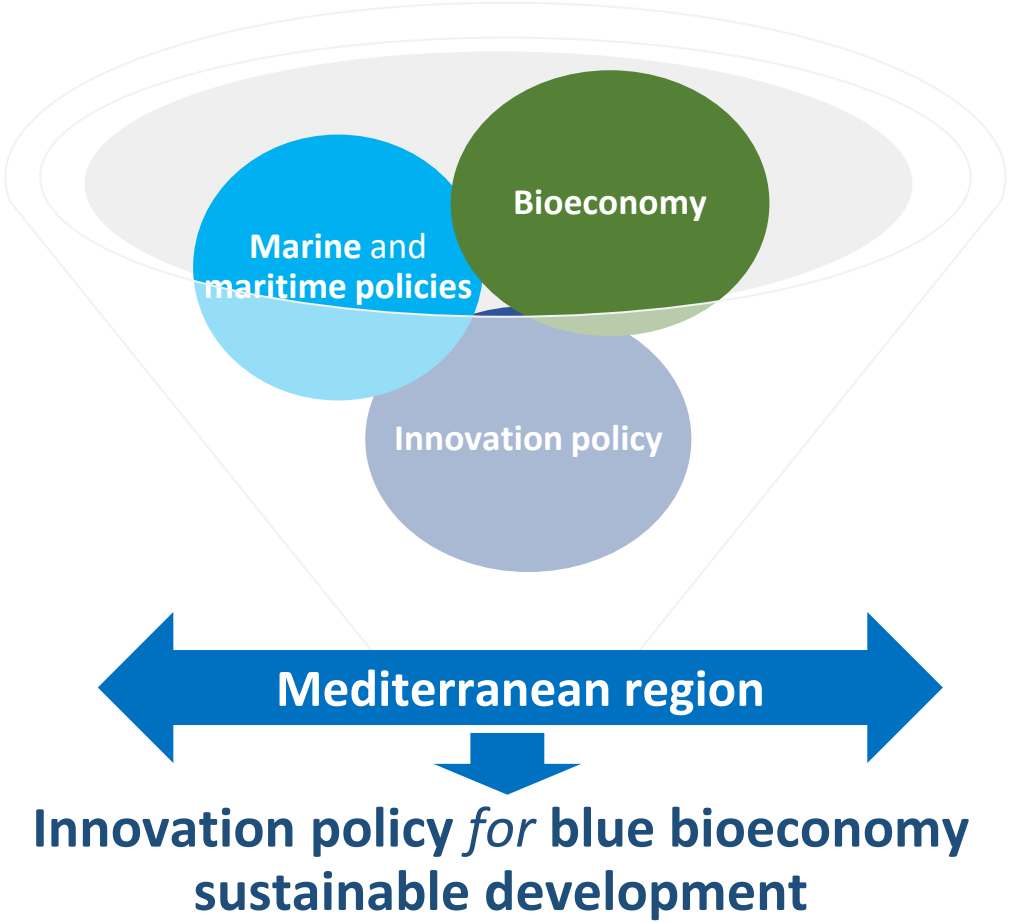
13 – 25 October

Summary

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

What? BLUE BIO MED

- **Better coherence of innovation policies** for blue bioeconomy at different levels of government;
- Improved **capacity to orient innovation** to address complex societal challenges;
- Reinforced transnational **MED blue bioeconomy innovation community**



Project co-financed by the European Regional Development Fund

WHY?

- Mediterranean Innovation performance lacks behind the EU average (EUROSTAT)
- Fragmentation of policies and stakeholders in MED area
- Growing policy interest on sustainable blue bioeconomy (Med Strategies, SdG's..)
  - New funding opportunities in the next years
  - Need to tackle complex challenges

THE STRATEGIC PROJECTS: BLUE BIO MED & B-BLUE

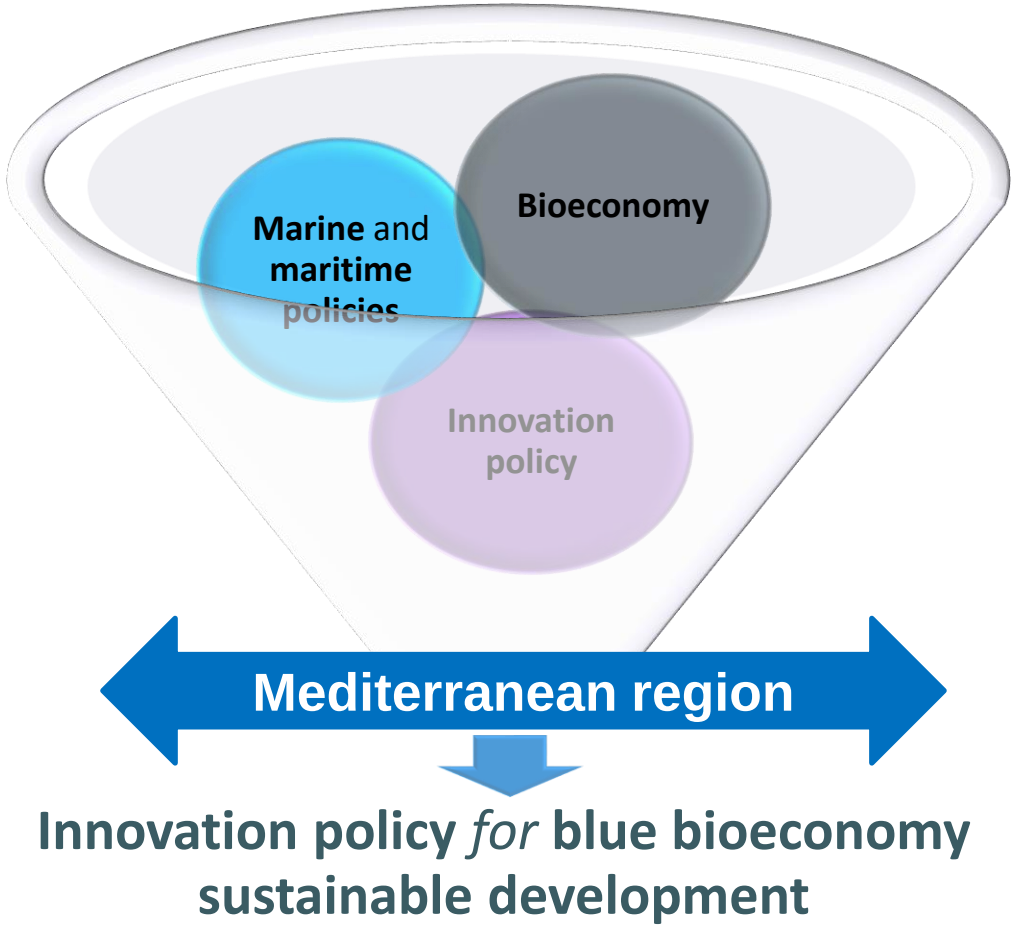
Novel policy approach on innovation

Transformative innovation and systemic transitions

COMMUNITY APPROACH: Engage stakeholders, raise awareness, tackle complex challenges, identify priorities, practical example, suggest solutions…

INTERREG MED STRATEGIC PROJECTS: The scope

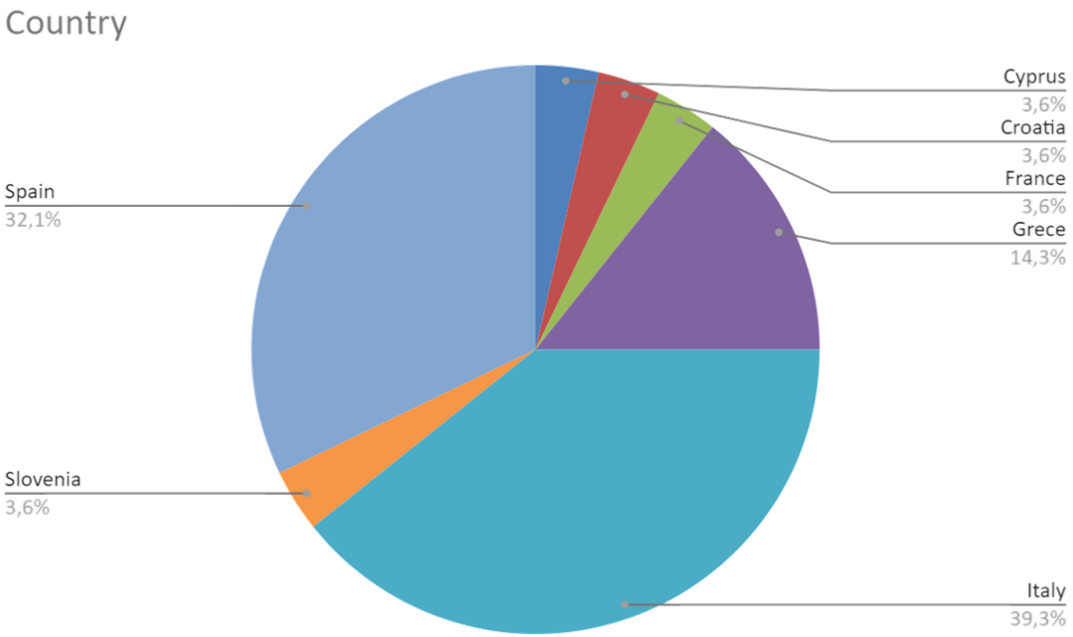
- **Better coherence of innovation policies** for blue bioeconomy at different levels of government;
- Improved **capacity to orient innovation** to address complex societal challenges;
- Reinforced transnational **MED blue bioeconomy innovation community**

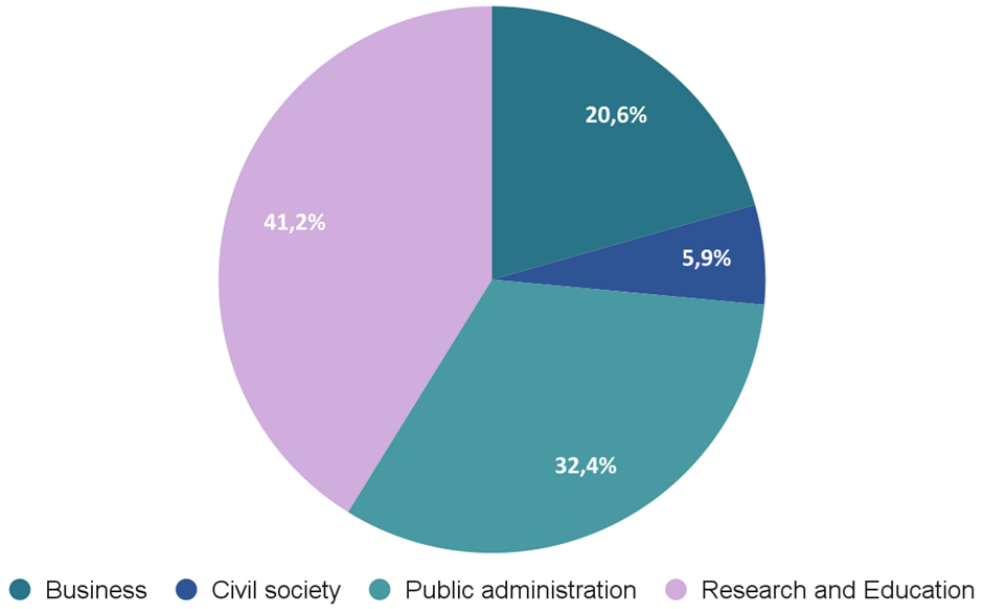


HOW? The multi-actors workshops

- **Stimulating an open discussion** among MED key actors around the value added of a transformative innovation policy approach to address common challenges (**testing** this research and innovation approach);
- **Collecting inputs for the further development of a governance model** to implement transformative innovation across the Mediterranean (**implementing** this research and innovation approach);
- **Connecting stakeholders** from the quadruple helix and from different MED regions and countries wanting to work together on the challenge with a transformative approach.

WHO?


Country
Cyprus
3,6%
Croatia
3,6%
France
3,6%
Grece
14,3%
Spain
32,1%
Slovenia
3,6%
Italy
39,3%


20,6%
5,9%
32,4%
41,2%
Business
Civil society
Public administration
Research and Education

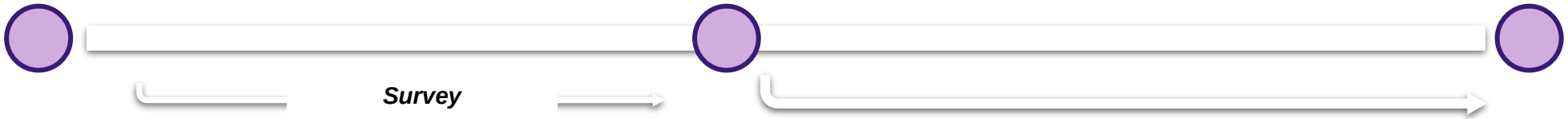
Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

SUSTAINABLE AQUACULTURE - STEPS AND OBJECTIVES

Launch Event
28 September

1st Workshop
13 October - **Building a common vision**

2nd Workshop
25 October - **Explore innovation potentials**



objectives

- Prepare participants to actively contribute to the next 2 meetings
- Stimulate networking among participants

- Create a common language, an even level of knowledge and a shared understanding and vision, among participants, regarding Sustainable Aquaculture in the Mediterranean
- Develop a shared vision on 4 key aspects: Governance, Environment, Social and Economics

- Facilitate a moment of dialogue on 3 Innovation Levers: Technical Innovation; Innovation through cooperation; Knowledge-related innovation
- Finalize a map of possible stakeholders and initiatives
- Create new networks with participants interested in developing projects in the future

Interreg Mediterranean

BLUE BIO MED

Project co-financed by the European Regional Development Fund

4 TOPIC EXPERTS

Céline Dubreuil

Dr Céline Dubreuil, oceanography and environmental policy expert. She has been working in the field of sustainable development for nearly 20 years. She became Plan Bleu Director of Programmes in 2021.

Link to the complete Bio

Arianna Cecchi

Degree in marine environmental sciences and MSc in Marine Geotechnics, Arianna started as an environmental consultant in 1998.
Since July 2021, employed in ART-ER, Sustainable Development Area.

Link to the complete Bio

Kristian Mancinone

Master in Economics and Management of Social Economy Organizations, he
working in ART-ER on the development of the regional social innovation ecosystem within the framework of Smart Specialization Strategy (S3).

Link to the complete Bio

Lourdes Reig Puig

PhD in Marine Science and a Master in Scientific Communication. Research and teaching in aquaculture at the Universitat Politècnica de Catalunya.
Nowadays coordinator of BlueNetCat grouping more than 590 researchers on Blue Growth.

Link to the complete Bio

Launch event

28 September 2021

Project co-financed by the European Regional Development Fund

AGENDA

Objectives

- Prepare participants to actively contribute to the next 2 meetings
- Stimulate networking among participants

Networking

Participants are divided into groups to present themselves to the others through cards answering 3 questions.

Introduction on 1st workshop

Interaction with participants

- Dr. Céline Dubreuil introduction of the 1st workshop focus: *"Aquaculture: A Booming sector in the Mediterranean"*

Introduction on 2nd workshop

Interaction with participants on 3 focus:

- *Knowledge – related innovation* by Kristian Mancinone
- *Innovation through cooperation* by Arianna Cecchi
- *Technical Innovation and Business Models* by Lourdes Reig Puig

Final Assignment

Final greetings and launch of the assignment for the participants, to be done before the 1st workshop

EVIDENCES FROM NETWORKING

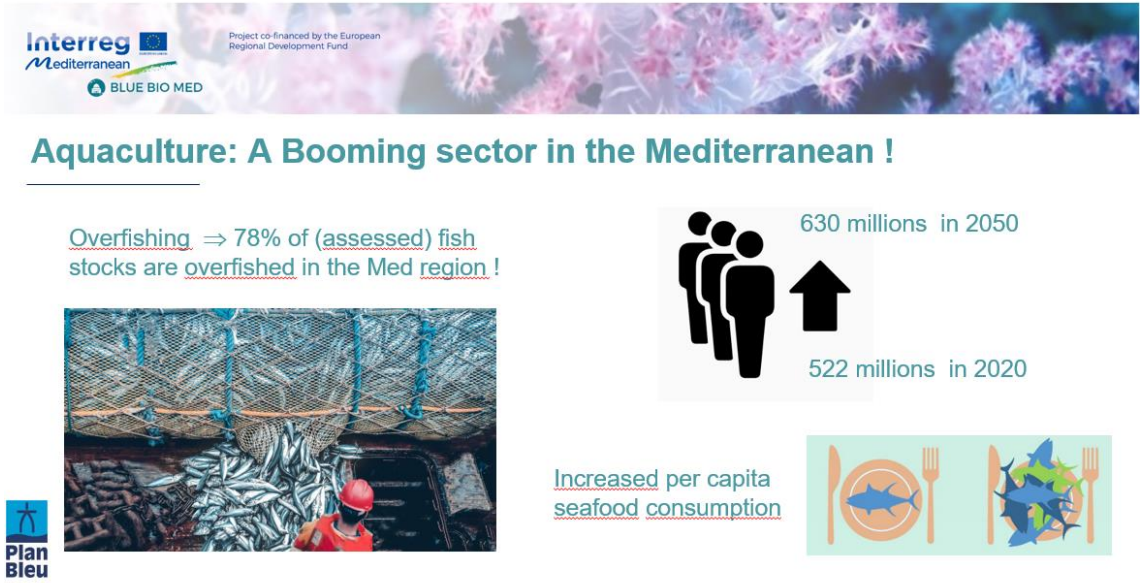
What has impressed you about the people you've networked with?

INTRODUCTION ON 1st WORKSHOP FOCUS

What do you think is the biggest challenge facing aquaculture in the MED region?

Speech by Dr. Céline Dubreuil

Link to the presentation

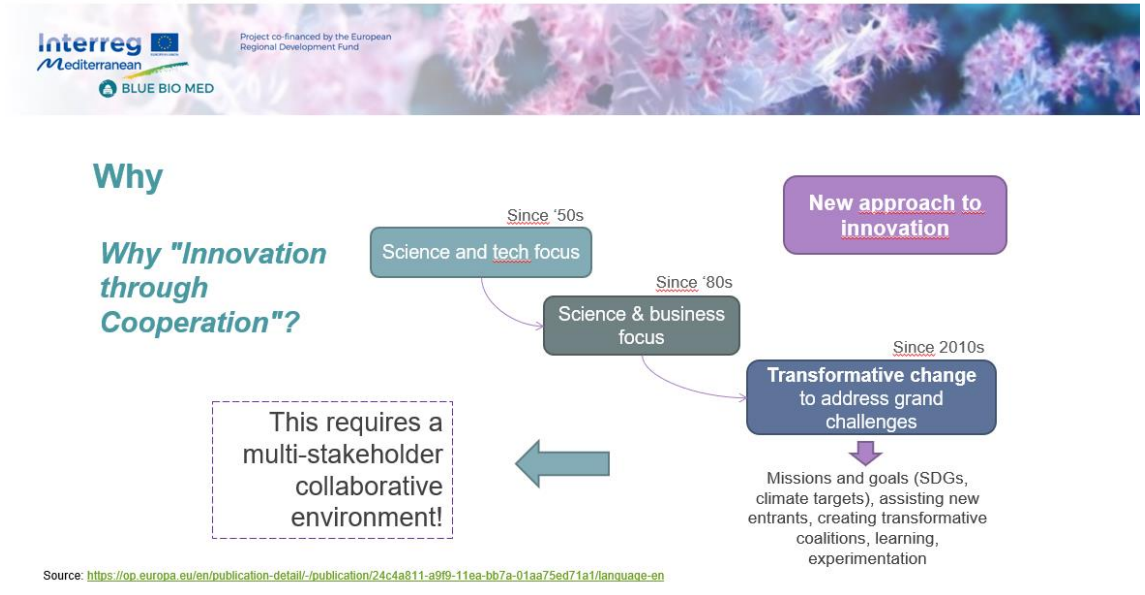


INTRODUCTION TO INNOVATION THROUGH COOPERATION

What does ' Innovation through Cooperation' means to you?

