

Climate change & fish stocks in North Sea: implications for management

Mark Dickey-Collas

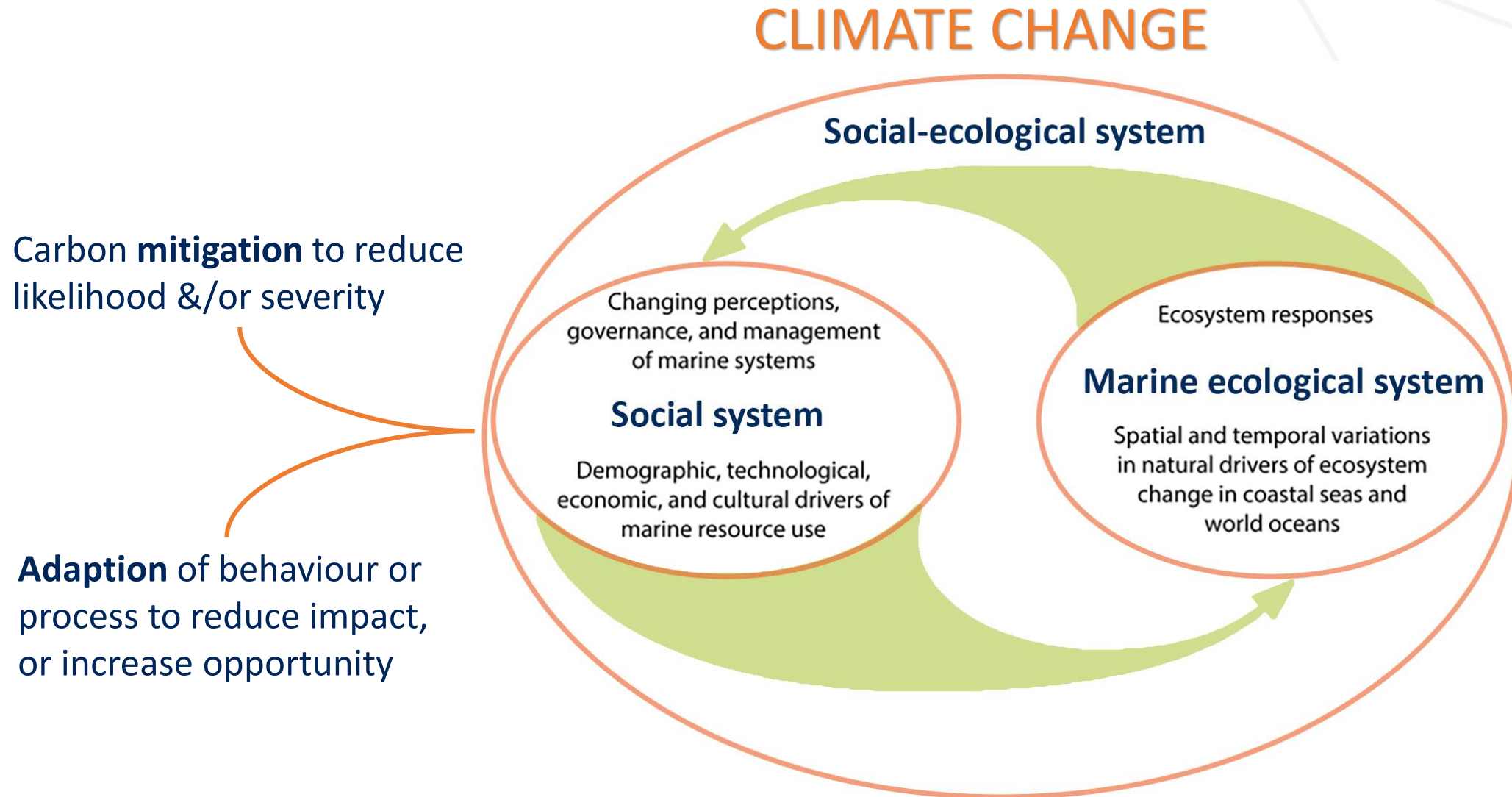
 @DickeyCollas
@ICES_ASC



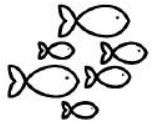
Science for sustainable seas



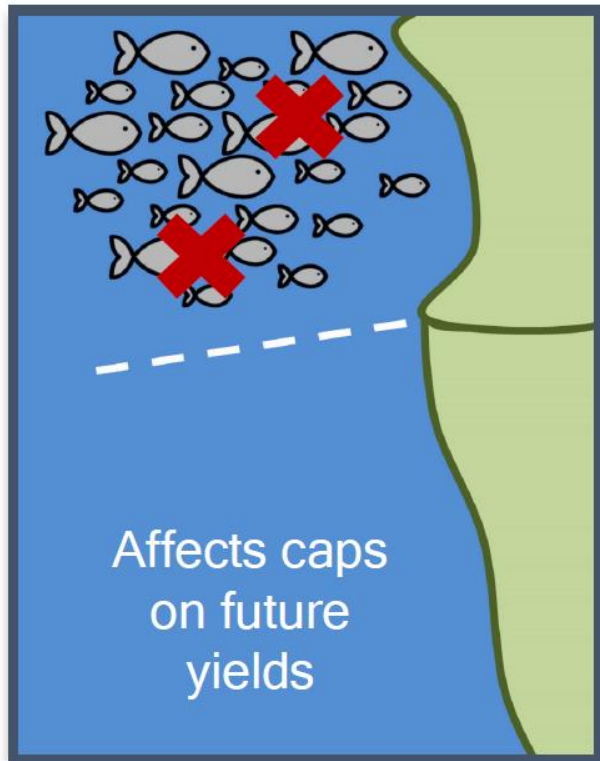
Fisheries: a social-ecological system



