



CERES

Climate change and European aquatic RESources

*This project receives funding
from the European Union's
Horizon 2020 research and
innovation programme under
grant agreement No 678193.*

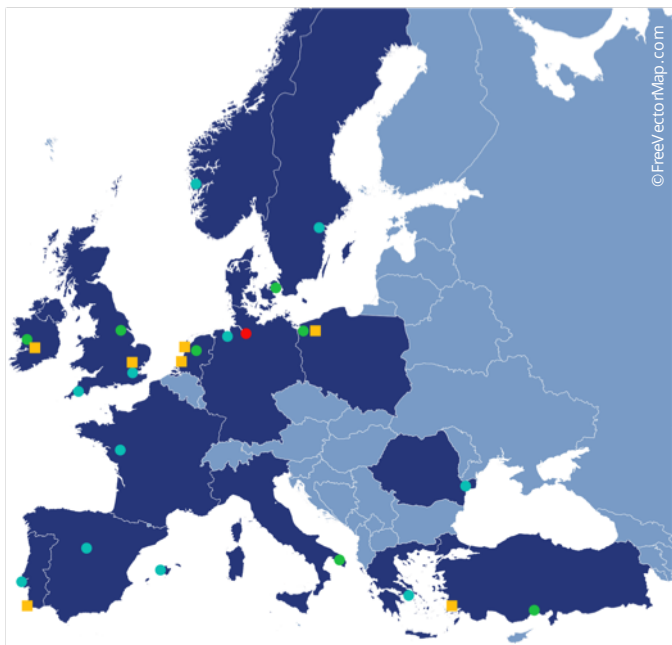


CERES for Blue growth

CERES advances a cause-and-effect understanding of **how climate change will influence Europe's most important fish and shellfish resources** and the economic activities depending on them.

CERES will provide tools and adaptive strategies allowing **marine and inland fisheries and aquaculture sectors** and their governance to prepare for adverse changes or future benefits of climate change.

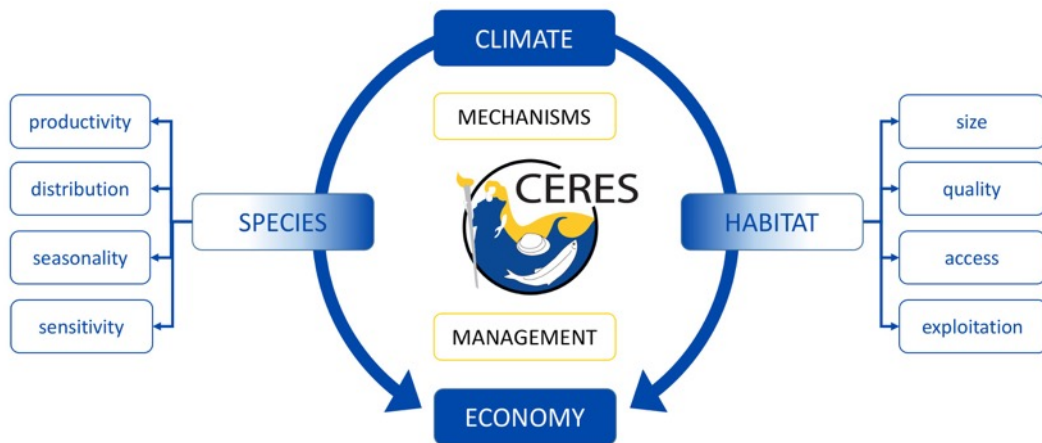
CERES at a glance



- Horizon 2020, Blue Growth
Budget € 5.6 millions
March 2016 to February 2020
- 15 countries
- 160 members from 8 universities,
11 research institutes, 7 industry partners
- Coordination:
Hamburg University, Germany

Climate links to economy

Climate impacts directly and indirectly on European fisheries and aquaculture, both on target species as well as their habitat.