Speech by Arianna Cecchi

Link to the presentation



INTRODUCTION TO KNOWLEDGE-RELATED INNOVATION

What does it mean for you to innovate through sharing knowledge?

Speech by Kristian Mancinone

Link to the presentation

Interreg Mediterranean
Project co-financed by the European Regional Development Fund
BLUE BIO MED

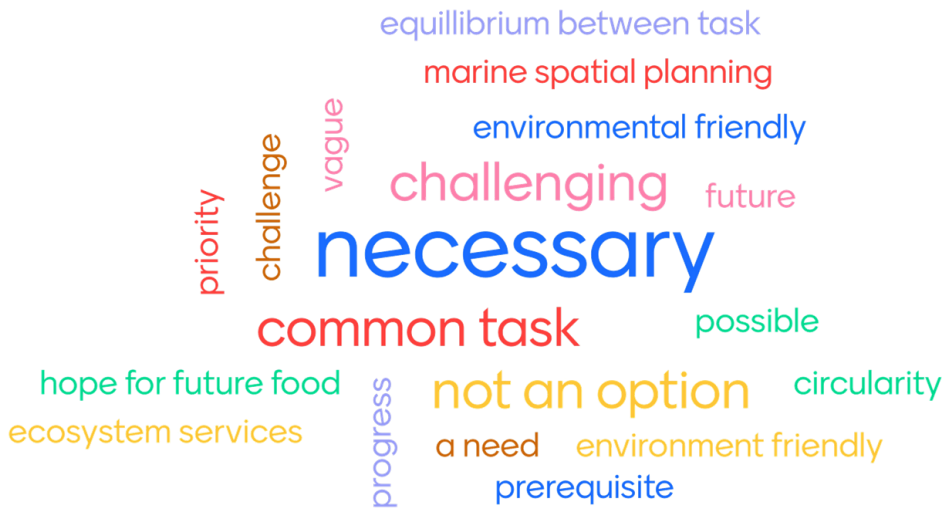
Dynamics of knowledge and innovation

Innovation is a knowledge management process, involving creation, integration, sharing and application of knowledge.

A new challenge: avoid knowledge polarization for achieving sustainable innovation → collective intelligence and open innovation

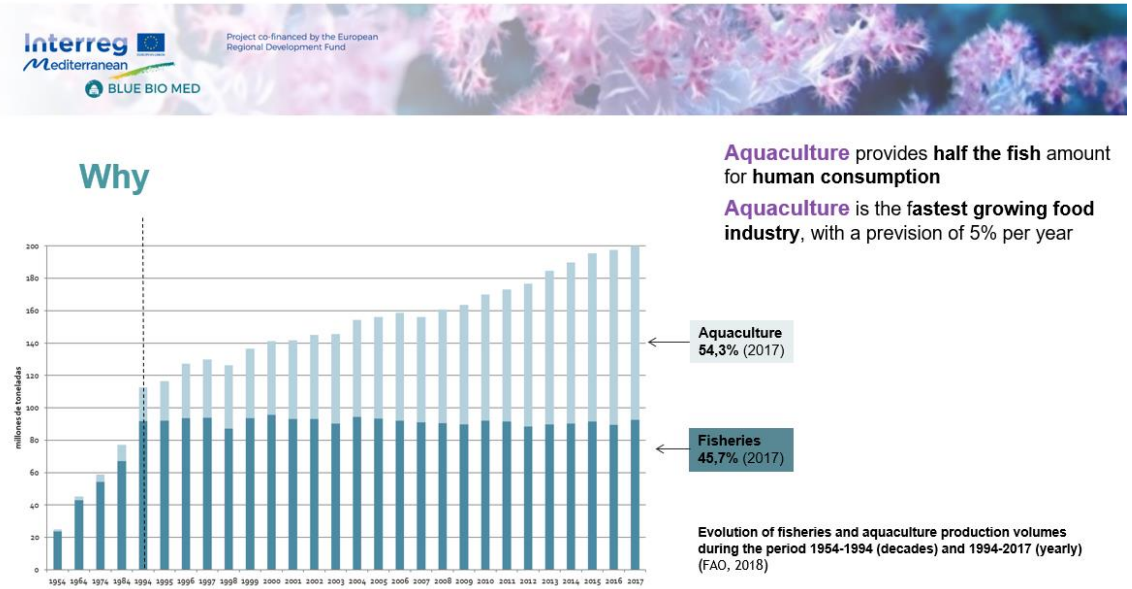
INTRODUCTION TO TECHNICAL INNOVATION AND BUSINESS MODEL

The sustainability of aquaculture is...



Speech by Lourdes Reig Puig

Link to the presentation



1st Workshop

13 October 2021

Project co-financed by the European Regional Development Fund

AGENDA

Objectives

- Create a common language, an even level of knowledge and a shared understanding and vision, among participants, regarding Sustainable Aquaculture in the Mediterranean
- Develop a shared vision on 4 key aspects: Governance, Environment, Social and Economics

Recap & Workshop launch

Lead Facilitator made a brief recap of the launch event and introduced the focus of this 1st workshop and the working methodology

Speech on the 4 Key Aspects of Aquaculture

Dr. Céline Dubreuil set the base on the 4 key aspects of Aquaculture (Governance, Environment, Social and Economics) in terms of macroeconomic and technical trends, objectives, and future challenges

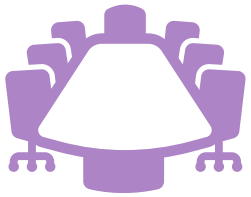
World Café on Aquaculture

Participants were split in 4 groups, in which they deal with a different focus for each gruop, details in the next slide

Debrief on Aquaculture World Cafè

Facilitators recall what emerged from the group works

Link to Dr. Céline Dubreuil's presentation



Link to 1st Workshop Miro Board

Project co-financed by the European Regional Development Fund

EVIDENCES FROM 1st WORKSHOP

After World Cafè discussion

Governance

Critical Aspects :

- **Inconsistency** of policies at different territorial levels
- **Legislative gaps** that hinder innovation to happen; lack of legislative framework for some sectors *(i.e. seeweed, new species)*

Needs :

- **Involvement of local actors** through participatory processes *(for MSP, for common regulatory framework, S3 design, …)*

Environment

Critical Aspects:

- **Feed** is an issue to be resolved, cause it's also a **key** to improve **ecological footprint**

Needs:

- **Special planning of aquaculture** linked to **ecosystem carrying capacity**
- **Choice of geographic area** to integrate multitrophic aquaculture and reduce negative environmental impact
- **Certificate Sustainable Aquaculture** and monitor the certification

Social

Critical Aspects :

- **Conflicts** linked to **lack of spaces** dedicated to aquaculture, in particular potential conflicts with the tourism sector
- **Lack of knowledge** on what Sustainable Aquaculture is, particularly for the consumers

Needs:

- **Public regulations, campaign, education** to show what Sustainable Aquaculture is
- **Raise awareness** in the public

Economics

Critical Aspects :

- **Communication about the products** is lacking

Needs:

- **Romantic view of "natural/tipical/traditional food"** is no more applicable
- **KPIs to monitor the quality of products** to support marketing moves and communications with measurable and comparable evidences

2nd Workshop

25 October 2021

Project co-financed by the European Regional Development Fund

AGENDA

Objectives

- Facilitate a moment of dialogue on 3 Innovation Levers: Technical Innovation; Innovation through cooperation; Knowledge-related innovation
- Finalize a map of possible stakeholders and initiatives
- Create new networks with participants interested in developing projects in the future

Launch of the workshop and ways of working

Lead Facilitator launched the workshop and the teamwork on the 3 Innovation Levers (Innovation through cooperation; knowledge – related innovation; technical innovation and business models)

Teamwork

Participants were divided into 3 groups, 1 for each Innovation Levers:

- *Innovation through cooperation*
- *knowledge – related innovation*
- *technical innovation and business models*

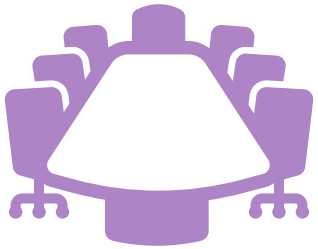
Final presentation

Each Specialist presented what emerged from the group discussion

Innovation through Cooperation

Knowledge-related Innovation

Knowledge-related Innovation



Link to 2nd Workshop Miro Board

Project co-financed by the European Regional Development Fund

EVIDENCES FROM 2nd WORKSHOP

Arianna Cecchi

Innovation through Cooperation

We support a **collaborative framework for Innovation in Sustainable Aquaculture**,

• characterized by these features (SUCCESS FACTORS):

intersectoral, bottom-up, participative/inclusive, complementary to the existing initiatives.

• whose members are (KEY PARTNERS):

All actors of the quadruple helix at all levels and of the aquaculture value chain, including small private companies, civil society organizations (building capacity for them to be part of the initiative), financial institutions and programme owners.

• It should (TRUSTWORTHY RELATIONSHIP):

foster information and experiences sharing; ensure transparency and privacy; identify common practical (as “non high level”) goals; offer the opportunity to meet directly (both in person and digitally), creating the relationships and the bonds

• Delivers these benefits to its members (VALUE PROPOSITION):

Creation of a critical mass to develop new knowledge, methodologies and promote synergies; work in a more integrated and intersectoral way; be involved in long-term processes; create a culture of collaboration and participation that can (Should) be replicated in the smaller scale

• and should mainly be focused on (KEY ACTIVITIES):

Identifying the key priorities at MED level; generate new ideas among peers; creating opportunities for exchange focusing on specific topics (for instance through intersectoral and multi-thematic exchange and matchmaking platforms)

Project co-financed by the European Regional Development Fund

EVIDENCES FROM 2nd WORKSHOP

Kristian Mancinone

Knowledge-related Innovation

In order to develop a **Knowledge Exchange Platform** there are **needs** to satisfy and **knowledge gaps** to fill, that are:

Needs:
- **develop plans**, at national level, to **create maritime spatial plans**
- **promote/enforce communication** about production methods
- support long term startegies with **stable funding**
- have a **stable legal framework**, at least at a macro-regional level

Knowledge gaps:
- mismatch between **education institutions and market**
- **policy makers** need more skills (i.e. in technical issues) in order to build new strategies for aquaculture

Critical success factors, initiatives and activities to foster and encourage knowledge innovation have also been identified:

Critical success factors:
- **Exploring target**
- Connection/**Networking**
- **Lifelong learning**, dedicated training programs
- **Different communication**
- Protect the **intellectual property**
- Common **certification standard**

Initiatives:
- Connect **industry and research**
- **International master/programs**
- **IPR exploitation**

Activities:
- Promote **results of successful projects**
- Create **exchange programs**
- **European university programs**

Project co-financed by the European Regional Development Fund

EVIDENCES FROM 2nd WORKSHOP

Lourdes Reig Puig

Technical Innovation and Business Models

The **most important** points emerged from the discussion between participants for the **IMTA** are:

- the need to **work together** with research institute and companies
- the need of a **common legal framework** among different regions and countries
- the need of a **multi-disciplinarity** view also, chemists, economists, engineers and not only biologists' point of view
- the need of a **change of vision** toward this new IMTA approach: be open to new **disciplines**, **technologies**, **habits**
- the need to **start with small scale project** that can be demonstrative, successful and assumable
- the need to **help the consumer in change** their minds and habitudes
- the need to **take account of climate change and pollution**, which will be important drivers to consider to change things
- the need of **digitalization,** whereas digital is a key tool to collect information to support the decision-making process
- the need to **consider the circular economy**
- the need to **increase ecosystem services**

Let's keep in touch!

One of the aims of the policy experiment is to connect different stakeholders to create a network of people involved in advancing sustainable aquaculture in the Med.

Contacts

Kaimakoudi Eleni, *Agricultural Economics Research Institute*, ekaimakoudi@agreri.gr

Gonzalez Victoria, *University of Alicante,* victoria.fernandez@ua.es

Infante Carlos, *Fitoplancton Marino, S.L.,* carlos.infante@easyalgae.com

Garcia Jesus, *University of Murcia,* jesus.argente@um.es

Porte Cinta, *IDAEA-CSIC*, cpvqam@cid.csic.es

Agrotis Neophytos, *Cyprus Marine & Maritime Institute (CMMI),* neophytos.agrotis@cmmi.blue

Chiodini Luca, *Regione Emilia-Romagna,* luca.chiodini@regione.emilia-romagna.it

Statzu Vania, *Mediterranean Sea and Coast Foundation (MEDSEA)*, vaniastatzu@medseafoundation.org

Reig-Puig Lourdes, *Universitat Politècnica de Catalunya* (*UPC)*, lourdes.reig@upc.edu

Mannelli Sofia, *Chimica VERDE BIONET*, presidente@chimicaverde.it

Paravano Lino, *Java Biocolloid Europe SRL*, lino@java-biocolloid.com

Bachouche Samir, *WestMED Initiative,* bachouche.samir@gmail.com

Carlos Carballo, *CUPIMAR S.A,* carlos.carballo@cupimar.com

Chrysa Efstratiou, *Hellenic Centre for Marine Research*, ch.efstra@hcmr.gr

Antonia Giannakourou, *Hellenic Centre for Marine Research,* agiannak@hcmr.gr

Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

stefano.valentini@art-er.it arianna.cecchi@art-er.it lucia.cortelli@art-er.it

Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

ATTACHMENTS

Attachments Summary

- Launch Event
- Overview on Aquaculture 1st view
- Innovation through Cooperation 1st view
- Knowledge-related Innovation 1st view
- IMTA-Technical Innovation and Business Models 1st view
- 1st Workshop
- Aquaculture Key Focus
- 2nd Workshop
- Innovation through Cooperation 2nd view
- Knowledge-related Innovation 2nd view
- IMTA-Technical Innovation and Business Models 2nd view

Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

Launch Event

Céline Dubreuil

Dr Céline Dubreuil holds a PhD in oceanography and a Master's degree in environmental policy. She has been working in the field of sustainable development for nearly 20 years. After 8 years at the World Water Council devoted to international water policy, Céline joined the Plan Bleu in 2012 as a programme officer for water, climate change, wetlands and the blue economy in the Mediterranean. She became Director of Programmes in 2021. Plan bleu is partner of the Mediterranean Blue Growth community project.

Overview on Aquaculture

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Aquaculture: A Booming sector in the Mediterranean !

Overfishing ⇒ 78% of (assessed) fish stocks are overfished in the Med region !

Increased per capita seafood consumption

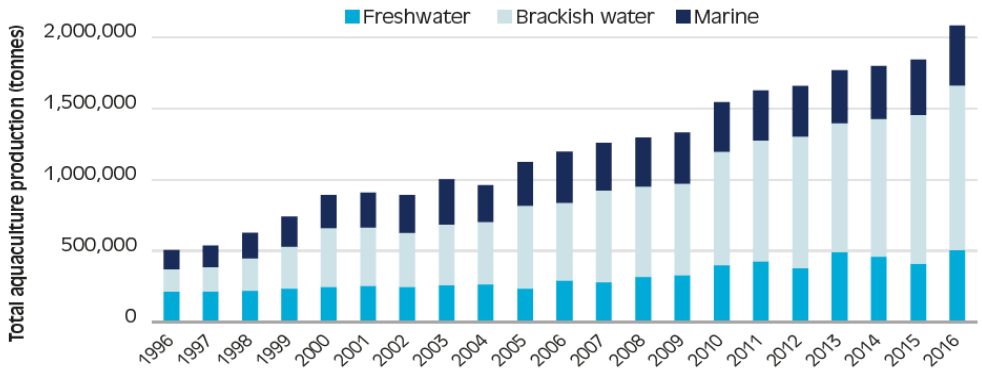
Plan Bleu

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Aquaculture: A Booming sector in the Mediterranean !

Plan Bleu

- Major role in economic growth and food security for a growing population
- 313,000 direct and indirect jobs in the Med and Black Sea countries
- Aquaculture production X4 between 1996 and 2016 and >2 million tonnes /year
- 2/3 fish farming and 1/3 shellfish farming
- Mainly on the northern shore of the Med: Turkey, Greece, Italy, Spain
- By 2025, aquaculture is expected to provide >50% of all fish used for human consumption
- +112% production by 2030 (Med EU countries)



(Source: produced by GFCM from FishStat and SIPAM data, 2019)

This rapid expansion of aquaculture raises sustainability issues !

Plan Bleu

Project co-financed by the European Regional Development Fund

Let's define with us a vision of SUSTAINABLE aquaculture …

…during our next Workshop, *Wednesday 13th October*

4 aspects will be addressed:

- Governance
- Environment
- Social
- Economics

…on the basis of the Road map for sustainable aquaculture developed by Plan Bleu

Arianna Cecchi

After a degree in marine environmental sciences and MSc in Marine Geotechnics, Arianna started as an environmental consultant in 1998. In 2001 joined the Task Force “Environment” at the Italian Ministry of Environment, related to European Structural Funds.

Since 2006 Arianna has worked on innovation:

- In 2006, employed by the regional agency ASTER, in the Environment and Energy Area, she was supporting regional research groups and laboratories to exploit their research through **innovation projects**.
- From 2013 to 2020 worked with EIT Climate-KIC as **Innovation lead** at EU (first) and Italian levels (later), supporting Climate-KIC partners to develop and deploy climate-innovation projects.
- Since July 2021, employed in ART-ER, Sustainable Development Area.

Innovation through cooperation teamwork

Why

Why "Innovation through Cooperation"?

New approach to innovation

Since ‘50s

Science and tech focus

Since ‘80s

Science & business focus

Since 2010s

Transformative change to address grand challenges

Missions and goals (SDGs, climate targets), assisting new entrants, creating transformative coalitions, learning, experimentation

This requires a multi-stakeholder collaborative environment!