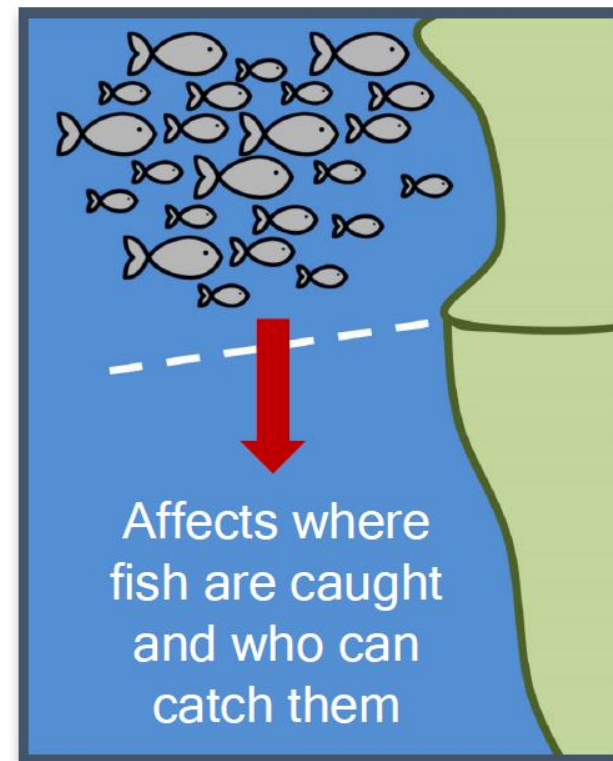
Fish & climate change



Changes in Productivity



Changes in Range



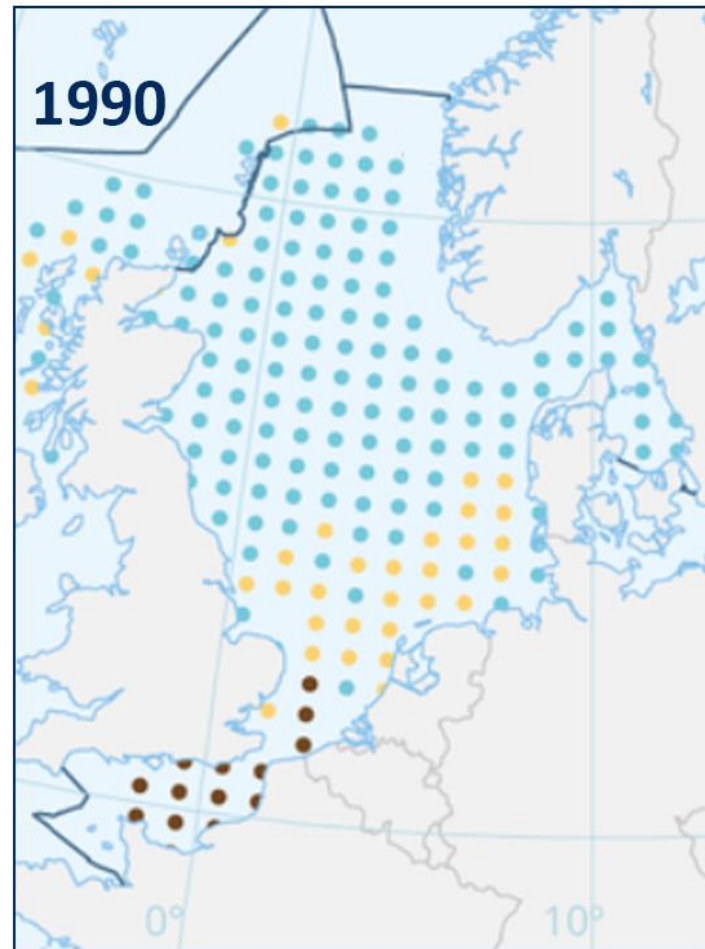
Differing temporal
& spatial scales

Change is happening, evidence from ICES surveys



European Environment Agency
**Indicator of changes in fish
distribution in European seas**