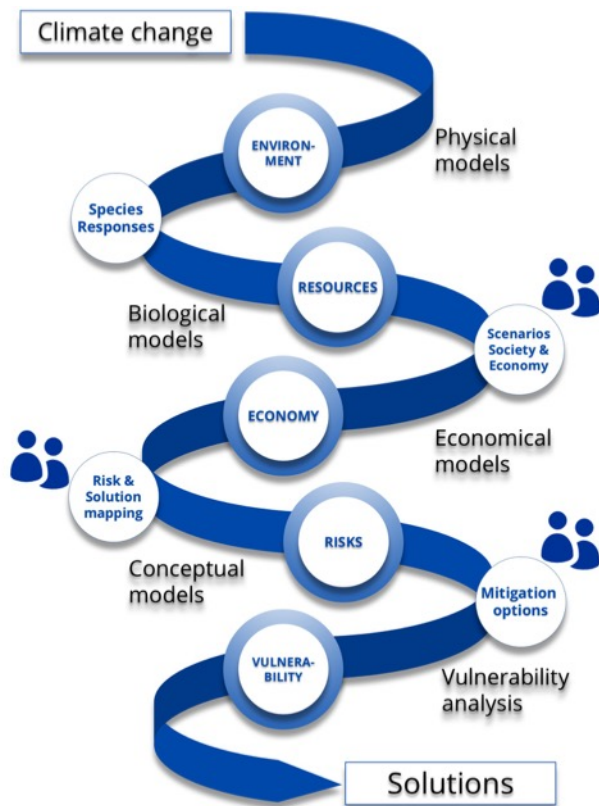
CERES in a nutshell

Environment

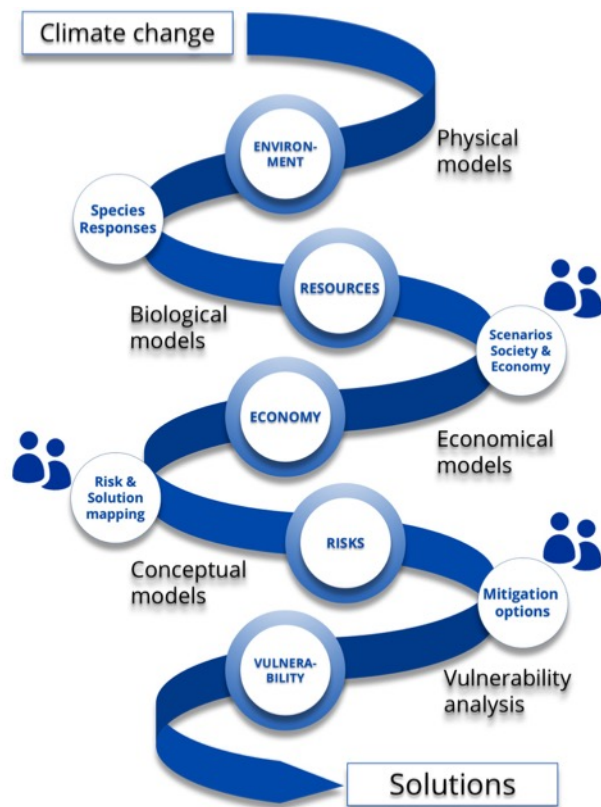
CERES will project future changes in physical conditions of marine and inland waters relevant for fisheries and aquaculture industries.

Resources

Biological models will scale up physiological and ecological responses of target species to estimate future changes in the productivity of fish and shellfish resources.



CERES in a nutshell



Economy

Based on future social and economic scenarios, CERES will estimate consequences for the marine and inland fisheries and aquaculture industries.

Risks & vulnerability

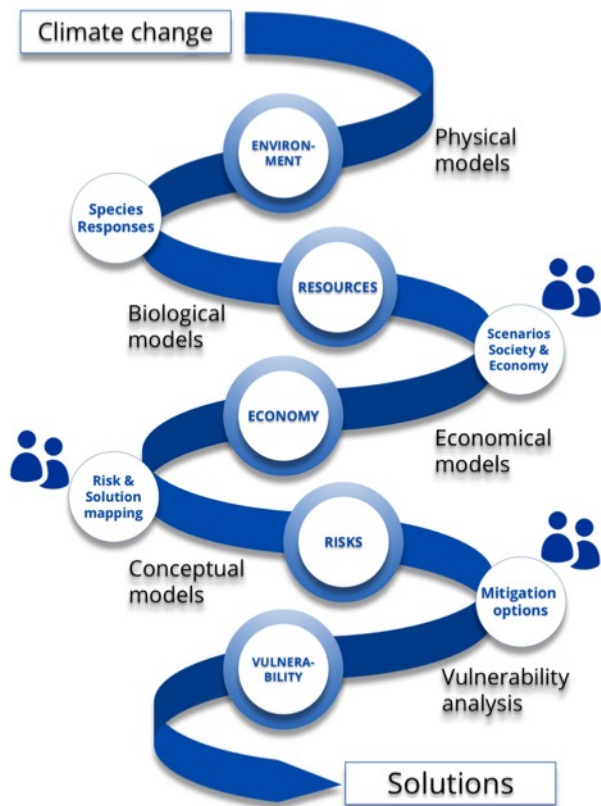
CERES will assess risks, adaptive capacity and vulnerability of European fisheries and aquaculture sectors using different conceptual models.

CERES in a nutshell

Solutions

CERES will provide viable “bottom-up” (industry-driven) solutions to minimize the risks and maximize potential benefits of climate change.

CERES will also provide “top-down (policy & management) solutions and highlight challenges where current governance structures may hinder future adaptation.





Questions for CERES

Environment

How will physical and biogeochemical features of marine and inland waters change in a future climate?

Aquaculture

Which current or emerging species will be most profitable (and sustainable) to culture in light of climate change?



Questions for CERES

Fish stock changes

When and how far will European marine fish stocks shift? How can fisheries adapt?

How will inland fisheries be affected, e.g. in fish community dynamics, productivity and invasiveness of introduced species?