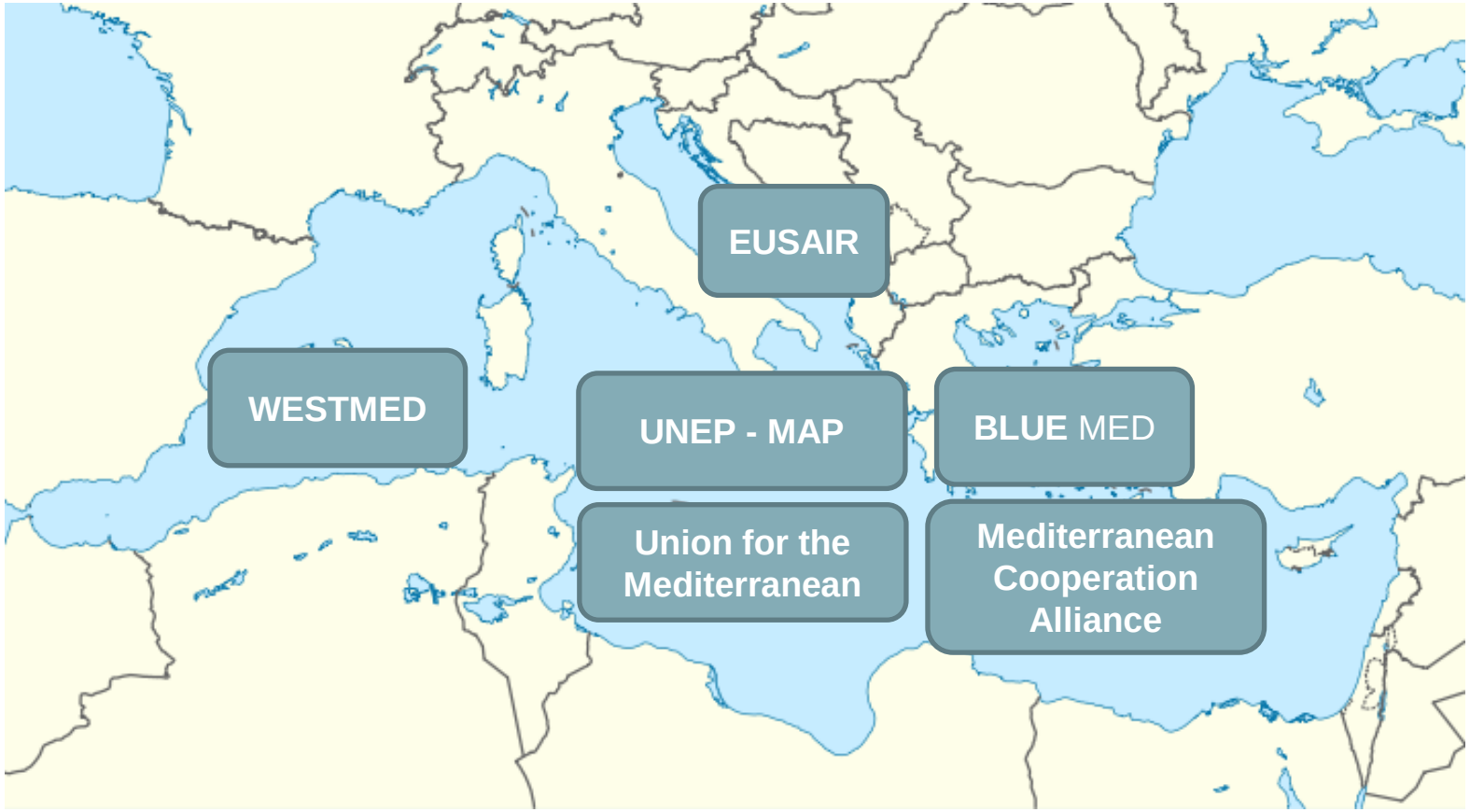
Source: https://op.europa.eu/en/publication-detail/-/publication/24c4a811-a9f9-11ea-bb7a-01aa75ed71a1/language-en

What

What is Transformative Innovation?

- Deep change in socio-technical system
- Mission-driven
- Multiple changes, simultaneously
- Impact-driven and place-based

An Innovation alliance built upon existing initiatives



The aim

"INDUSTRY value-chain-led"

ETPs

"RESEARCH driven"

JPIs

BLUE MED

"Mission driven" Knowledge triangle-led

EIT -KICs

The aim of the "innovation through cooperation" working group is to understand:

- with **whom?**
- **how?**
- **what?**

Kristian Mancinone

In ART-ER I'm working on the development of the regional social innovation ecosystem within the framework of Smart Specialization Strategy (S3). Involved in Responsible Research and Innovation projects dealing with public engagement and impact of the research and innovation ecosystem; RRI is seen as a framework to connect territorial social challenges and research and innovation facilities and centers at regional level. Previously I was involved in activity related to education and training of students and researchers and startup development.

Master in Economics and Management of Social Economy Organizations, I'm passionate about non profit and civic innovation. I'm interested in design thinking and human-centered design.

I'm ADDICTED TO SOCIAL INNOVATION

Dynamics of knowledge and innovation

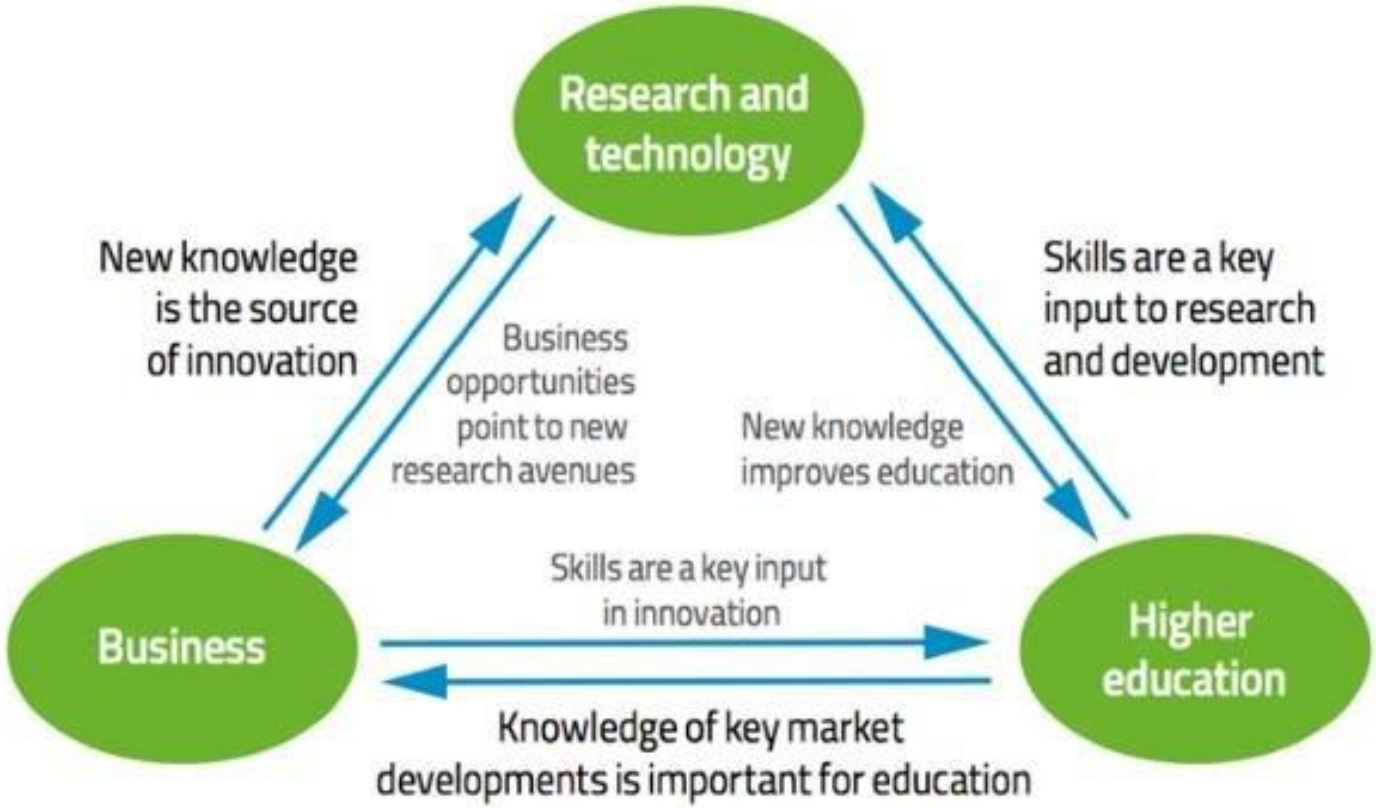
Innovation is a knowledge management process, involving creation, integration, sharing and application of knowledge.

A new challenge: avoid knowledge polarization for achieving sustainable innovation → collective intelligence and open innovation

Knowledge sharing: a definition

Knowledge sharing is an activity through which knowledge as information, skills, or expertise (both tacit and explicit) is exchanged among people, friends, families, communities or organizations

Knowledge triangle



The aim of the Knowledge related innovation group

1) Deepen the dynamics in knowledge creation, accumulation and utilization

2) Explore potential opportunities for knowledge-related innovation

3) Discover solutions and partnerships for innovating knowledge sharing in sustainable aquaculture

Guiding Questions

1) How should the exchange of knowledge occur and prompt to underpin innovation in Sustainable Acquaculture?

2) What skills and competences need to be shared and what are knowledge gaps?

3) What could support the development of knowledege sharing, what are the critical success factors?

Lourdes Reig Puig

I've a PhD in Marine Science and a Master in Scientific Communication. I've been working for more than 35 years in aquaculture. First in production, in a private company, and then in research and teaching at the Universitat Politècnica de Catalunya (UPC).

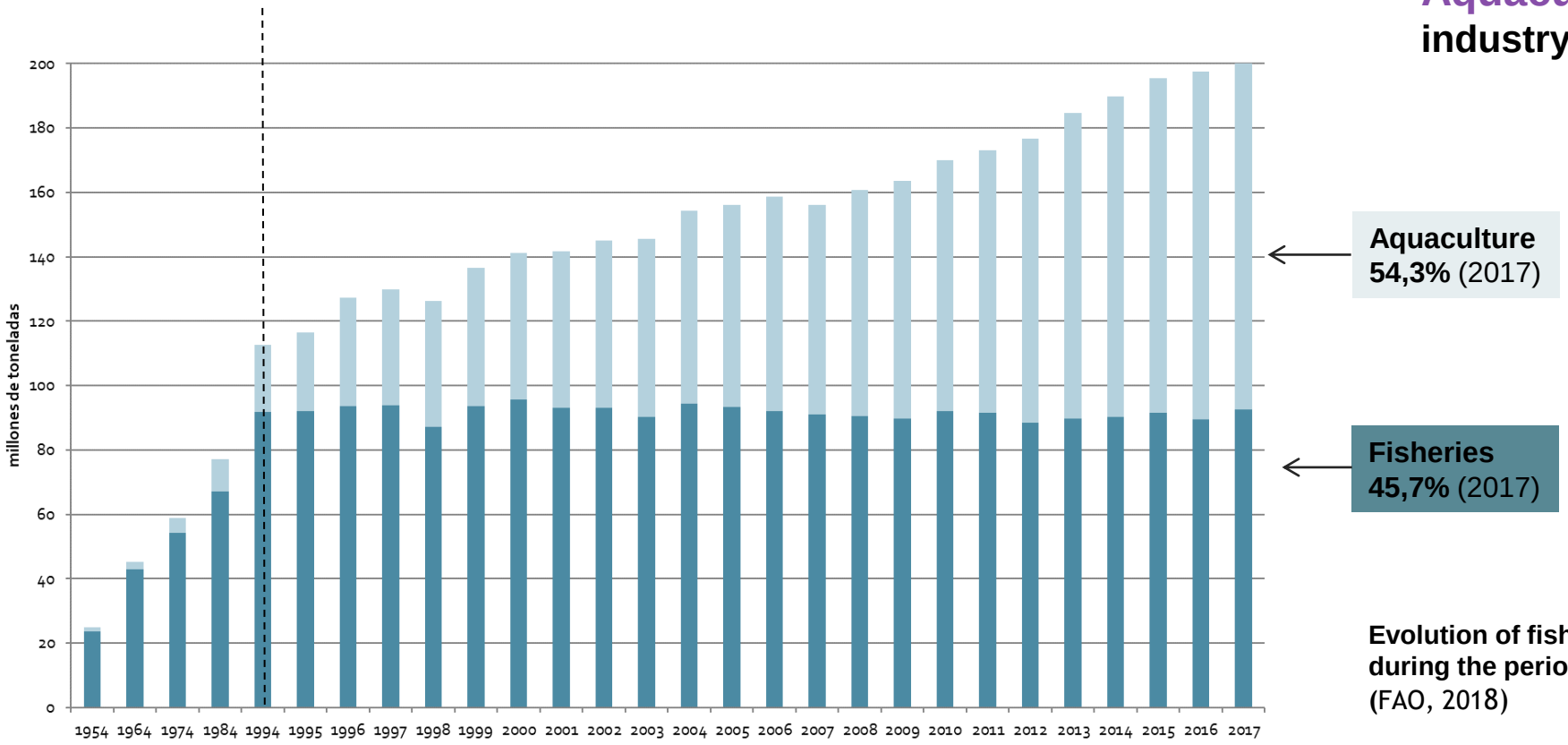
Nowadays I'm interested in improving the image of aquaculture among consumers, and learning how to communicate its benefits to society.

Recently, I've accepted the challenge to coordinate the Catalan Network for Blue Innnovation (BlueNetCat) grouping more than 590 researchers on Blue Growth.

Why

Aquaculture provides **half the fish** amount for **human consumption**

Aquaculture is the f**astest growing food industry**, with a prevision of 5% per year



Aquaculture
54,3% (2017)

Fisheries
45,7% (2017)

Evolution of fisheries and aquaculture production volumes during the period 1954-1994 (decades) and 1994-2017 (yearly) (FAO, 2018)

Why

In the **Mediterranean** **Aquaculture** is expected to provide…

…**food security**

…**employment** and

…**economic development**

…while **reducing the dependence on overexploited wild stocks**

Will that be possible while keeping it **sustainable in the long term**?

Source: http://www.fao.org/3/I9766EN/i9766en.pdf

What

The Mediterranean should envisage a future for its aquaculture '**where the industry will be globally competitive, sustainable, productive, profitable and equitable**' as stated in the Strategy for the sustainable development of Mediterranean and Black Sea aquaculture

Innovation should be applied on…

…**governance**

…**technology**

…**environmental, social** and **economic** challenges

TARGET 1: Build and efficient regulatory and administrative framework to secure sustainable aquaculture development

- Output 1.1: Improved aquaculture regulatory frameworks and streamlined public sector management
- Output 1.2: Integrated aquaculture in coastal zones

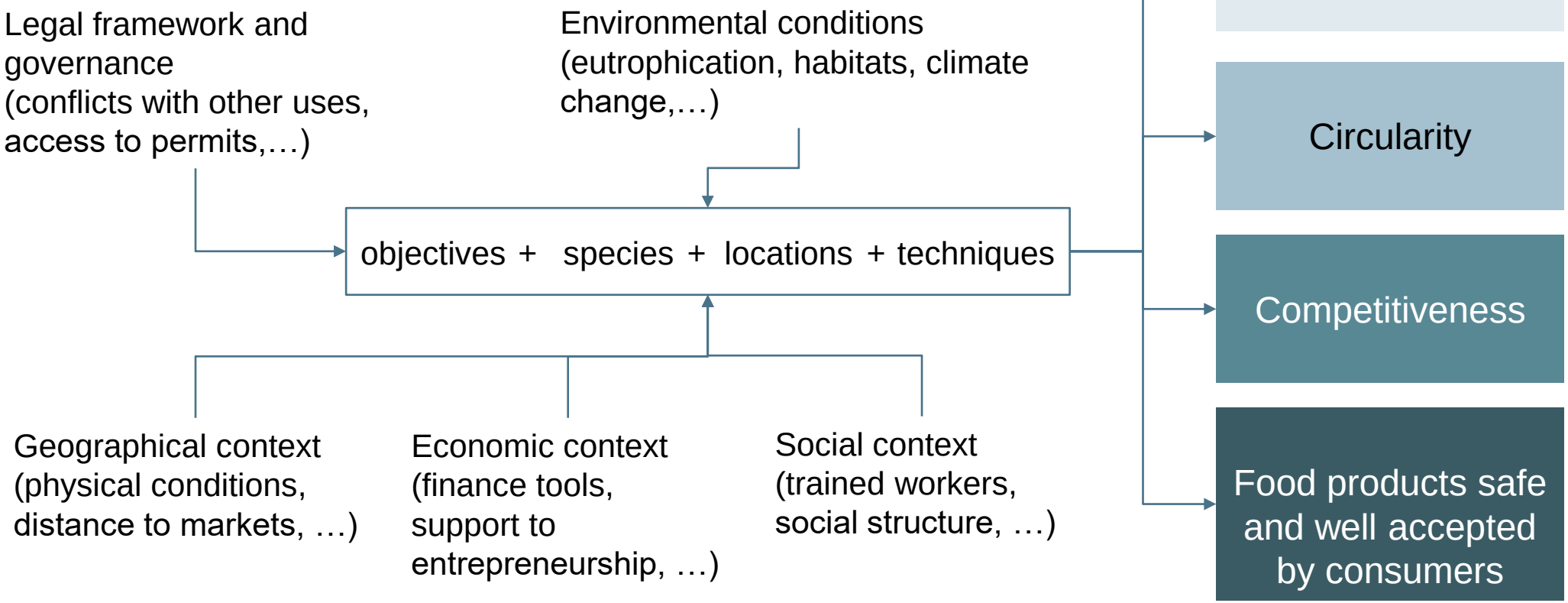
TARGET 2: Enhance interactions between aquaculture and the environment while ensuring animal health and welfare

- Output 2.1: Mitigated impacts on the environment and improved environmental protection
- Output 2.2: Responsible aquatic animal health and welfare management
- Output 2.3: Enhanced research and knowledge sharing on aquaculture

TARGET 3: Facilitate market-oriented aquaculture and enhance public perception

- Output 3.1: A market-driven aquaculture sector development
- Output 3.2: Safety and quality of Mediterranean and Black Sea aquaculture products
- Output 3.3: Enhanced aquaculture and aquaculture products marketing and communication

The aim of the teamwork



Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

1st Workshop

Dr Céline Dubreuil

Programme Director – Plan Bleu

AQUACULTURE KEY FOCUS

Dr Céline Dubreuil

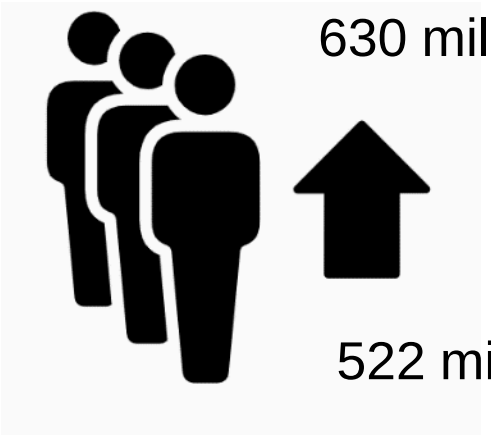
Workshop 1

13 October 2021

Project co-financed by the European Regional Development Fund

Aquaculture: A Booming sector in the Mediterranean !

Overfishing 78% of (assessed) fish stocks are overfished in the Med region !



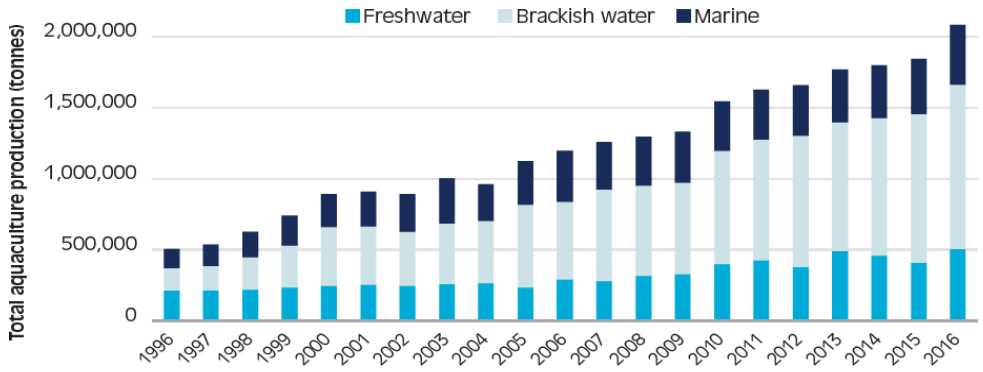
Increased per capita seafood consumption

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Aquaculture: A Booming sector in the Mediterranean !