- Dominance Boreal species
- Dominance Lusitanian species
- High dominance Lusitanian species



For more detail by species
see Baudron et al 2020

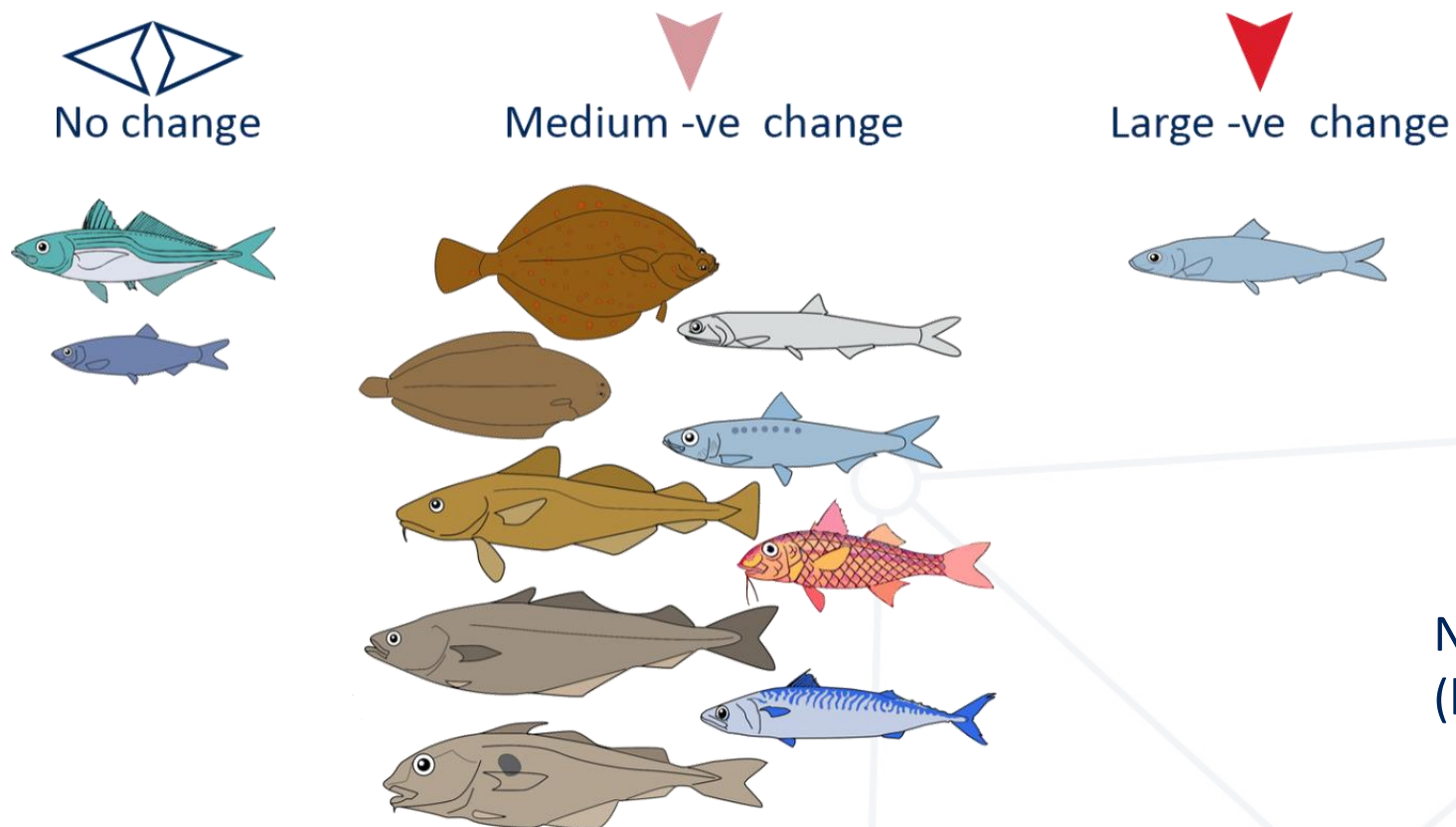
<https://doi.org/10.1111/ecog.04864>

Ratio of Lusitanian to Boreal species in ICES trawl surveys

<https://www.eea.europa.eu/ims/changes-in-fish-distribution-in>

Projected to change in North Sea fish by 2050

<https://ceresproject.eu/>



No sudden events, as yet.
(low likelihood/high impact)