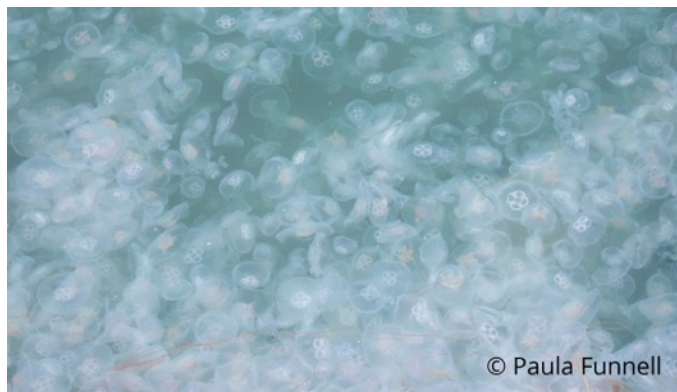
Questions for CERES

Fish stock yield

What are the implications of changes in ecosystem-level interactions and productivity for fish stocks and their fisheries?

Fishery behaviour

What are the likely changes in fleet behaviour? How will policy measures (closed seasons, areas etc.) influence the fleets?



Questions for CERES

Mitigation and early warning

Which early warning techniques can protect against climate-driven increases in the frequency of events such as harmful algal blooms, jellyfish outbreaks, the spread of pathogens or episodes of coastal hypoxia?



Questions for CERES

Policy and management

What (environmentally sustainable) policy changes can increase the scope and enhance the profits of fisheries and aquaculture in the short-, medium- and long-term?

Who will benefit from CERES?

CERES species groups:

> 50% high-value fisheries and
> 90% high-value aquaculture
targets in European marine
and inland waters.

All industries dependent on
these species can directly
benefit from suggested
solutions.

Who?	What?	Why?
regulators, fishers, operators	anticipate, prepare & adapt	minimize economic losses & social consequences
European industry, public	identify new opportunities	reap potential benefits for producers & consumers
policy-makers, managers & industry	reduce risks & uncertainties	support fisheries management & aquaculture development



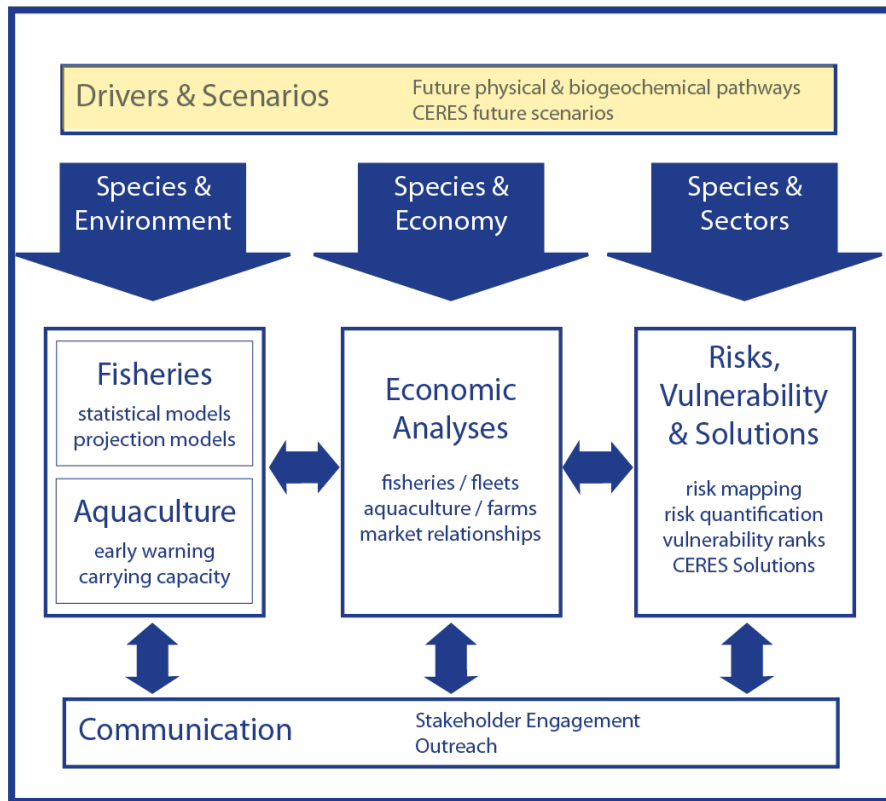
CERES species

- small pelagics (e.g. herring, sardine, sprat), flatfishes, gadoids, tuna, mackerel, capelin, dolphin fish, red mullet, salmon, sea bass, sea bream, meagre, trout, carp, pike perch, eel, shad, sturgeon, white fishes etc.
- blue and Mediterranean mussel, oysters, clams, shrimp, squid
- emerging species