Plan Bleu

- Major role in economic growth and food security for a growing population
- 313,000 direct and indirect jobs in the Med and Black Sea countries
- Aquaculture production X4 between 1996 and 2016 and >2 million tonnes /year
- 2/3 fish farming and 1/3 shellfish farming
- Mainly on the northern shore of the Med: Turkey, Greece, Italy, Spain
- By 2025, aquaculture is expected to provide >50% of all fish used for human consumption
- +112% production by 2030 (Med EU countries)



(Source: produced by GFCM from FishStat and SIPAM data, 2019)

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

This rapid expansion of aquaculture raises sustainability issues !

- Sustainable aquaculture means ensuring **not only** that the industry is **economically and environmentally sustainable but also** that farms operate in a **socially and culturally responsible manner**
- Challenges considered here under 4 pillars: Governance, Environmental, Social & Economics
- On the basis of the ***Road map for a sustainability transition in Mediterranean aquaculture*** developed by Plan Bleu (2021)

  → Based on a regionally shared long-term vision for aquaculture in the Mediterranean (coastal and off-shore), this road map aims to foster transition towards raise visibility and operationalize innovative approaches, methods, tools and practices to tackle priority challenges posed by the expansion of marine aquaculture in the Mediterranean.

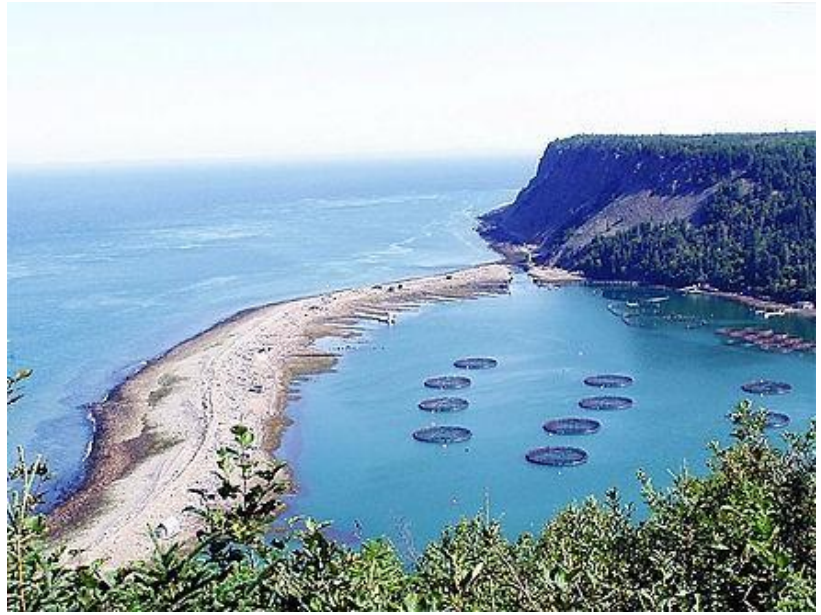
Partners:

UN environment programme | Mediterranean Action Plan Barcelona Convention | Plan Bleu | AFD | Interreg Mediterranean BLUE GROWTH | Interreg Mediterranean BIODIVERSITY PROTECTION

Governance challenges for aquaculture

Plan Bleu

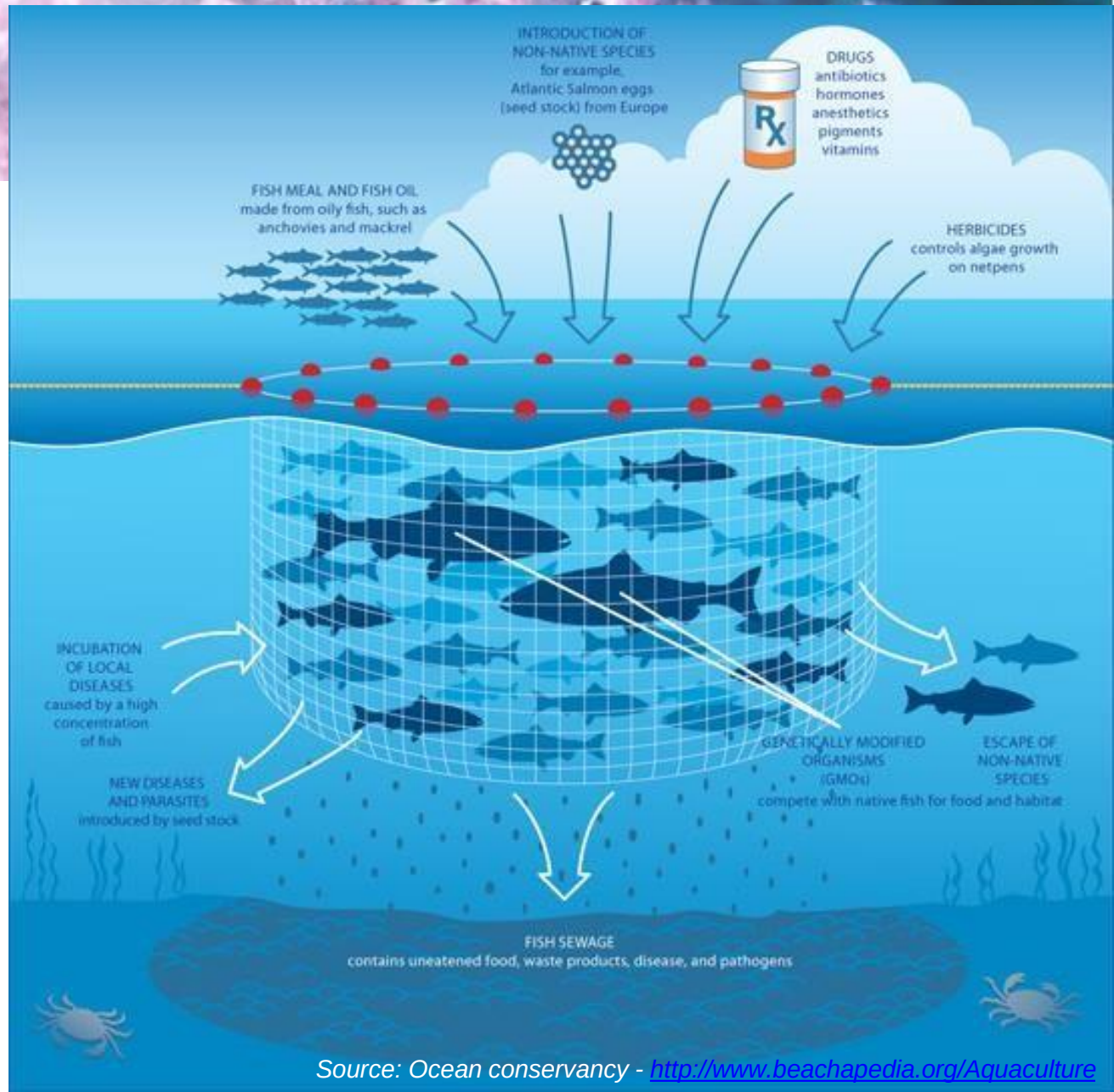
- Space occupation and conflicts among uses
- Interaction between MPAs and marine aquaculture
- Science-based strategies and plans
- Complexity of national licensing systems
- Lack of streamlined administrative management and of dedicated regulatory frameworks
- Overlapping of legislations and authorities
- Insufficient long-term planning
- Lack of participatory approach in decision-making processes



Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Environmental challenges

- **Escape** of fishes (non-native and sometimes invasive) Disease transmission
- **Effluents** eutrophication with loss of biodiversity and habitats
- Impact on the provision of ecosystem services
- Consumption of fishmeal and fish oil
- Genetic alteration of stocks
- Use of antibiotics, hormons, pigments…
- **Vulnerability to climate change**
- Animal **welfare**



Source: Ocean conservancy - http://www.beachapedia.org/Aquaculture

Plan Bleu

Social challenges of the aquaculture sector

- **Social acceptability at local level**
- Impact on **small coastal communities relying on fishing**

- **Insufficient awareness of corporate social responsibility** in the sector
- **Knowledge transfer**

Plan Bleu

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Plan Bleu

Economic challenges of the aquaculture sector

- **Limited competitiveness** which could be due to a combination of factors:
  - Low productivity
  - Poor feeding performance
  - Inadequate health management performance
  - Lack of market strategies
  - Insufficient knowledge of consumer preferences
- **Disconnection between productivity strategies and market evolution**
- **Difficulty for small businesses to entry the market** mainly for the complexity to obtain new concessions and financing
- **Poor circular economy practices**
- **Poor entrepreneurial and finance tools**

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Therefore, a SUSTAINABLE aquaculture sector means…

…more competitive

…resilient to climate change

…limited negative impacts

…productive

…create business and employment opportunities

…equitable

…profitable

Plan Bleu

Project co-financed by the European Regional Development Fund

Thank you for your attention !

Contact: cdubreuil@planbleu.org

Website:
www.planbleu.org

➢ References:

- Plan Bleu (2021) *Road map for a sustainability transition in Mediterranean aquaculture*
- MedAID (Développement Intégré de l'Aquaculture Méditerranéenne). Projet H2020. http://www.medaid-h2020.eu/
- INTERREG MED BLUEfasma project - https://bluefasma.interreg-med.eu/
- Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030 (EU Commission 2021)
- Vers une économie bleue durable dans la région méditerranéenne (UpM, 2021)
- Stratégie pour le développement durable de l'aquaculture en Méditerranée et en mer Noire (CGPM 2018)

Project co-financed by the European Regional Development Fund

BLUE BIO MED

Mediterranean Innovation Alliance for Sustainable Blue Economy

2nd Workshop

INNOVATION THROUGH COOPERATION

Arianna Cecchi

Workshop 2

25 October 2021

OBJECTIVE

Which type of cooperation alliance could be established to underpin transformative innovation for a sustainable aquaculture in the Mediterranean?

- **why?**
- **who?**
- **what?**
- **how?**

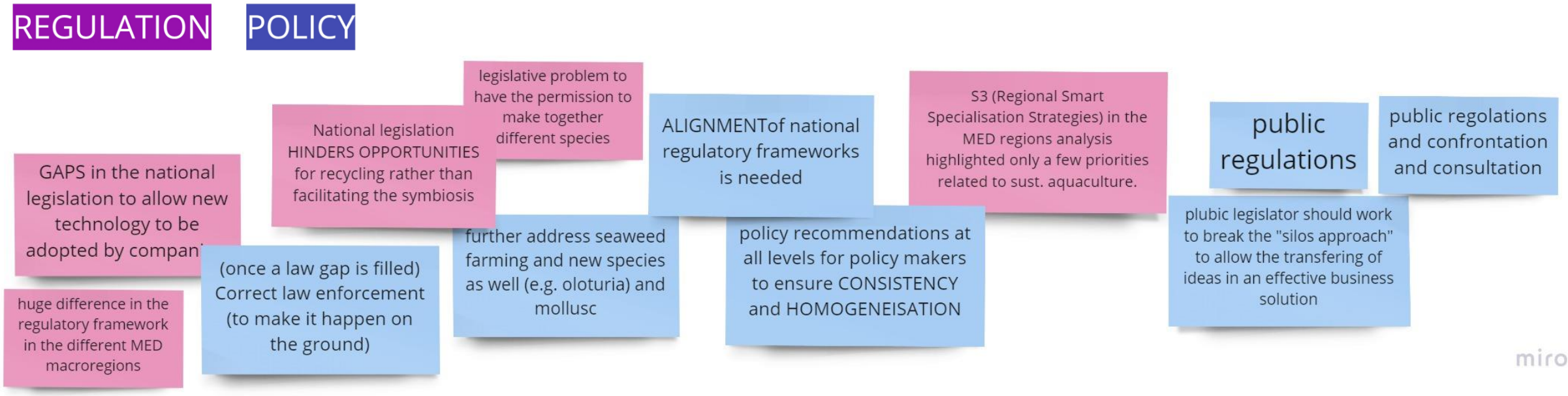
META-OBJECTIVE
Distill info to create the backbone of an innovation alliance for blue bioeconomy

WHY?

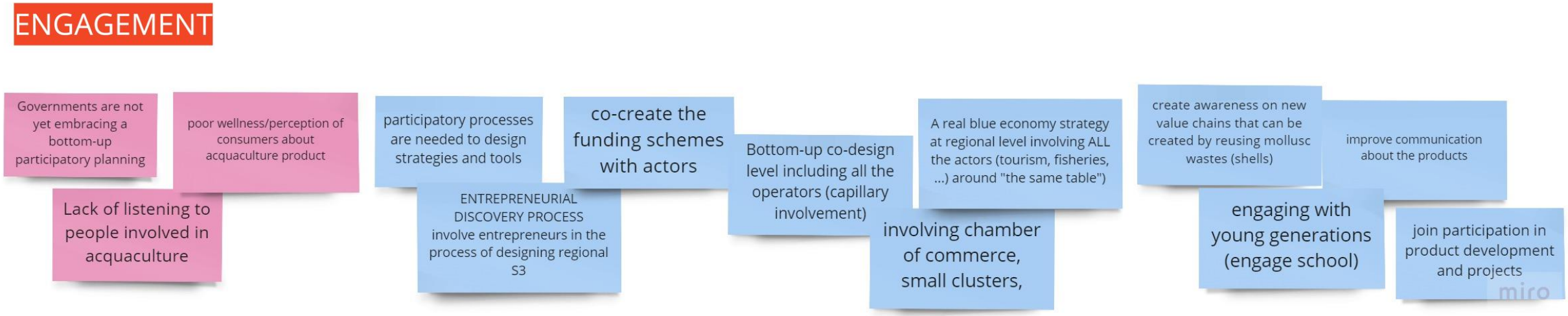
Needs and challenges emerged from Workshop 1

REGULATION
POLICY
ENGAGEMENT
FUNDING/FINANCE
COOPERATION
NETWORKING
ENVIRONMENT
MSP
INSTRUMENTS

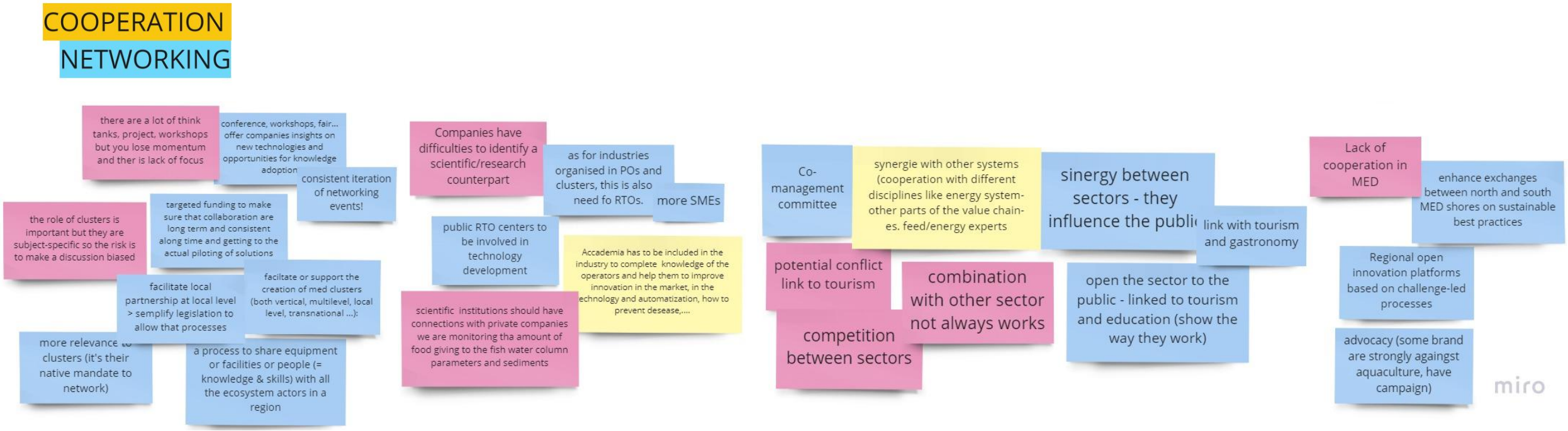
Needs and critical aspects/1



Needs and critical aspects/2

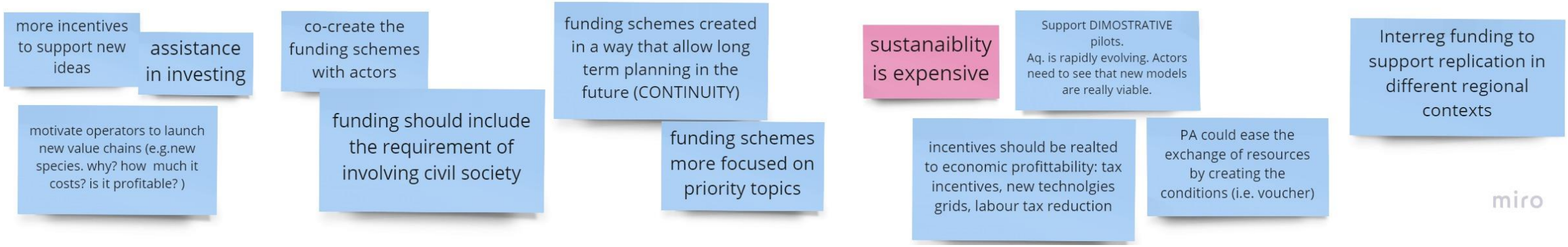


Needs and critical aspects/3



Needs and critical aspects/4

FUNDING/FINANCE

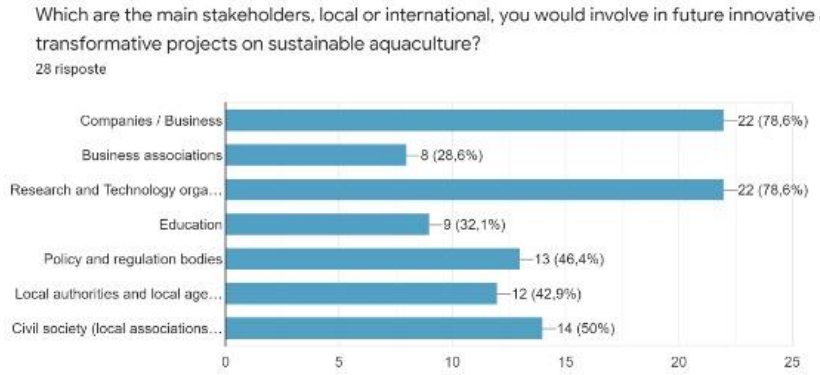


WHO?

LOCAL NATIONAL INTERNATIONAL

Policy and regulation bodies

Vasileios Gongolidis
Department of Fisheries and Marine Research
General Secretariat of Research and Innovation
FAO
EU DG for Maritime Affairs and Fisheries
Ministry of Agricultural Development - Aquaculture Fisheries Management Department- Greece
GFCM, PLAN BLEU, BLUEINVEST
WestMED Initiative
EUSAIR



companies/ business

LINO
NEXT PROTEIN
Next Tuna GMBH
CULMAREX
All aquaculture companies
Kimagro Fishfarming Ltd.