Herring <https://ceresproject.eu/wp-content/uploads/2020/02/16-Herring-in-the-North-Sea-revised.pdf>

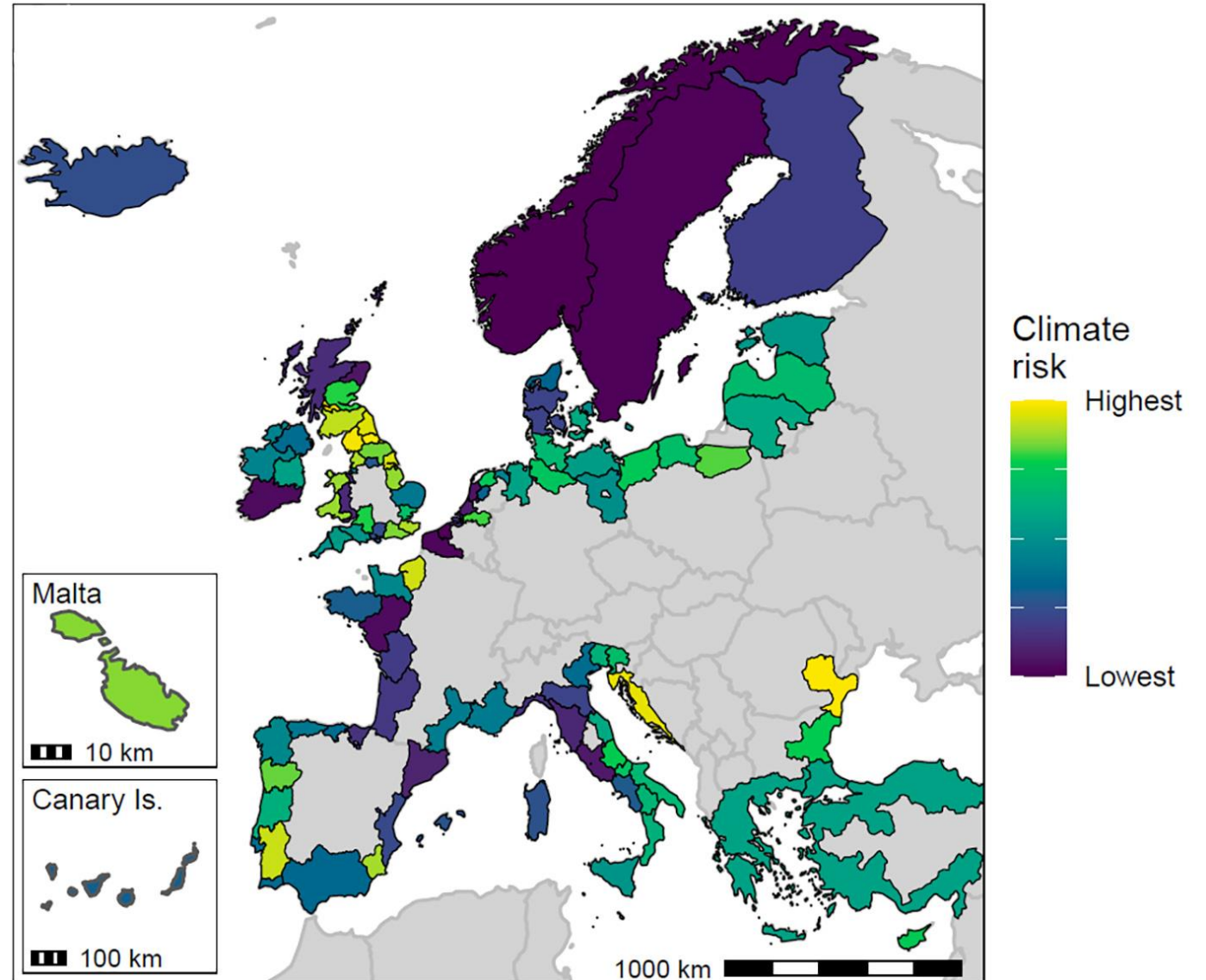
Gadoids https://ceresproject.eu/wp-content/uploads/2020/02/17-Gadoids-in-the-North-Sea_revised.pdf