CERES economies

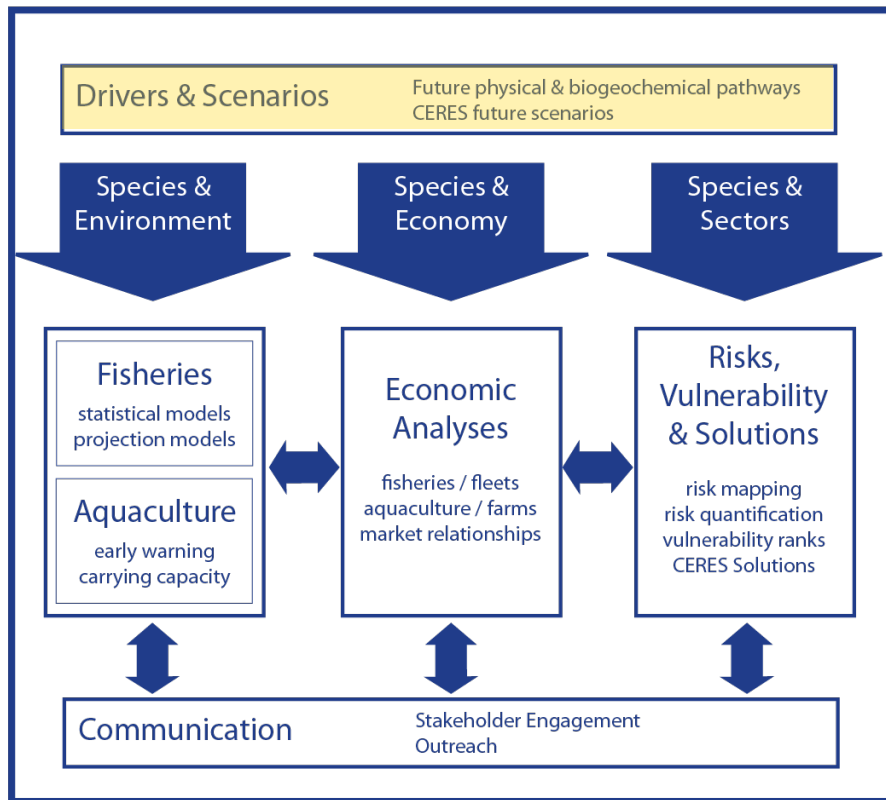
- demersal and pelagic fisheries
- purse seine and longline
- on-bottom and suspended cultures
- sea cages and coastal ponds
- semi-intensive and extensive farming
- inland aquaculture



Scientific structure

Drivers:

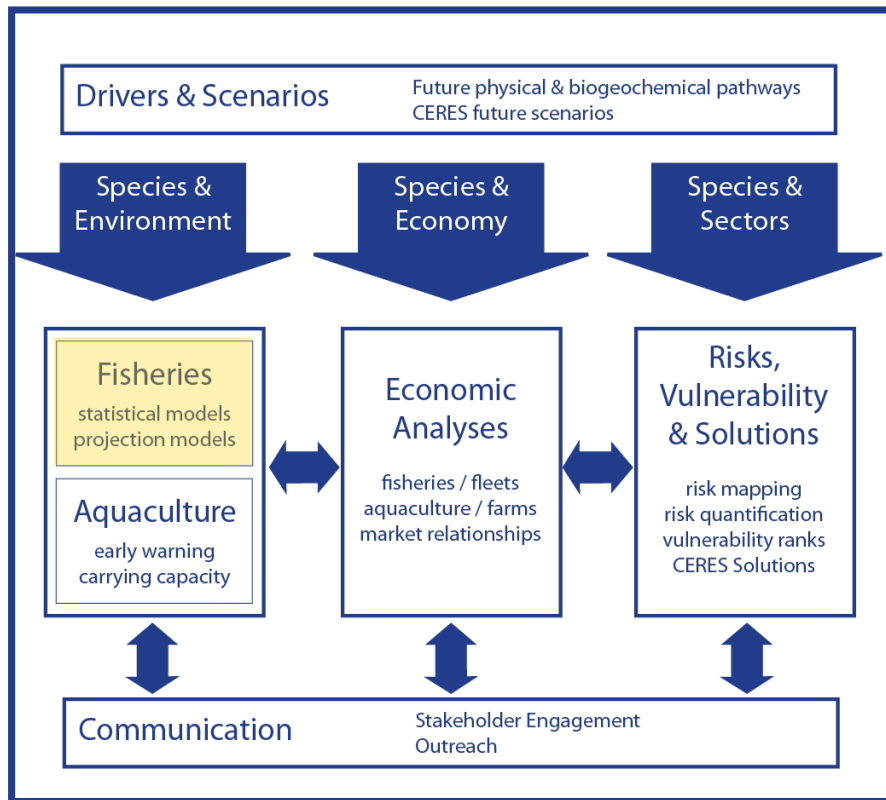
Estimates of climate-driven changes in key physical and biogeochemical parameters in European Seas, based on the IPCC Assessment Report scenarios and regionally downscaled climate models.



Scientific structure

Scenarios:

Social, economic and policy frameworks, e.g. fuel and fishing costs, domestic and global demand for fisheries and aquaculture products, technological developments and changes in European policy and management.