RTO

Univ.of Alicante
CyMARC
IFAPA
Bluefarm
CMMI - Cyprus Marine and Maritime Institute
HCMR (GR) & CMMI (CY)
EATIP
Centro Tecnológico de la Acuicultura CTAQUA
CNRDPA
JESUS E ARGENTE GARCIA

Business Association

Cooperativa pescatori San Giuseppe
Cooperativa Sant'Andrea
Cooperativa Sant'Andrea
Hellenic Aquaculture Producers Organization (HAPO)
Federation of Greek Mariculture

Local authorities/agenicies

Generalitat de Catalunya - SDG Pesca i Aqüicultura
Generalitat de Catalunya - SDG Pesca i Aqüicultura

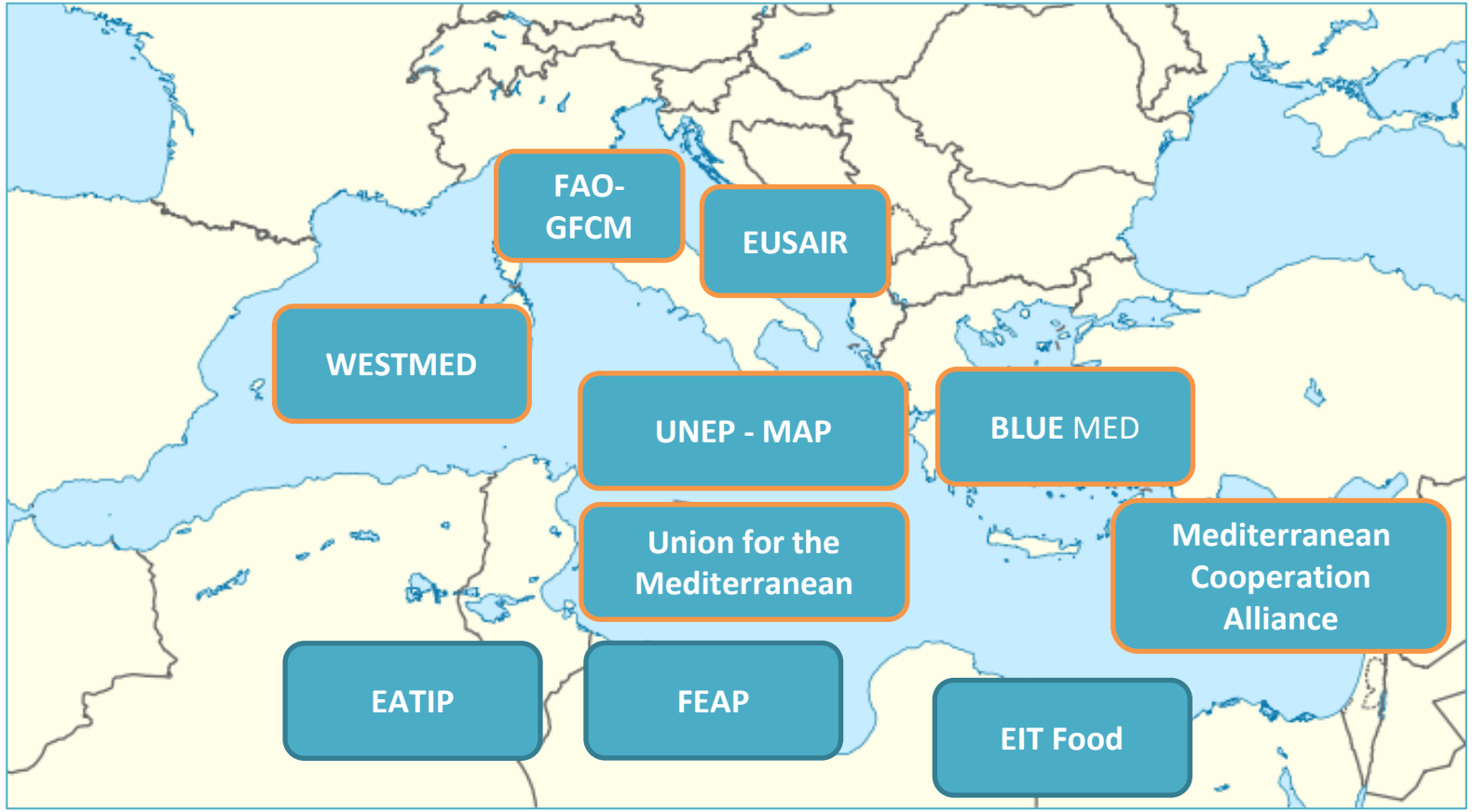
civil society

Consumers associations
IUCN

Education

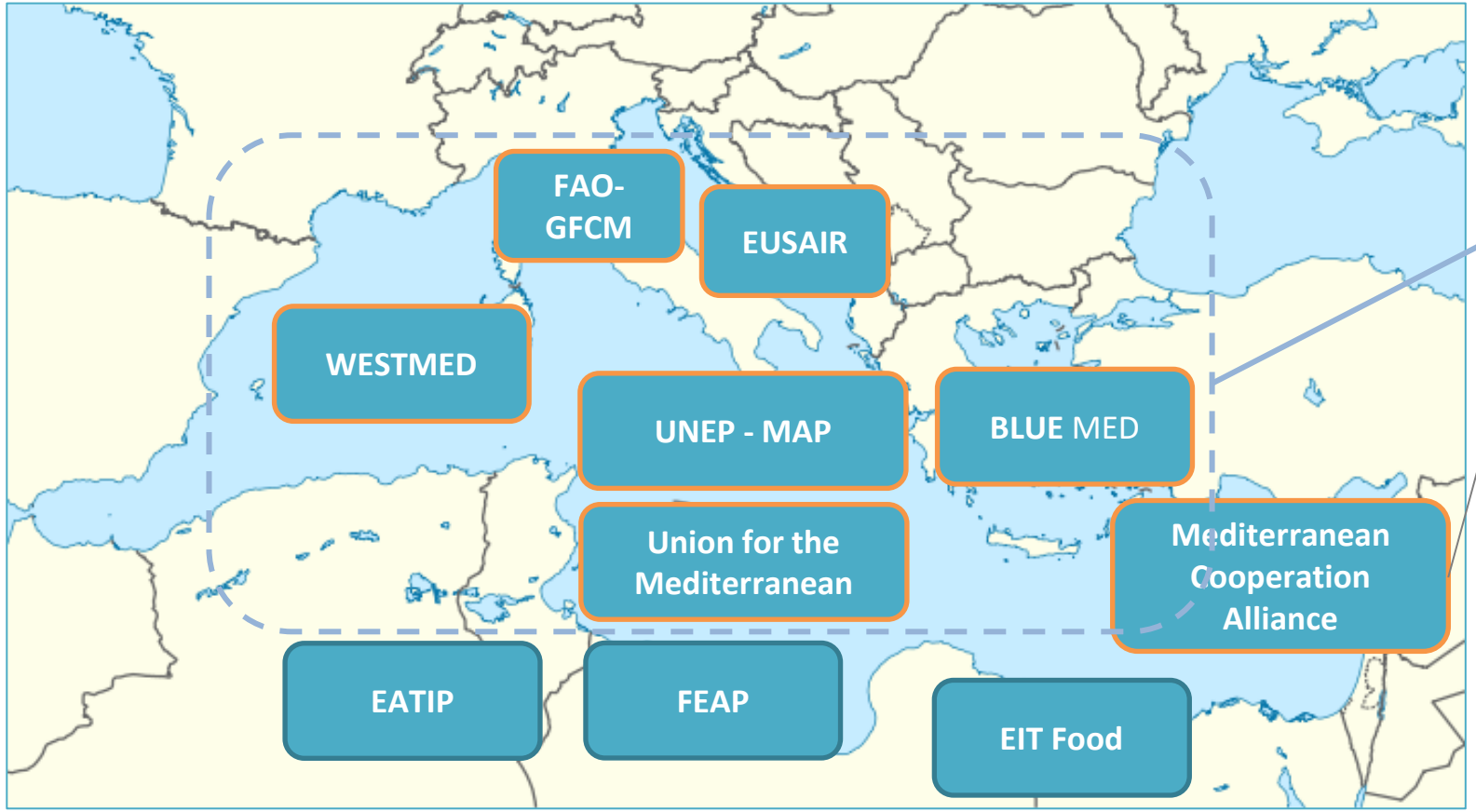
Agricultural University of Athens
National Technical University of Athens
CIHEAM

WHO?



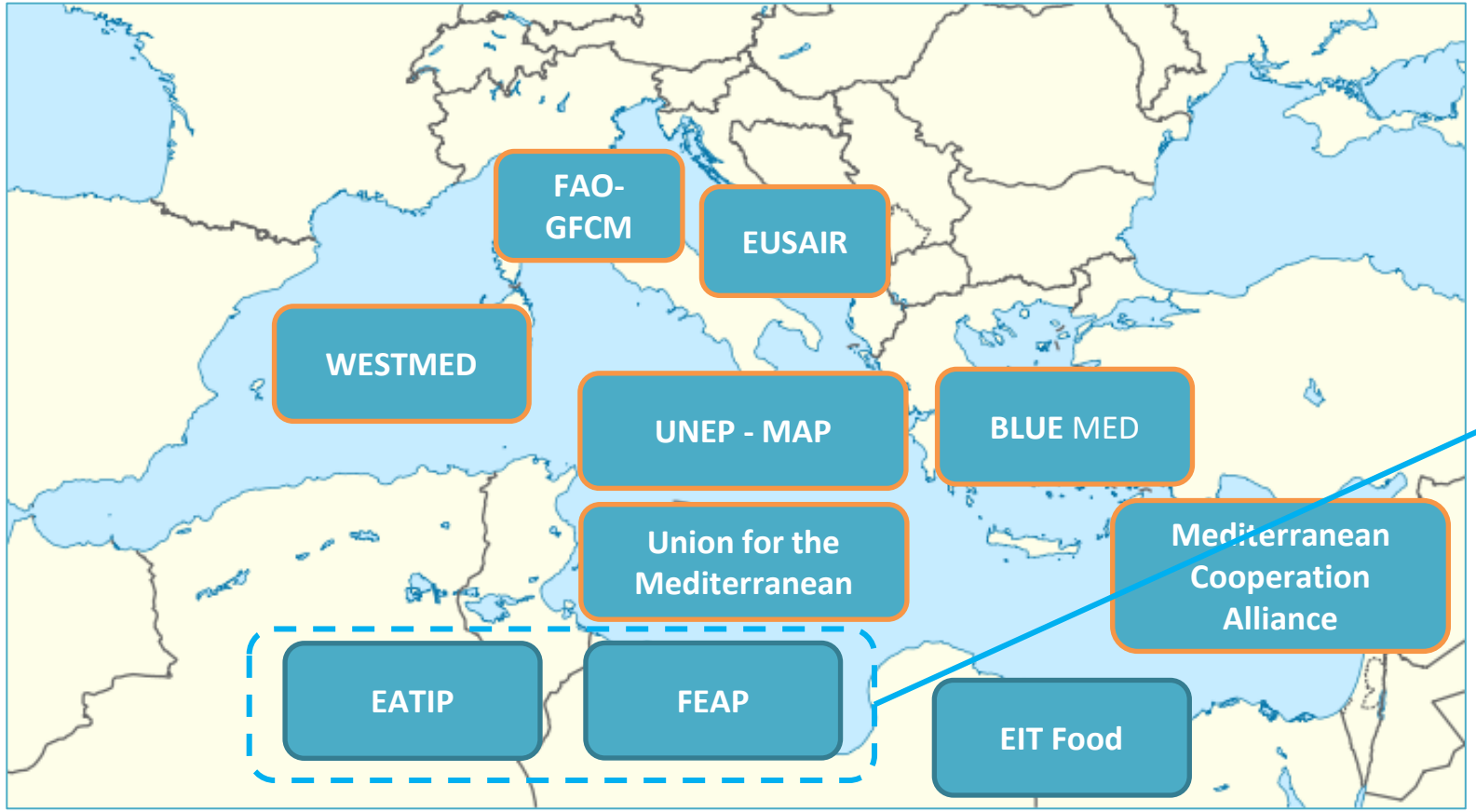
- LOCAL PAs / REGIONs
- COUNTRIEs
- INTERGOV.AGENCIES
- ACCADEMIA
- RTOs
- CLUSTERS
- BUSINESS ASSOCIATIONs
- COMPANIES
- RESEARCHERs
- STUDENTs
- CIVIL SOCIETY

WHO?



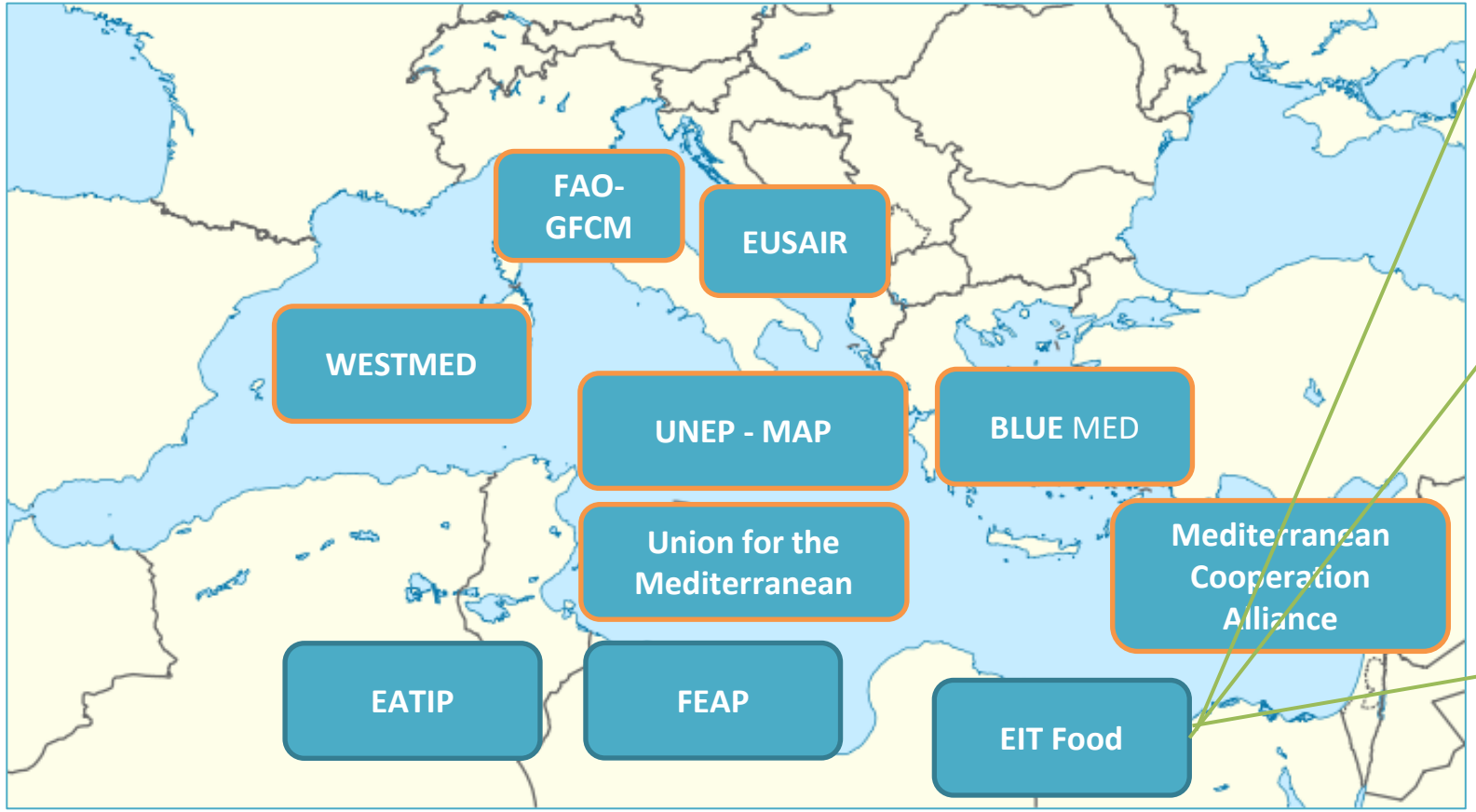
- LOCAL PAs / REGIONs
- COUNTRIEs
- INTERGOV.AGENCIES
- ACCADEMIA
- RTOs
- CLUSTERS
- BUSINESS ASSOCIATIONs
- COMPANIES
- RESEARCHERs
- STUDENTs
- CIVIL SOCIETY

WHO?



- LOCAL PAs / REGIONs
- COUNTRIEs
- INTERGOV.AGENCIES
- ACCADEMIA
- RTOs
- CLUSTERS
- BUSINESS ASSOCIATIONs
- COMPANIES
- RESEARCHERs
- STUDENTs
- CIVIL SOCIETY

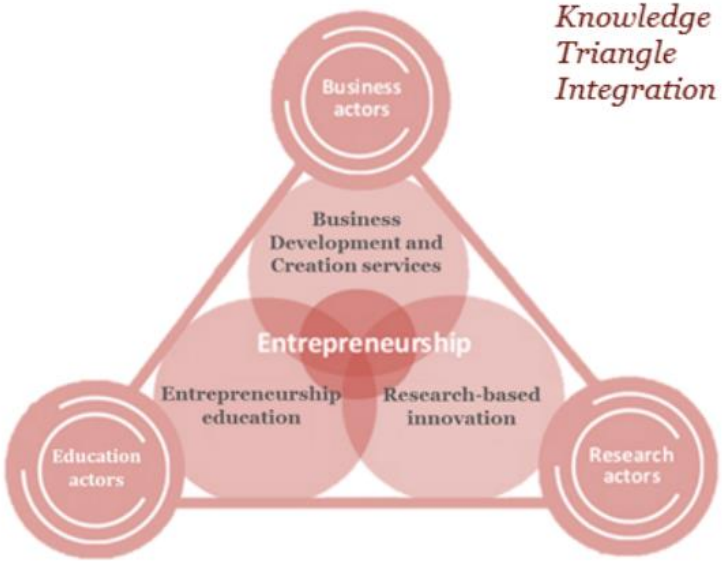
WHO?