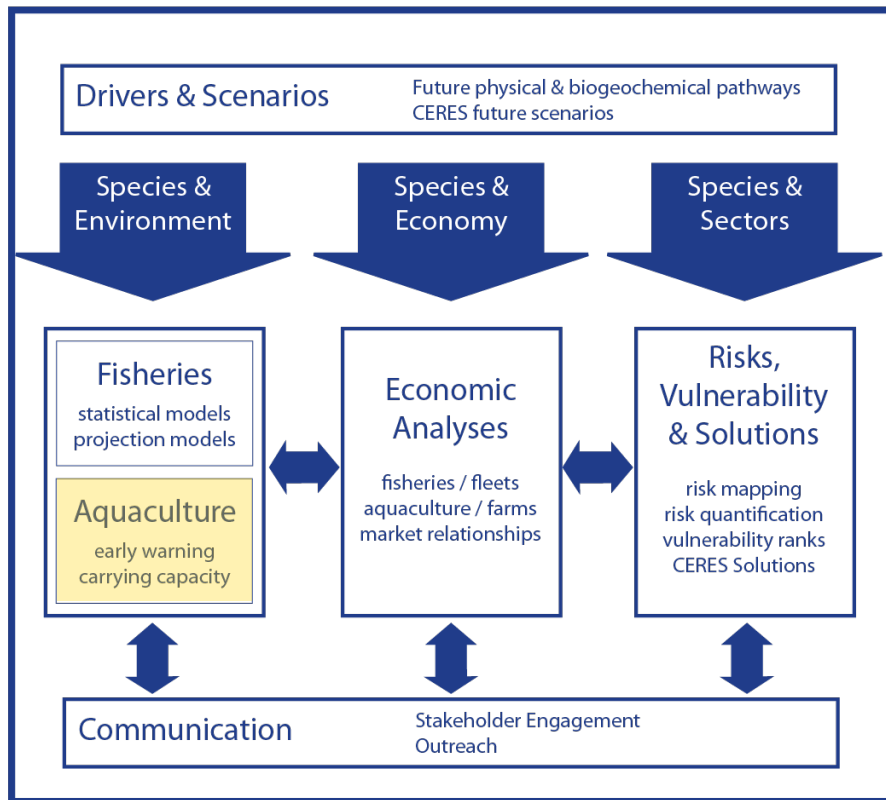


Scientific structure

Fisheries:

Impact of environmental factors on productivity and distribution of finfish and shellfish.

Model-based projections of expected impacts of climate change.

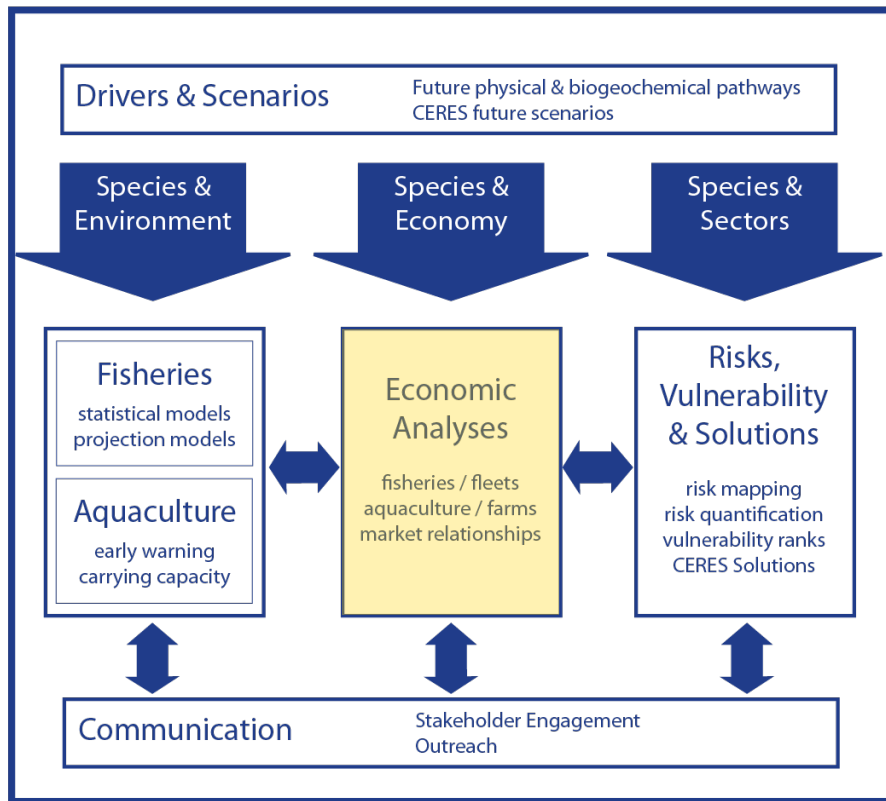


Scientific structure

Aquaculture:

Impact of direct and indirect climate-driven mechanisms on key aquaculture species in marine and inland waters