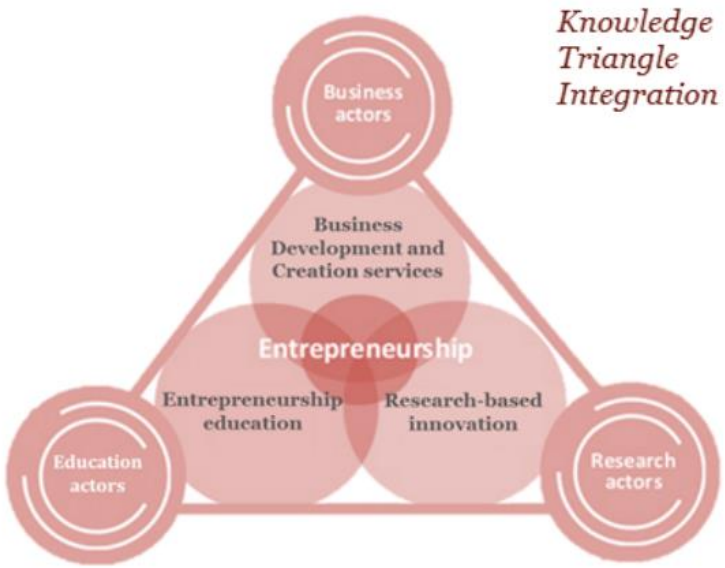
- LOCAL PAs / REGIONs
- COUNTRIEs
- INTERGOV.AGENCIES
- ACCADEMIA
- RTOs
- CLUSTERS
- BUSINESS ASSOCIATIONs
- COMPANIES
- RESEARCHERs
- STUDENTs
- CIVIL SOCIETY

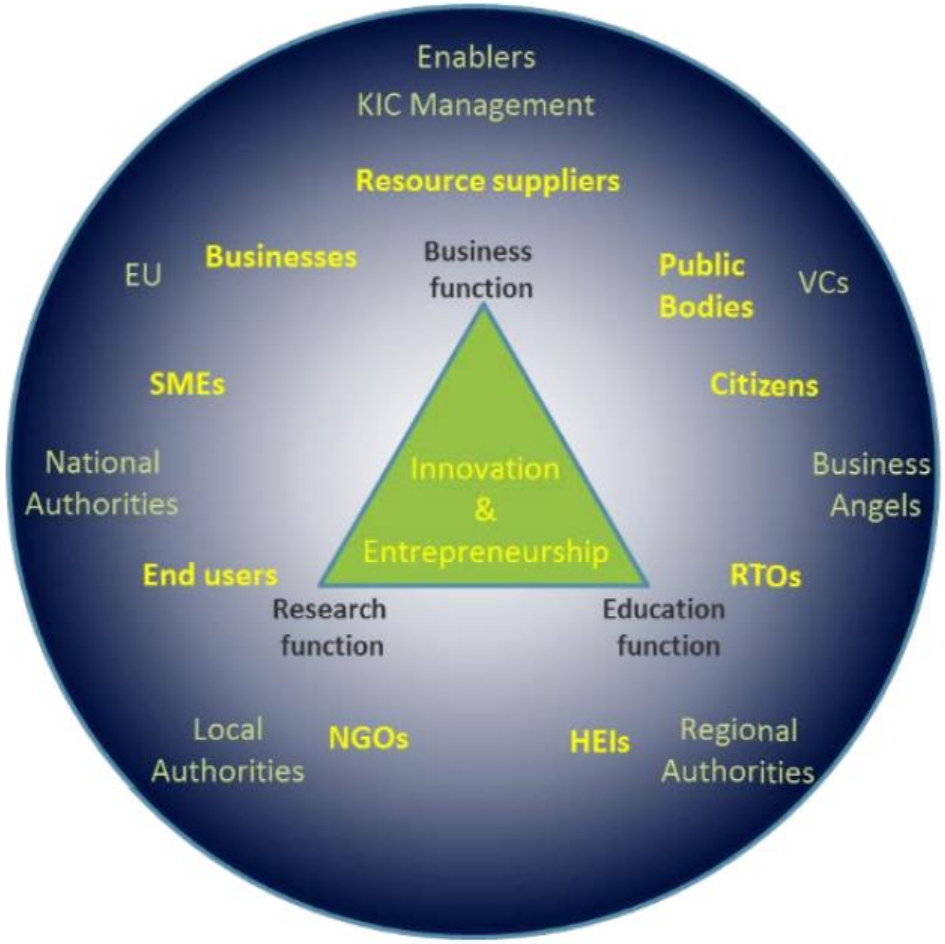
EIT model/1

challenge-based innovation; community; knowledge triangle integration



EIT model/2
"evolution" of the knowledge triangle





Source: "EIT: Our Impact from 2010 to 2016. The EIT – Making Innovation Happen"
European Institute of Innovation and Technology (EIT) Budapest | 26 October 2017

Innovation in aquaculture

Highlights

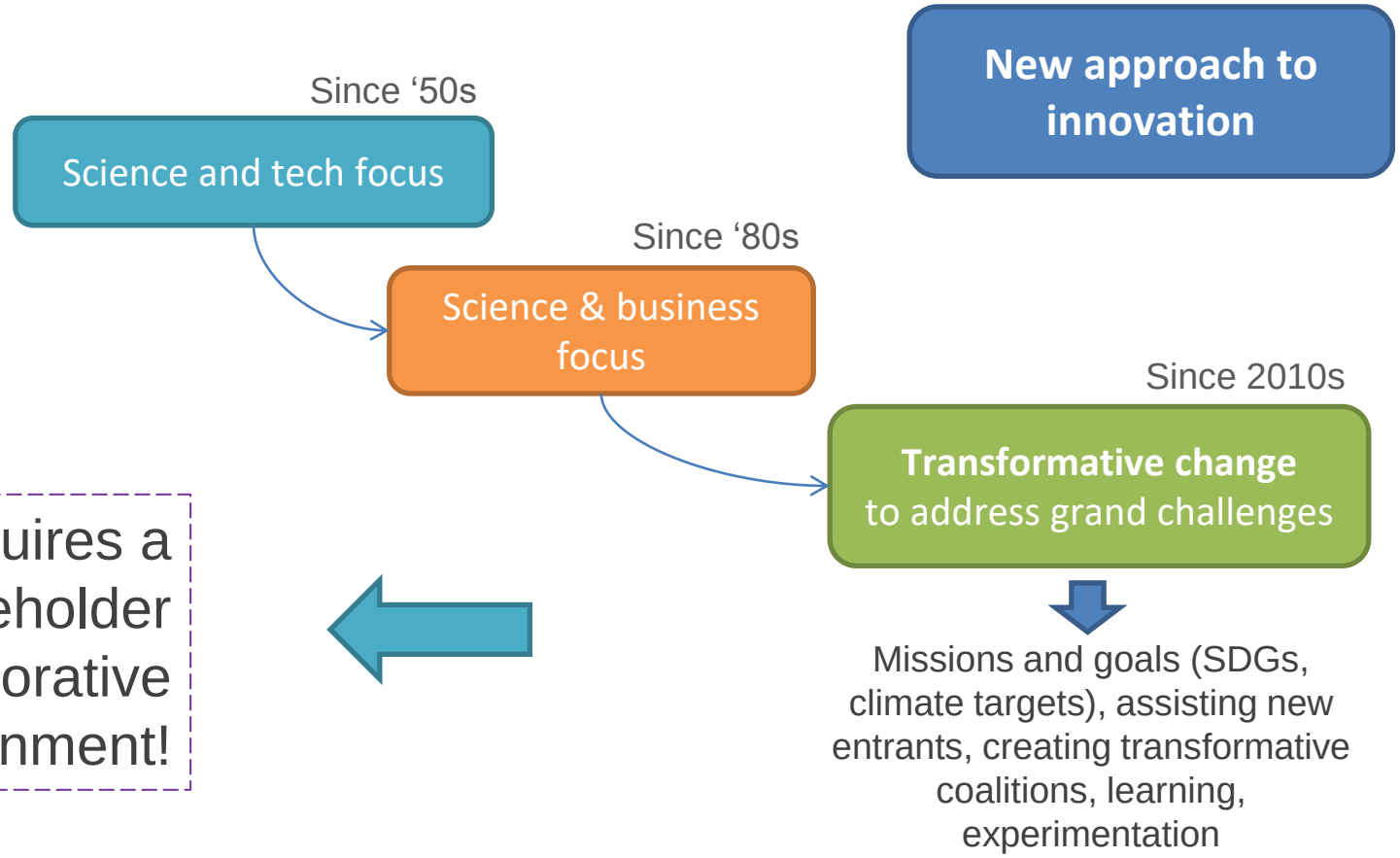
- First systematic review of how the aquaculture literature has approached innovation.
- The *Transfer of Technology* approach with a farm-level focus is still the predominant approach to aquaculture innovation.
- Studies with cross-fertilizations between different approaches to aquaculture innovation are limited.
- A new framework for innovation in aquaculture proposes cross-fertilization between approaches to address complex problems.

"Analysis identified the Transfer of Technology approach as still the predominant approach to aquaculture innovation; and, even with the integration of elements of Systemic approaches, most studies remain focused on the farm level and are technology driven"

Olivier M. Joffre, Laurens Klerkx, Malcolm Dickson, Marc Verdegem, How is innovation in aquaculture conceptualized and managed? A systematic literature review and reflection framework to inform analysis and action, Aquaculture, Volume 470, 2017, Pages 129-148, ISSN 0044-8486, https://doi.org/10.1016/j.aquaculture.2016.12.020.
(https://www.sciencedirect.com/science/article/pii/S0044848616312509)

Why

Why "Innovation through Cooperation"?



Source: https://op.europa.eu/en/publication-detail/-/publication/24c4a811-a9f9-11ea-bb7a-01aa75ed71a1/language-en

Transformative Innovation for Sustainable Aquaculture

Not just technology transfer to tackle **global challenges**

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

WHAT?

For instance…
(suggestions from workshop1)

Create a trustworthy MED CLUSTER

faciltate or support the creation of med clusters (both vertical, multilevel, local level, transnational ...):

the role of clusters is important but they are subject-specific so the risk is to make a discussion biased

Policy and regulation RECOMMENDATIONs

policy recommendations at all levels for policy makers to ensure consistency and hom,ogeneisation

public regolations and confrontation and consultation

ADVOCACY

advocacy (some branc are strongly againgst aquaculture, have campaign)

SYNERGY and sharing of existing tools

Regional open innovation platforms based on challenge-led processes

A real blue economy strategy at regional level (involving all the actors (tourism, fisheries, ...) around "the same table")

Be an OPEN INNOVATION platform for ALL ACTORS at ALL LEVELs

conference, workshops, fair... offer companies insights on new technologies and opportunities for knowledge adoption

scientific institutions shou connections with private co we are monitoring tha am food giving to the fish water column parameters and sediments

Be a TESTBED for new initiatives

co-create the funding schemes with actors

develop a kpis about the product quality to support mkt and communication with comparable evidences

certifications

Analysis and technical assistance

capacity to identify the market demands

assistance in investing

WHAT (other initiatives are doing…)

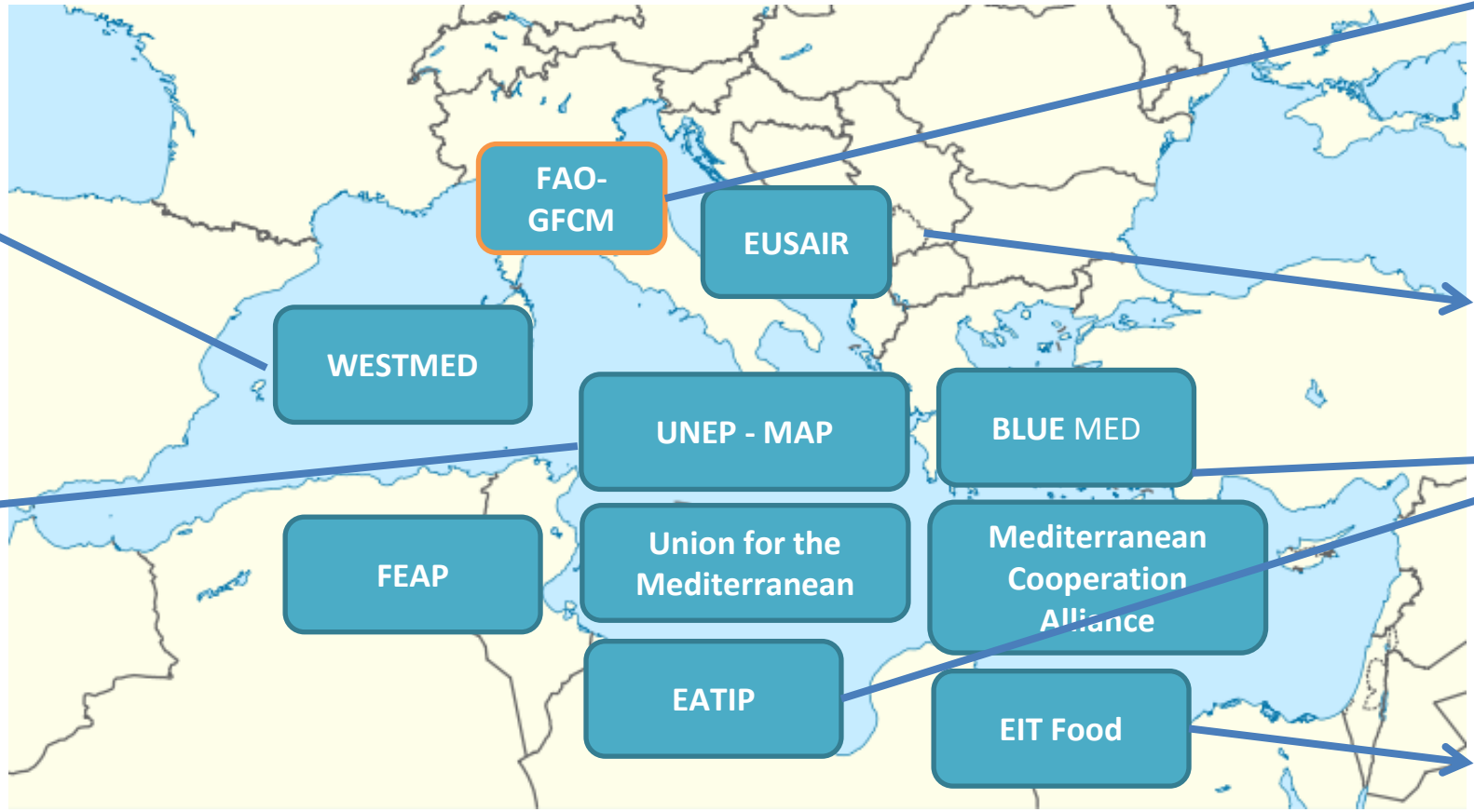
AquaWest
Accelerating Sustainable Aquaculture

Technical Group to support the adoption of innovative, eco-compatible sustainable aquaculture practices

Plan Bleu
Construisons ensemble l'avenir de la Méditerranée

14 LIFE BELOW WATER

Plan Bleu (2021) Road map for a sustainability transition in Mediterranean aquaculture



Scientific Advisory Committee on Aquaculture(CAQ)

Blue Growth EUSAIR

PILLAR 1
Topic 2 –> Fisheries and aquaculture

Acquaculture

SRIA

eit Food

Sustainable Aquacultre Programme

HOW?

Management
Membership
Working groups
Connection with existing groups
…

To be discussed further

INSPIRATION

"*interconnected, inclusive and more efficient* ***aquaculture*** *innovation ecosystem(s) across* ***the Mediterranean*** *that draws on the* ***existing*** *strengths of European, national,* ***regional and local ecosystems*** *and pulls in new,* ***less well-represented stakeholders*** *and* ***less advanced in innovation territories****, to set, undertake, and achieve* ***collective ambitions*** *towards challenges for the benefit of the society, including green, digital, and social transitions."*

From Horizon Europe "CONNECT" call 2021

Project co-financed by the European Regional Development Fund

KNOWLEDGE-RELATED INNOVATION

Kristian Mancinone

Workshop 2

25 October 2021

Dynamics of knowledge and innovation

Innovation is a knowledge management process, involving creation, integration, sharing and application of knowledge.

A new challenge: avoid knowledge polarization for achieving sustainable innovation → collective intelligence and open innovation

Dynamics of knowledge and innovation

Four types of knowledge (Lam, 2000):
(1) *embrained knowledge* that has, from an individual perspective, an explicit feature;
(2) *embodied knowledge*, that has, from an individual perspective, a tacit feature;
(3) *encoded knowledge*, characterized by explicit features from a collective perspective,
(4) *embedded knowledge*, that has more tacit features from a collective perspective

Knowledge sharing: a definition

Knowledge sharing is an activity through which knowledge as information, skills, or expertise (both tacit and explicit) is exchanged among people, friends, families, communities or organizations (Serban and Luan 2002; Bukowitz and Williams 1999; Hasmath and Hsu 2016).

Knowledge sharing: more insights

Knowledge sharing is the **process** by which information and know-how is conveyed between the actors of organizations in order to **develop new ideas, to implement best practices or new procedures** (Cummings, 2004).
According to Santos *et al.* (2012) knowledge sharing is defined as "*a provision of task, information and know-how to a person, so that he can* ***collaborate with others to solve problems, develop new ideas or implement policies or procedures***".
Davenport and Prusak (1998) enrich the debate on the knowledge sharing process by emphasizing the aspect of the **absorption of knowledge** which is significantly linked to the capacity to receive, implement and exploit the knowledge.

Knowledge sharing: characteristics

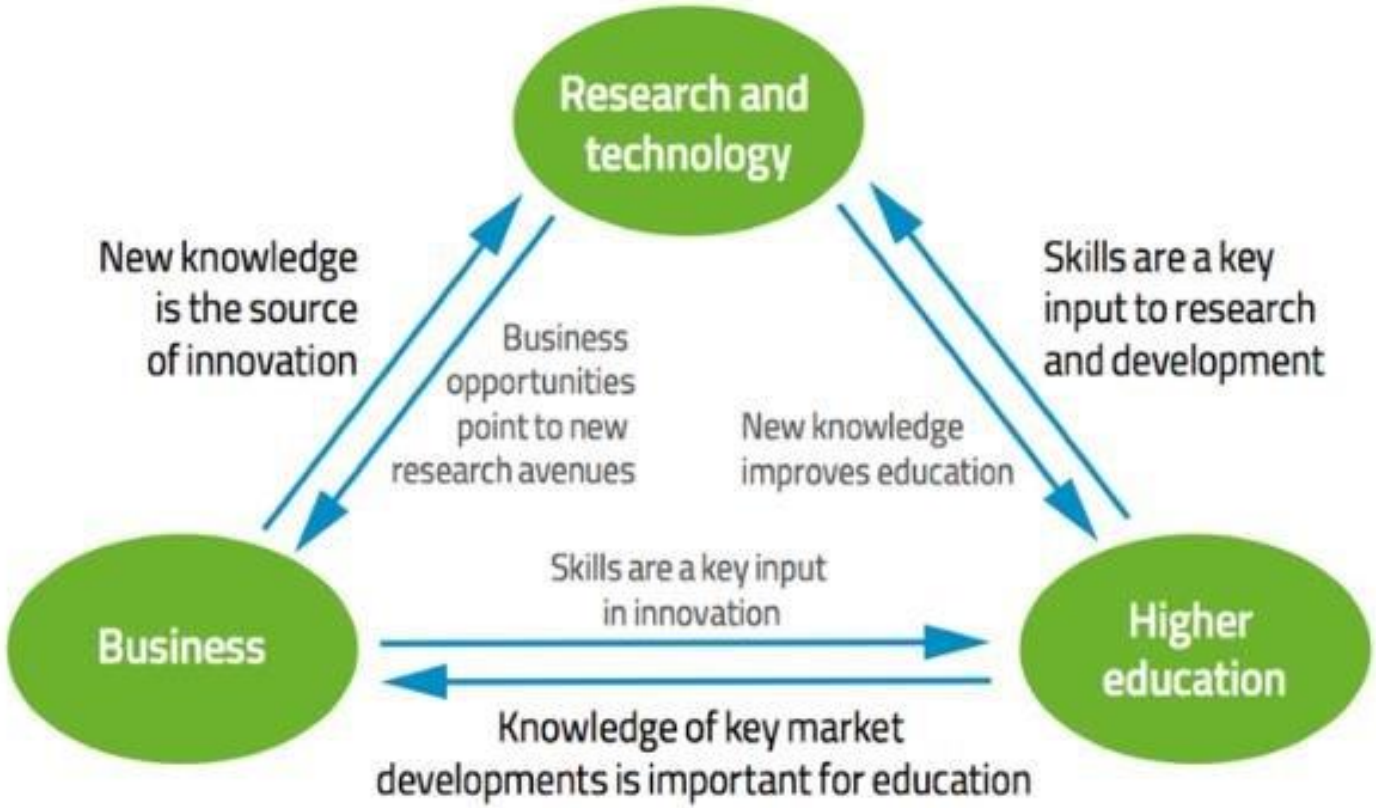
Communication/Absorption

Learning/Experiencing

Application/Adaptation

Diffusion/Exploitation

Knowledge triangle



Clusters

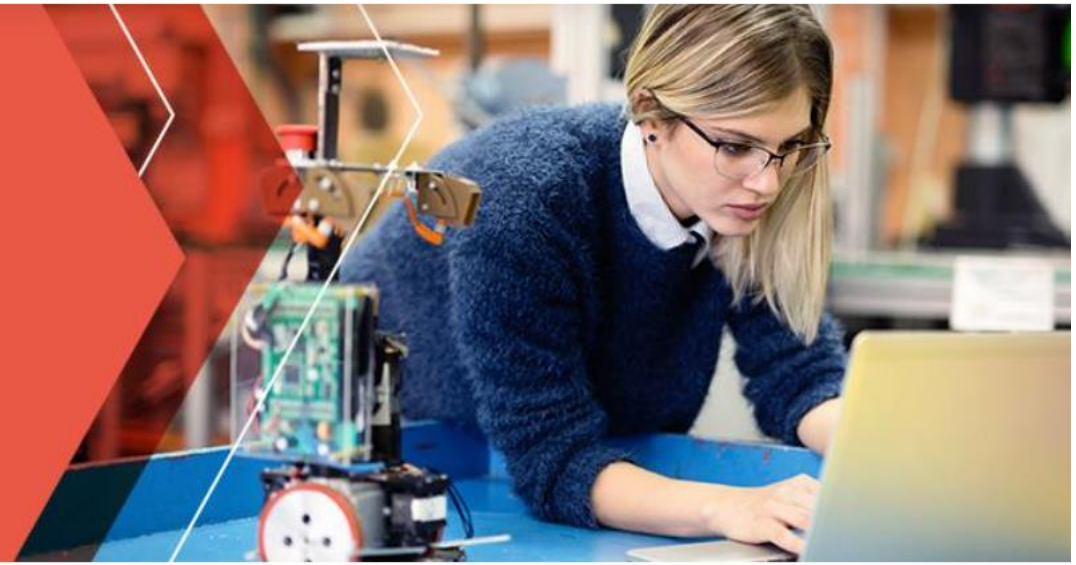
EUROPEAN CLUSTER COLLABORATION PLATFORM

Partners Funding News Events Knowledge In focus EREK

Register Login

Register now for our 8th Capacity Building webinar on Skills!