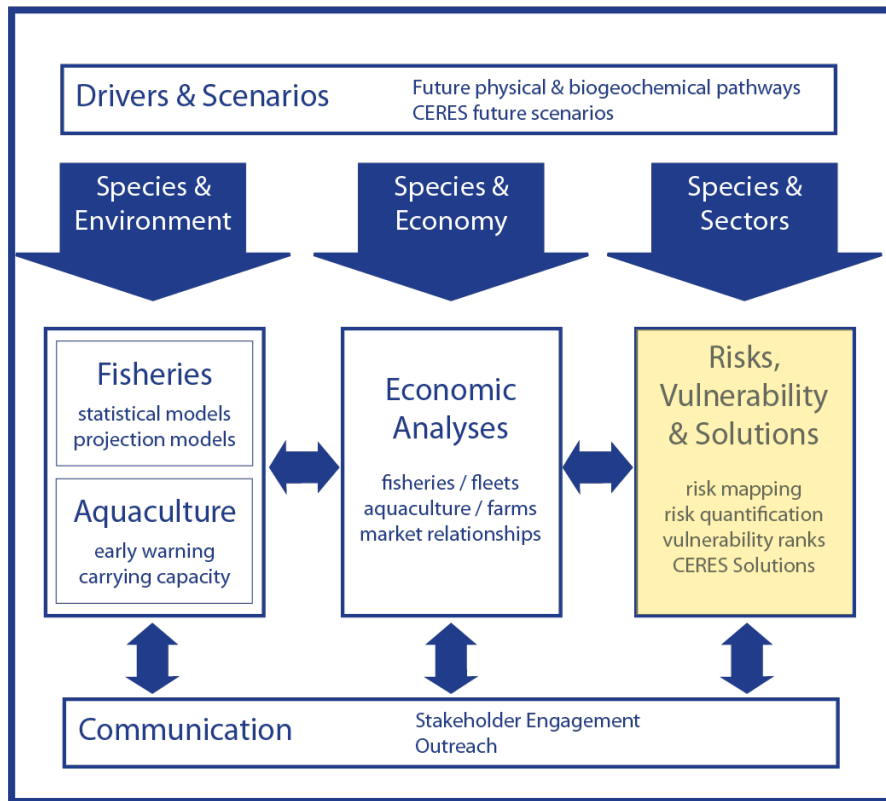
Model-based projections of production potential of established/emerging species



Scientific structure

Economic analyses:

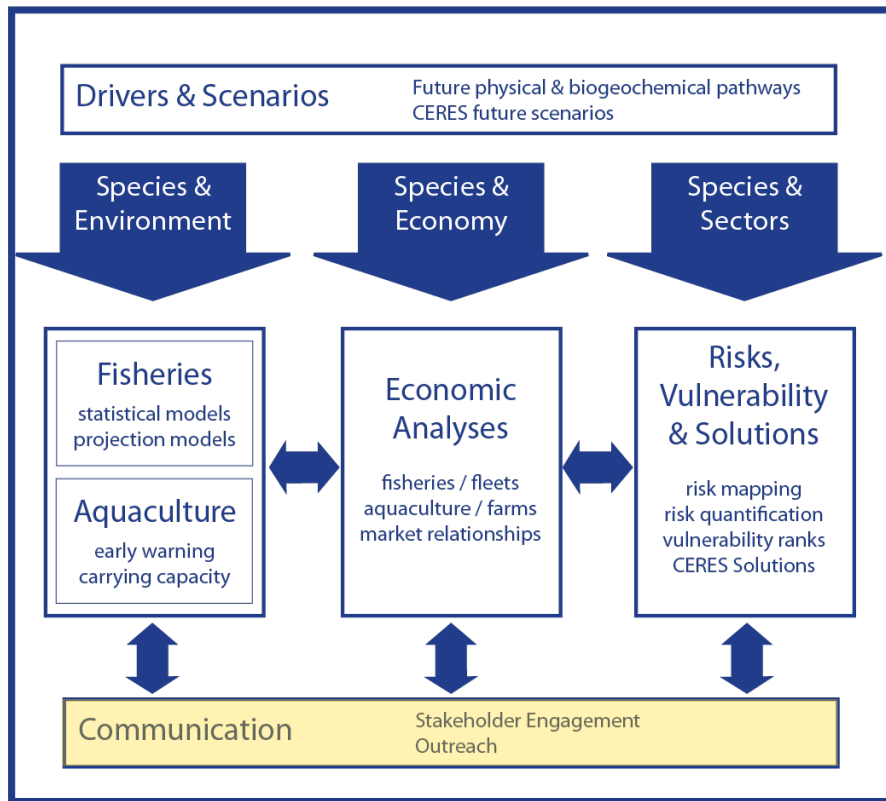
Economic consequences of climate change for fisheries and aquaculture sectors and the associated industries in Europe and economic implications of potential industry responses.



Scientific structure

Risk, vulnerability & solutions

Economic consequences of climate change for fisheries and aquaculture sectors and the associated industries in Europe and economic implications of potential industry responses.

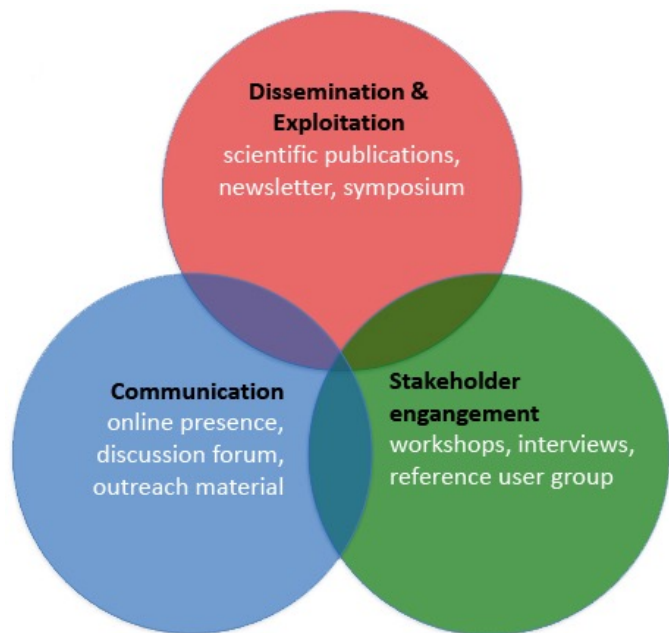


Scientific structure

Stakeholder engagement

Strong embedding of key fisheries and aquaculture industry partners in collaborative science within CERES.