Taking place on 27 October at 10:30 AM CEST



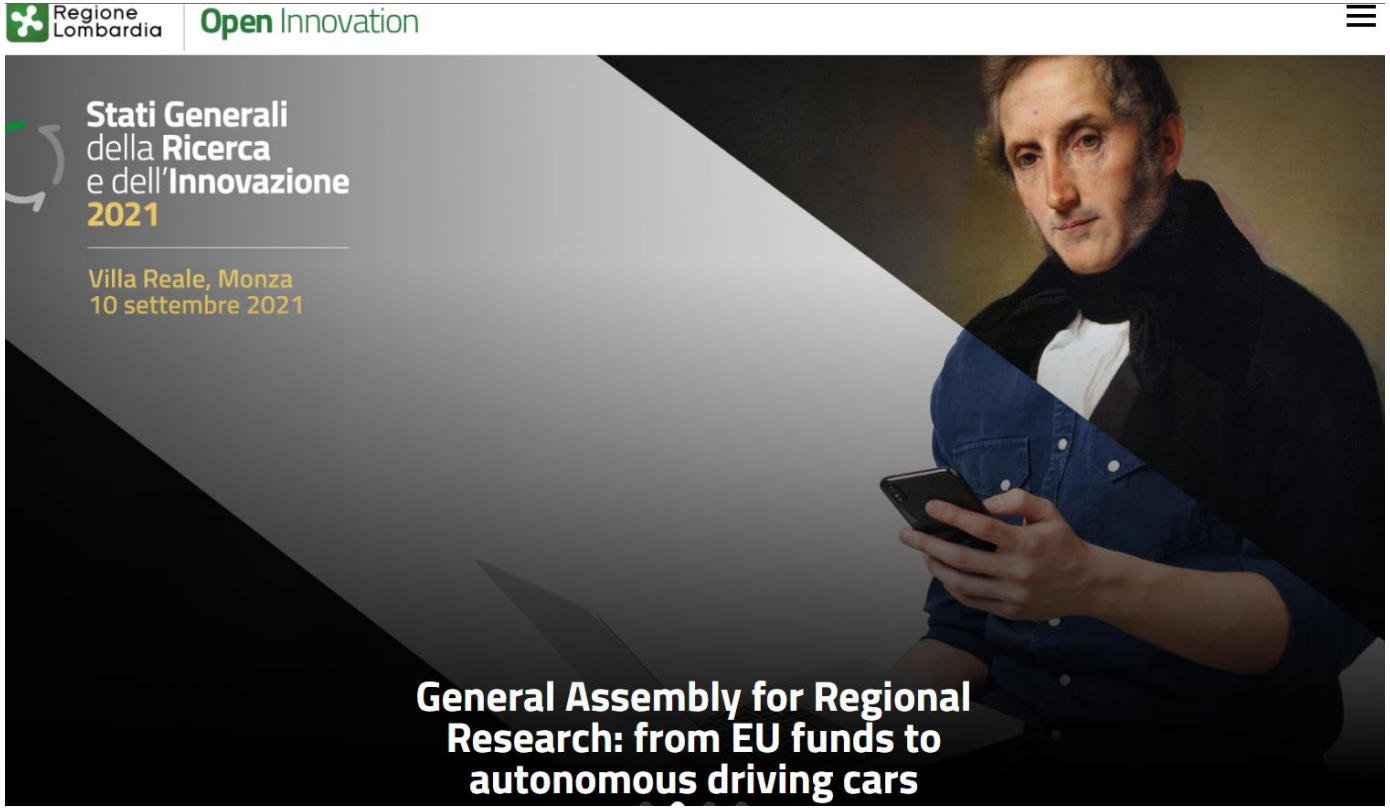
Strengthening the European economy through collaboration

Open innovation networks

DEMOLA

for Students | for Companies | more

Open innovation platforms



Knowledge innovation communities

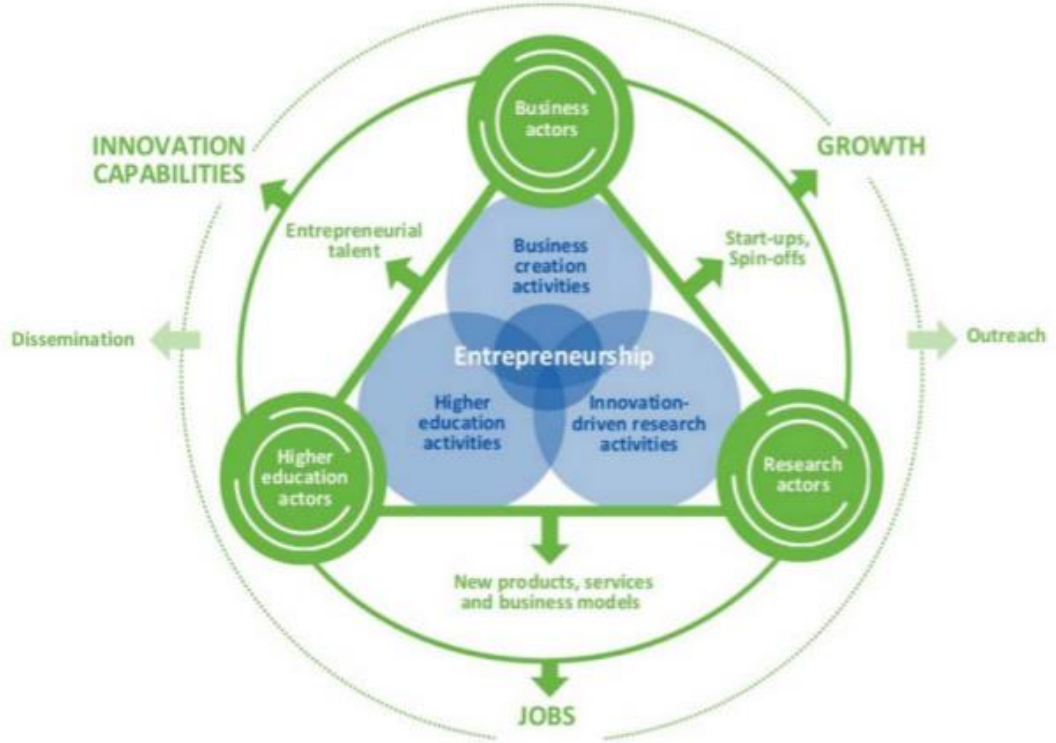
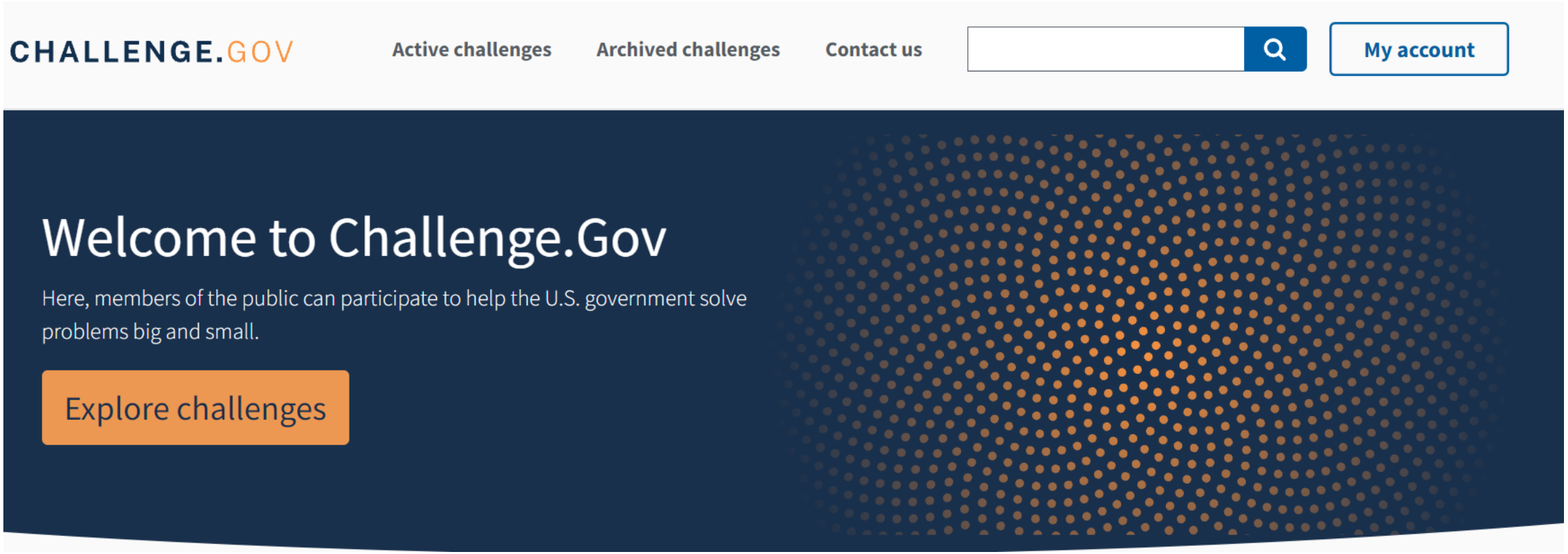


FIGURE 2-6: The KIC innovation model (source: EIT Health Campus, presentation by Dr. Ursula Muhle)

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Challenge-based innovation



Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

Challenge-based innovation

CBI Challenge Based Innovation

What is CBI?

Challenge Based Innovation is a 4-6 months programme where teams of university students develop projets that solve complex societal problems, inspired by technological ideas that come from instrumentation development or basic research at CERN.

Connect with CERN

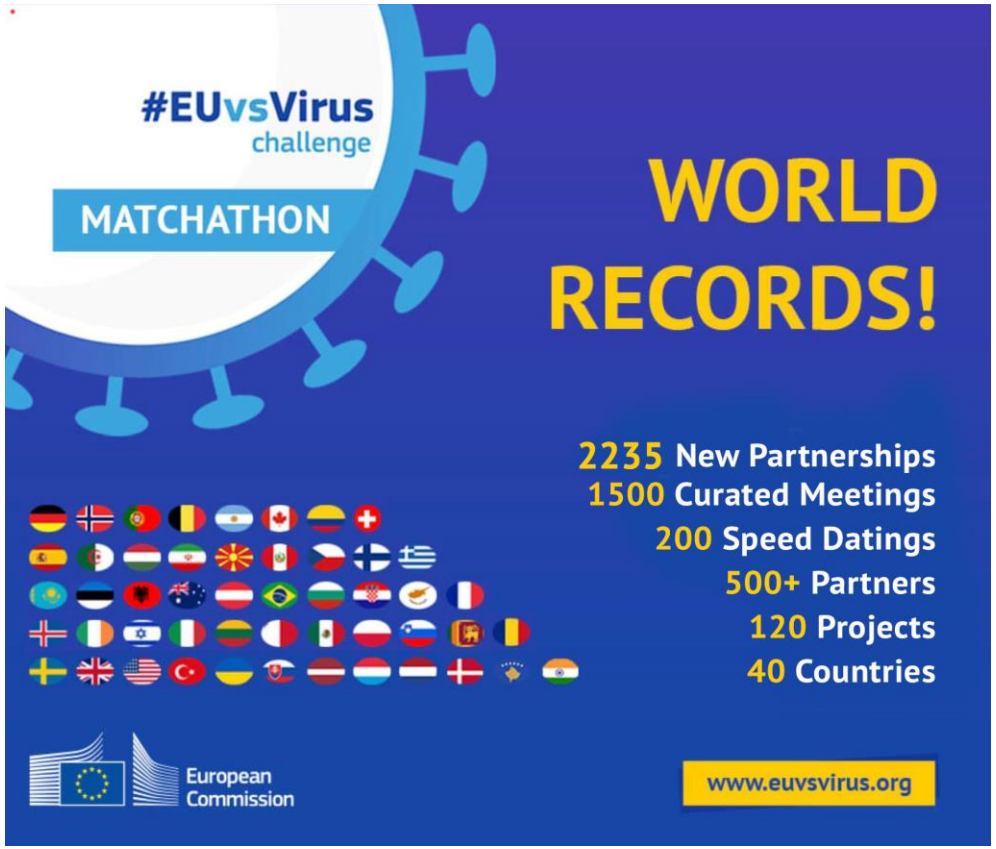
In CBI student teams work with CERN, one of the world's leading research centres in particle physics, for the purpose of making **disruptive innovation for societal impact.**

Learn to drive change

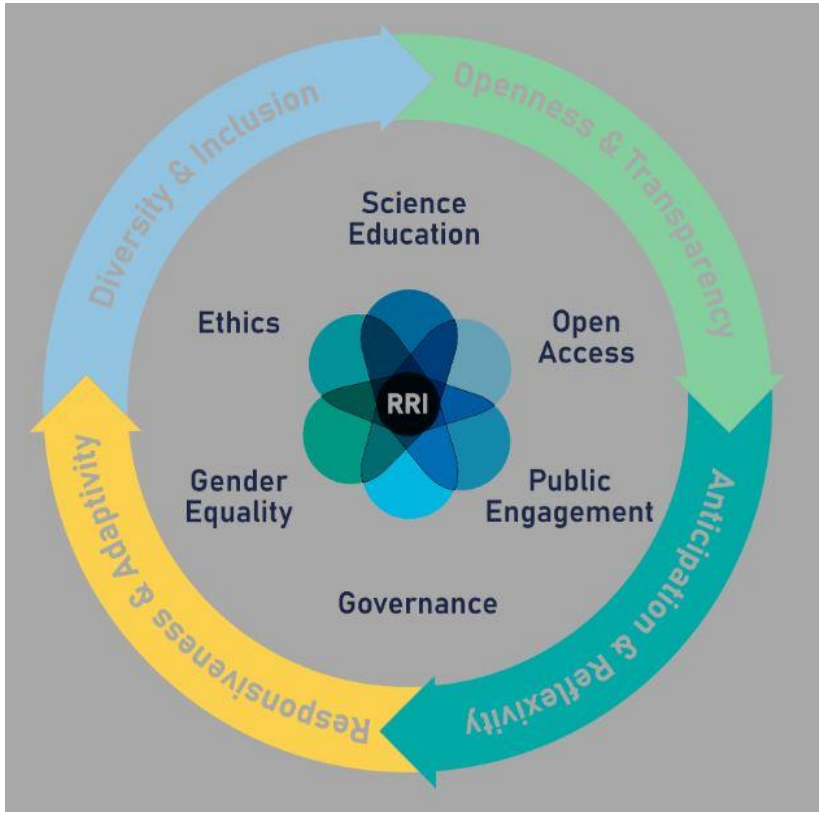
Here students apply their hard skills to challenging projects, in an **entrepreneurial setting**. They work in a **multidisciplinary team**, develop their **critical thinking** and get hands-on to make their ideas real through **prototyping and testing**.

Challenge-based innovation

Hackathons


#EUvsVirus
challenge
MATCHATHON
WORLD RECORDS!
2235 New Partnerships
1500 Curated Meetings
200 Speed Datings
500+ Partners
120 Projects
40 Countries
European Commission
www.euvsvirus.org

Responsible research and innovation



Project co-financed by the European Regional Development Fund

TECHNICAL INNOVATION AND BUSINESS MODELS

Lourdes Reig Puig

Workshop 2

25 October 2021

Project co-financed by the European Regional Development Fund

Facts

Aquaculture provides **half the fish** amount for **human consumption, being the fastest growing food industry**, with a prevision of 5% per year

Aquaculture follows a similar trend in the **Mediterranean** with a share of **2/3 finfish and 1/3 shellfish farming**

22 countries (Barcelona Declaration, 1976)

470 million of inhabitants (about 170 closed to the coast)

But **Aquaculture** in the Mediterranean has **a set of specific restrictions** provided the local conditions

- Environmental sustainability
- High biodiversity (between 4-18% of the world marine biodiversity)
- Local climatic conditions
- Economic context
- Social responsibility demand
- Cultural context
- Difficult spatial planning (many different legal frameworks)
- Competence of activities
- Demographic pressure

The Mediterranean should envisage a future for its aquaculture '**where the industry will be globally competitive, sustainable, productive, profitable and equitable**'

Strategy for the sustainable development of Mediterranean and Black Sea aquaculture

➔ Which are the technological innovations needed to set a sustainable aquaculture model?

According to the Strategy for the sustainable development of Mediterranean and Black Sea aquaculture

Innovation should be applied on…

…**governance**

…**technology**

…**environmental, social** and **economic** challenges

Discussion in Workshop 1

TARGET 1: Build and **efficient regulatory and administrative framework** to secure sustainable aquaculture development

- Output 1.1: Improved aquaculture regulatory frameworks and streamlined public sector management
- Output 1.2: Integrated aquaculture in coastal zones

TARGET 2: Enhance interactions between **aquaculture and the environment** while ensuring animal health and welfare

- Output 2.1: Mitigated impacts on the environment and improved environmental protection
- Output 2.2: Responsible aquatic animal health and welfare management
- Output 2.3: Enhanced research and knowledge sharing on aquaculture

TARGET 3: Facilitate **market-oriented aquaculture** and enhance **public perception**

- Output 3.1: A market-driven aquaculture sector development
- Output 3.2: Safety and quality of Mediterranean and Black Sea aquaculture products
- Output 3.3: Enhanced aquaculture and aquaculture products marketing and communication

Could we define a **model** for a **sustainable aquaculture** in the **Mediterranean**?