Industry involvement



CERES very much wants and needs the industry perspective at an early stage in the project.

Throughout the research process CERES conducts face-to-face interviews, online surveys, and arranges workshops with stakeholders.

Farmers, fisherman & industry can

- help to define **test scenarios** and identify what is important for each sector.
- contribute to **conceptual maps** of how climate change impacts on your industry.
- provide **anonymous data** to fuel economic analyses of farms and fleets.
- give **critical feedback** on analyses and project results.
- state their **perspective** on suggested solutions for industry and governance.
- spread **information** to other industry partners about this project.



culmarex

European Aquaculture
Technology and Innovation Platform



General Fisheries Commission
for the Mediterranean
Commission générale des pêches
pour la Méditerranée



External advice

The CERES reference user group consists of 7 external SMEs and umbrella organisations.

They provide expertise and insights into the perception and needs of industry and and policy makers/advisers.

Industry partners – aquaculture



Longline Environment

Consultancy for aquaculture companies, risk assessment



Vet Aqua International:

Veterinary practice & consultancy for aquaculture companies



Sagremarisco Viveiros de Marisco

Interface between industry, education and scientific research



Kiliç:

Large aquaculture facilities: trout, seabass, seabream, meagre

Industry partners – fisheries & inland



Pelagic Freeze-trawler Association
Association of 9 European pelagic freezer-trawler companies



VisNed:
Association of producer organizations in Dutch Demersal Fisheries



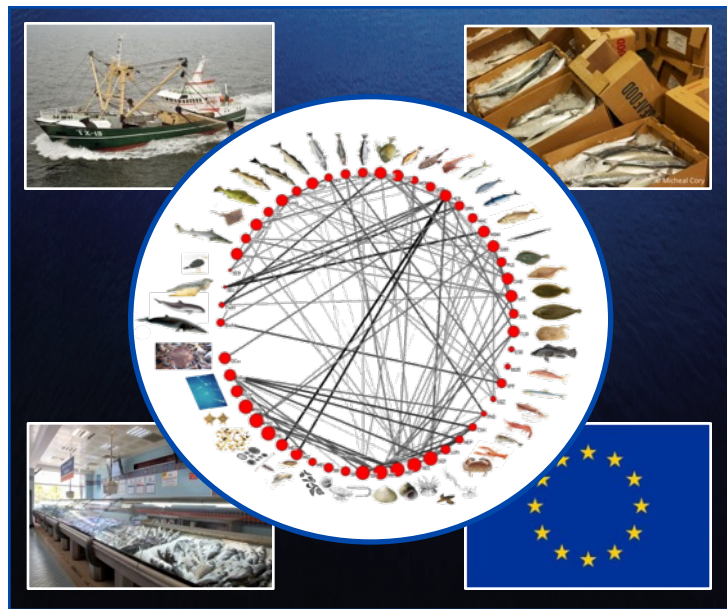
Inskie Centrum Rybactwa :
Large ponds: carp, whitefish, pikeperch

Scenarios on society and economy



- Future changes in governance, society, technology and economy may be just as important to fisheries/aquaculture as climate-driven changes in habitats and species.
- CERES uses a suite of future socio-political imagined futures in all modelling exercises. These scenarios are founded on discussions with stakeholders.

Fisheries & socio-economic models



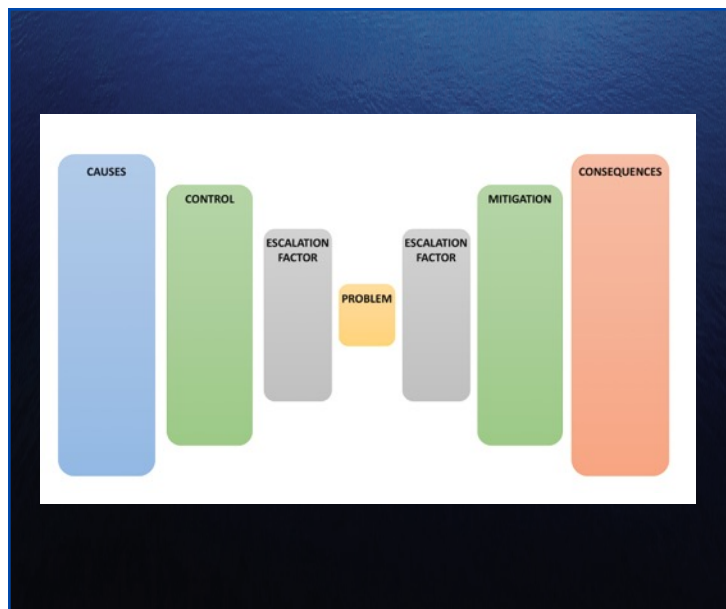
- How will fishing effort, catch composition and economic performance be influenced?
- How strong is the wider economic impact on associated sectors?
- How will trade flows influence in the international dependencies within Europe?
- Stakeholders are invited to contribute to simulation development with case-specific knowledge.