Could an IMTA based on molluscs a right **model** for a **sustainable aquaculture** in the **Mediterranean**?

IMTA Integrated multi-trophic aquaculture as a case study

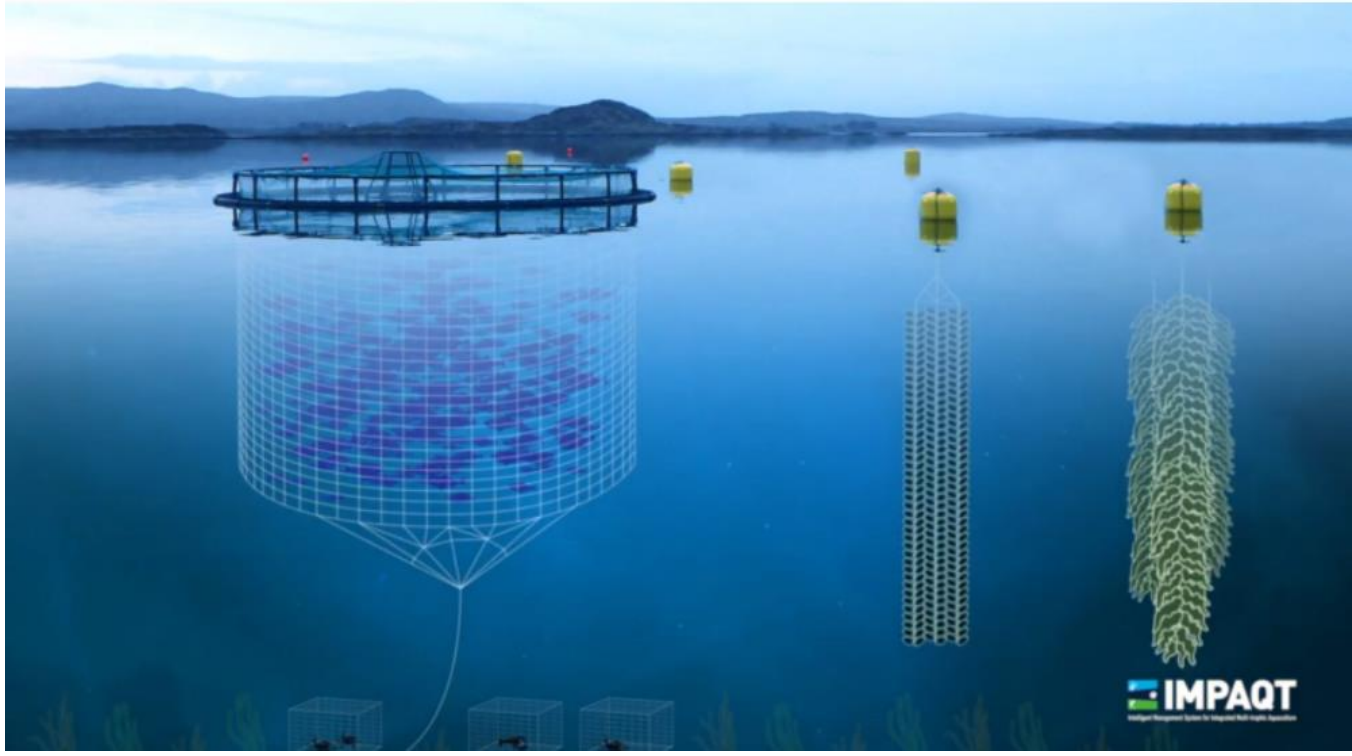
Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

What is IMTA? = Integrated multi-trophic aquaculture

Brief recap

Integrated multi-trophic aquaculture takes its **basic concept** from nature:

As in the food chain, **one species finds a feeding niche in the waste generated by another species**



So simple and so complex

https://projects.leitat.org/intelligent-management-systems-for-integrated-multi-trophic-aquaculture/

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

IMTA includes aquaculture based on

External feeding
(fish, crustacean, some mollusks)

+

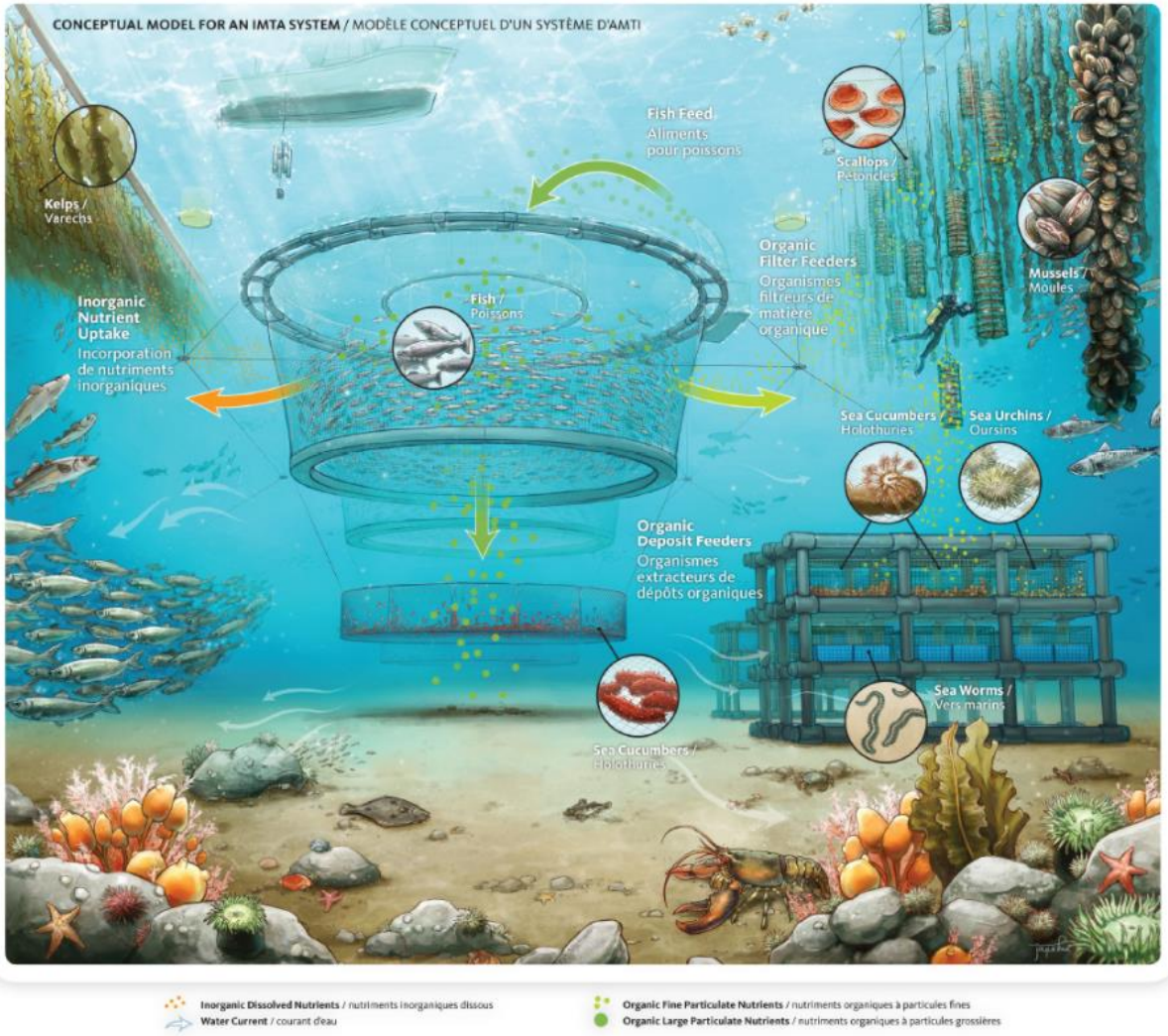
Organic extraction (from water or seabed)
(filter feeders or deposit feeders, as urchins, sea cucumber, …)

+

Inorganic extraction (from water)
(macroalgae and plant species)

All levels play an **ecological role** (feeding the next niche, bioremediation …)
+
All levels may have a **commercial value**

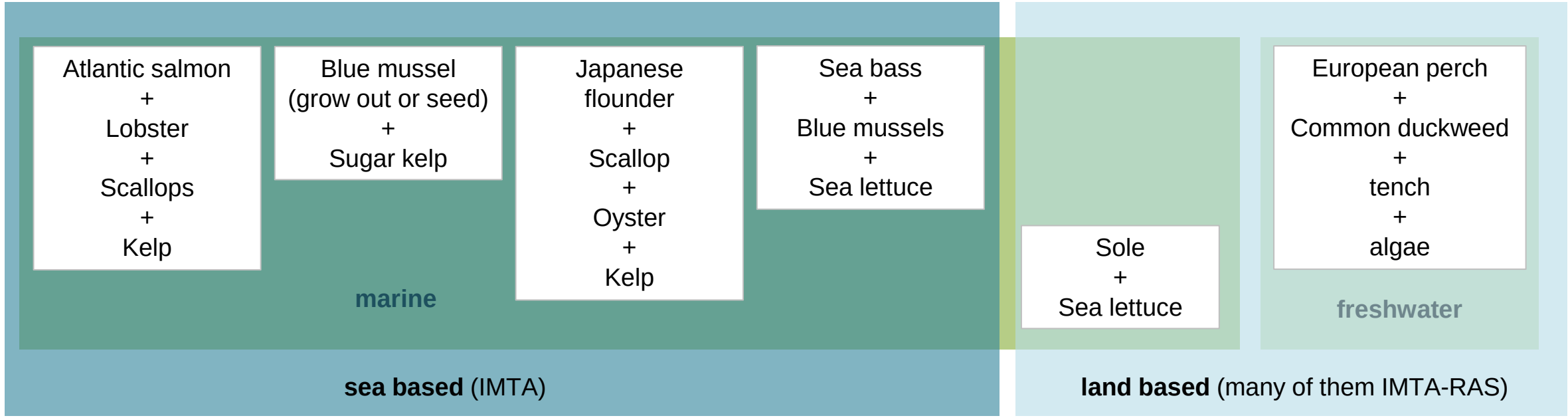
Optimization of space and resources while being environmentally friendly



https://www.dfo-mpo.gc.ca/aquaculture/sci-res/imta-amti/index-eng.htm

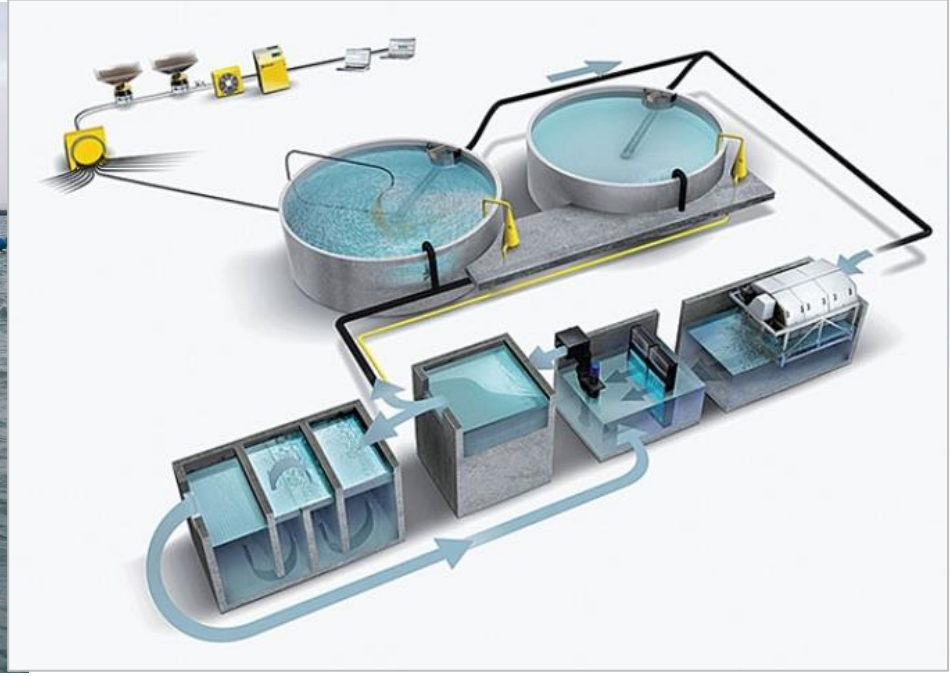
An IMTA can include **different trophic levels**

Some examples being tested today



And be located in **different environments** or **systems**

IMTA vs. IMTA-RAS



IMTA

IMTA-RAS

Recirculating Aquaculture Systems

In some locations near or offshore productions are **not possible,** or **suitable** or **profitable**

- Conflict of uses on public space (small or intensively used coast line)
- Legal framework
- Unstable environmental conditions

Positive outcomes of an IMTA-RAS	Negative outcomes of an IMTA-RAS
Higher yield	Higher cost
Optimal use of resources	Use of energy?
More stable environmental conditions	Lower diversity of suitable species

How close should be the different levels or components of an IMTA system?

In a **strict** sense: all in the same farm or site

More restrictive approach of the business model

In a **flexible** sense: a larger spatial scale can be considered

Factors as local hydrodynamics or biogeochemical processes may recommend some distance

More flexible approach of the business model

Spatial planning becomes a must!

Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

An IMTA needs to combine

Objectives
+
Species
+
Techniques
+
Geographical and local context

Potential benefits

Environmental sustainability

- zero residues
- potential bioremediation
- use of local species as a positive approach
- if fish are not included, no pressure on wild stocks

Economic sustainability

- if fish are not included, no external input (feed, chemicals)
- low level of investment compared with other farms
- diversification (commercial value)
- high revenue species
- potential of export to foreign markets
- possibility to combine with tourism
- ecosystem services

Social sustainability

- business model based on small projects, cooperative approach
- possibility to employ women

Public perception: better than other farmed products. Sustainability claim

Circularity

- blue carbon capture
- biobased products from shells

An IMTA implies a high level of complexity

Objectives
+
Species
+
Techniques
+
Geographical and local context

Potential impacts or problems

Environmental sustainability

- Only local species can be used (limited range, specially seaweed)
- Impact of the climate change on the production
- Impact of external contamination on the production (eutrophication, plastics, etc)
- A map of appropriate areas is not available in most of the countries

Economic sustainability

- Lack of knowledge concerning the most appropriate species and the techniques to make the production profitable
- Unstable conditions: (very) high level of uncertainty (feasibility and profitability)
- No finance tools
- Support to entrepreneurship?

Social sustainability

- No professional profiles available (trained workers)
- No educational programs dealing with the system

Public perception

- The products can be well accepted but what about the facilities?

Governance

- No legal framework for the system
- No legal framework for some of the products (quality and food safety)
- Competence for the public space
- Access to permits

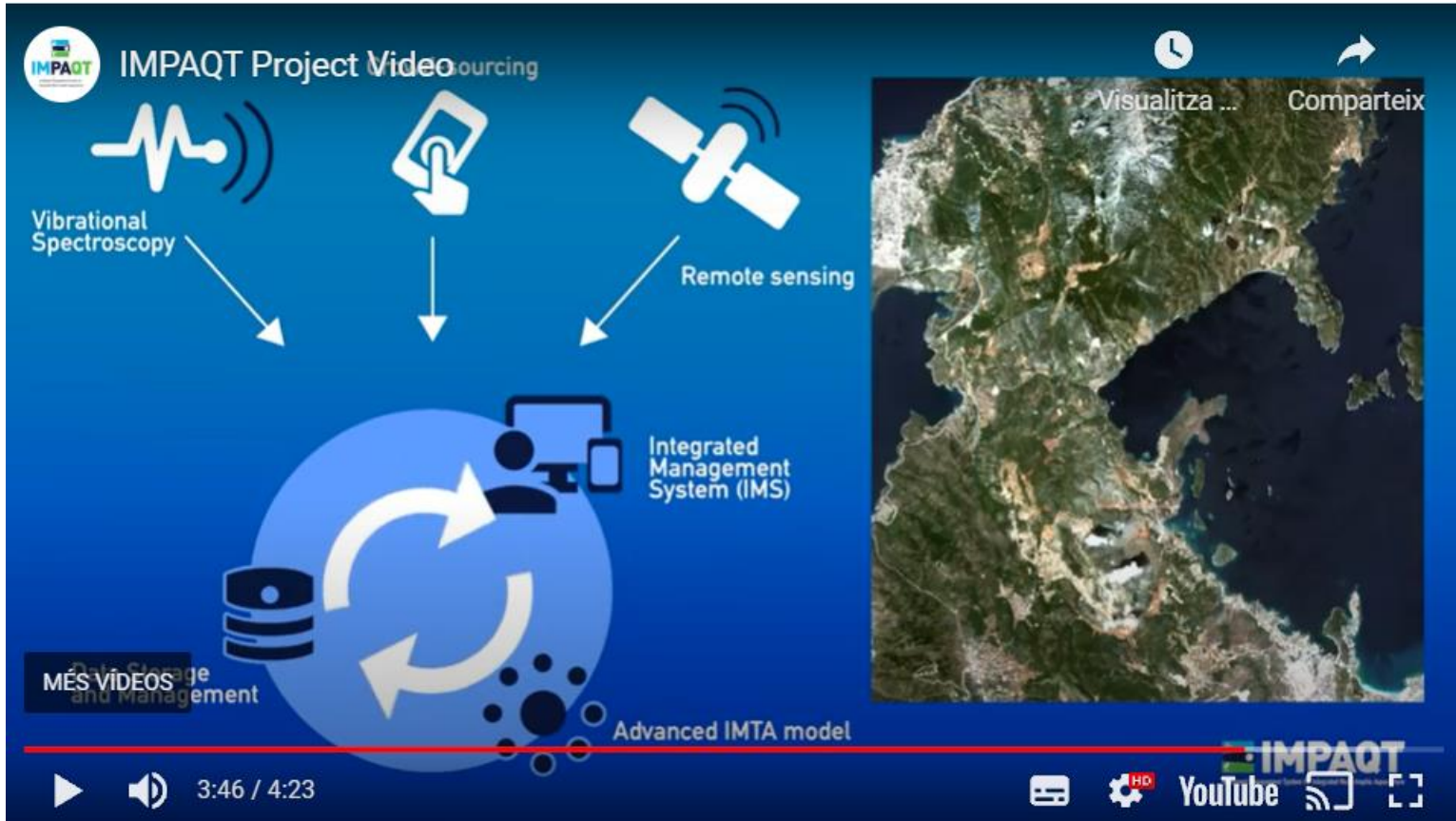
Interreg Mediterranean
BLUE BIO MED
Project co-financed by the European Regional Development Fund

New projects are being developed introducing innovation in IMTA

sensors ➔ data ➔ decisions

IMPAQT aims to develop and validate in-situ a multi-purpose, multi-sensing and multi-functional management platform for sustainable Integrated Multi-Trophic Aquaculture production.

The high-level ambition is to drive a paradigm shift in the European Industry and its acceptance of IMTA as a viable approach, by paving the way to both a more environmentally friendly and more efficient/higher yielding European Industry.



Guiding questions

- Which is in your opinion the most important **barrier/risk** for the development of IMTA in the Mediterranean?
- Which is in your opinion the most important **benefit/opportunity** for the development of IMTA in the Mediterranean?
- What should be the **basis for a business model** based on an IMTA system?
- How long are we from a **feasible and profitable IMTA system** for the Mediterranean?