Different farm models



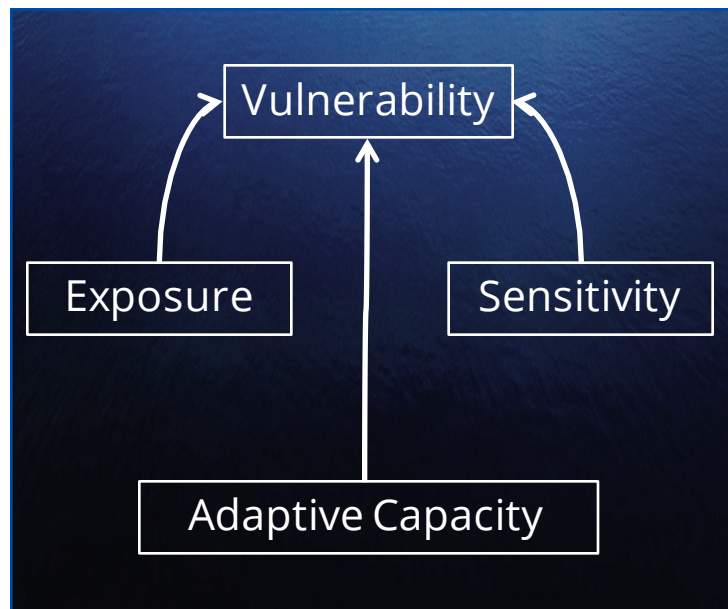
- scale-up individual model up to farm level
- integrate farm-level economics with sector level economics
- are based on individual farm data collected by CERES for aquaculture key species in various countries
- will compare the profitability & productivity of different production systems

Risks and opportunities



- Creation of conceptual frameworks of risks and opportunities for fisheries and aquaculture in light of future climate change and quantitative risk assessments (Bowtie analysis and Bayesian belief networks)
- Adaptation strategies and management advice

Risks and opportunities



- Broad-based ranking of vulnerability of fisheries and aquaculture targets and techniques using a qualitative assessment
- Bottom-up (guided by the industrial sectors) and top-down (guided by policy makers and governance) solutions for fisheries and aquaculture in light or projected climate change

Building bridges in H2020



2015 – 2018



2015 – 2018



2016 – 2020



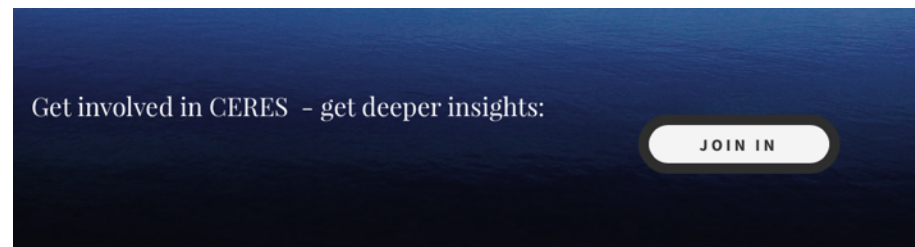
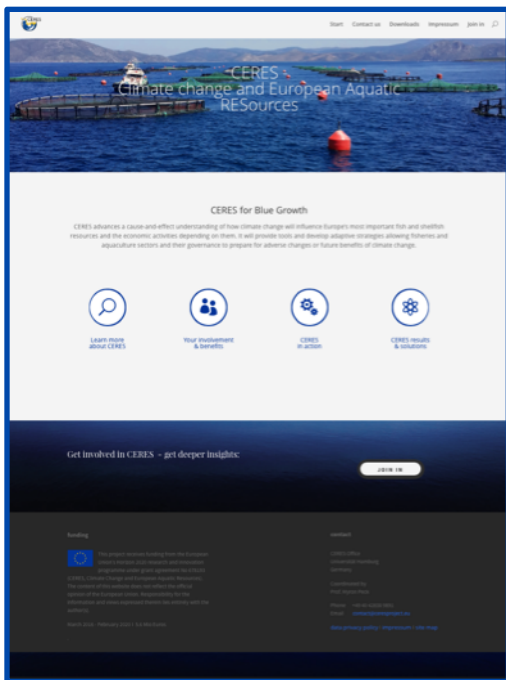
2016 – 2020



2016 – 2020



Website and contact database: ceresproject.eu



Consortium



Consortium

Coordinated by





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A wide-angle photograph of a coastal aquaculture site. Several large, circular and rectangular cages are suspended in the deep blue sea. A small white boat is visible in the middle ground. In the background, there are rolling hills and mountains under a clear sky. Red buoys are scattered throughout the water.

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ceresproject.eu

For further information
please contact:

contact@ceresproject.eu