Flatfish https://ceresproject.eu/wp-content/uploads/2020/02/19-Flatfish-in-the-North-Sea-and-north-east-Atlantic_revised.pdf

Climate risk to European fisheries & coastal communities



Some of Europe's most 'climate change vulnerable' marine communities are on the North Sea



Payne et al 2021

<https://doi.org/10.1073/pnas.2018086118>

Ecosystem-based fisheries management objectives



1. Ability to achieve

Process, governance, institutional & external drivers



2. Ecological well-being

Retained/non retained species, ecosystem & habitats



3. Human well-being

Social, economic & cultural: livelihood, food & nutrition security, health & safety, equity

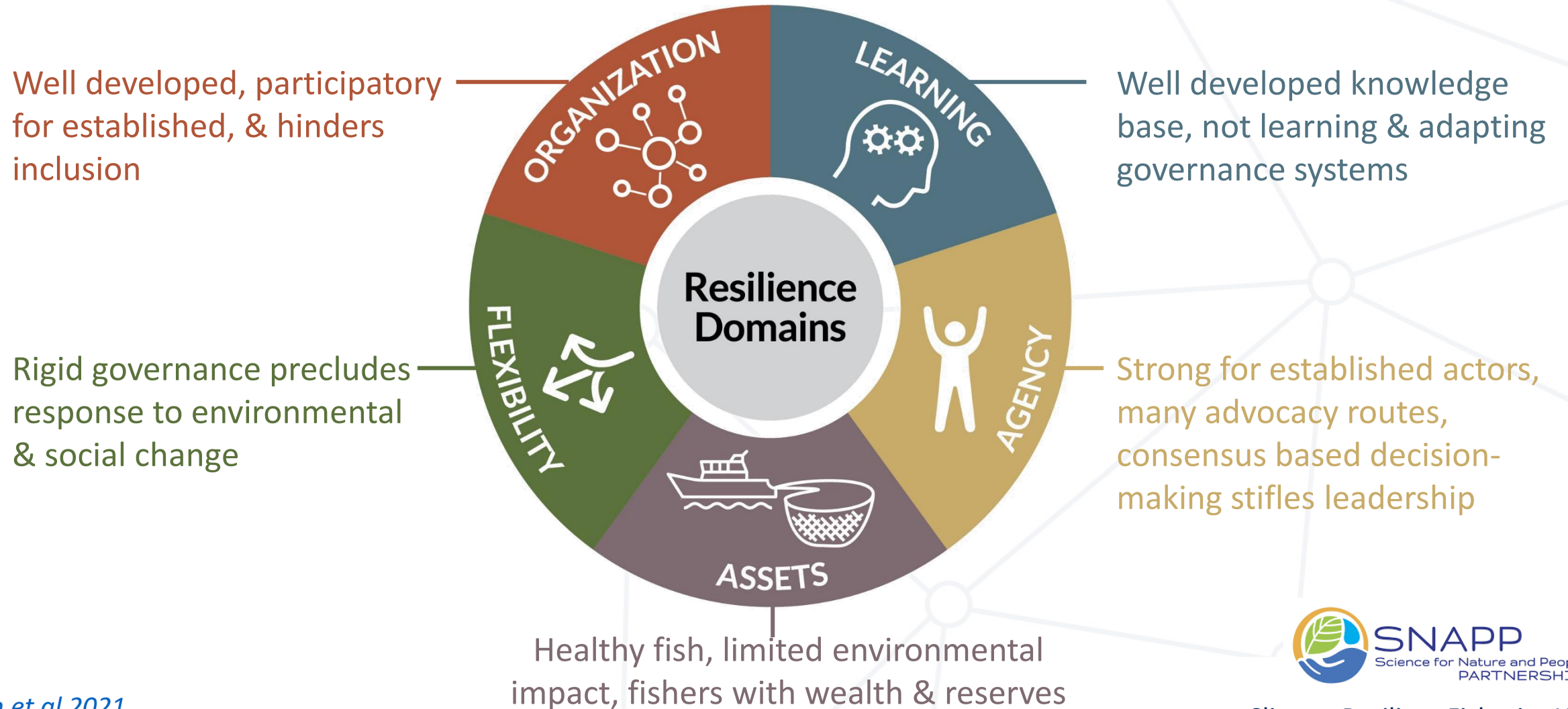
How does climate change impact the risks to achieving objectives?

Carbon mitigation measures & fishing

Fisheries, science & fisheries management are being impacted by wider societal priorities e.g. CO₂ reduction, energy security

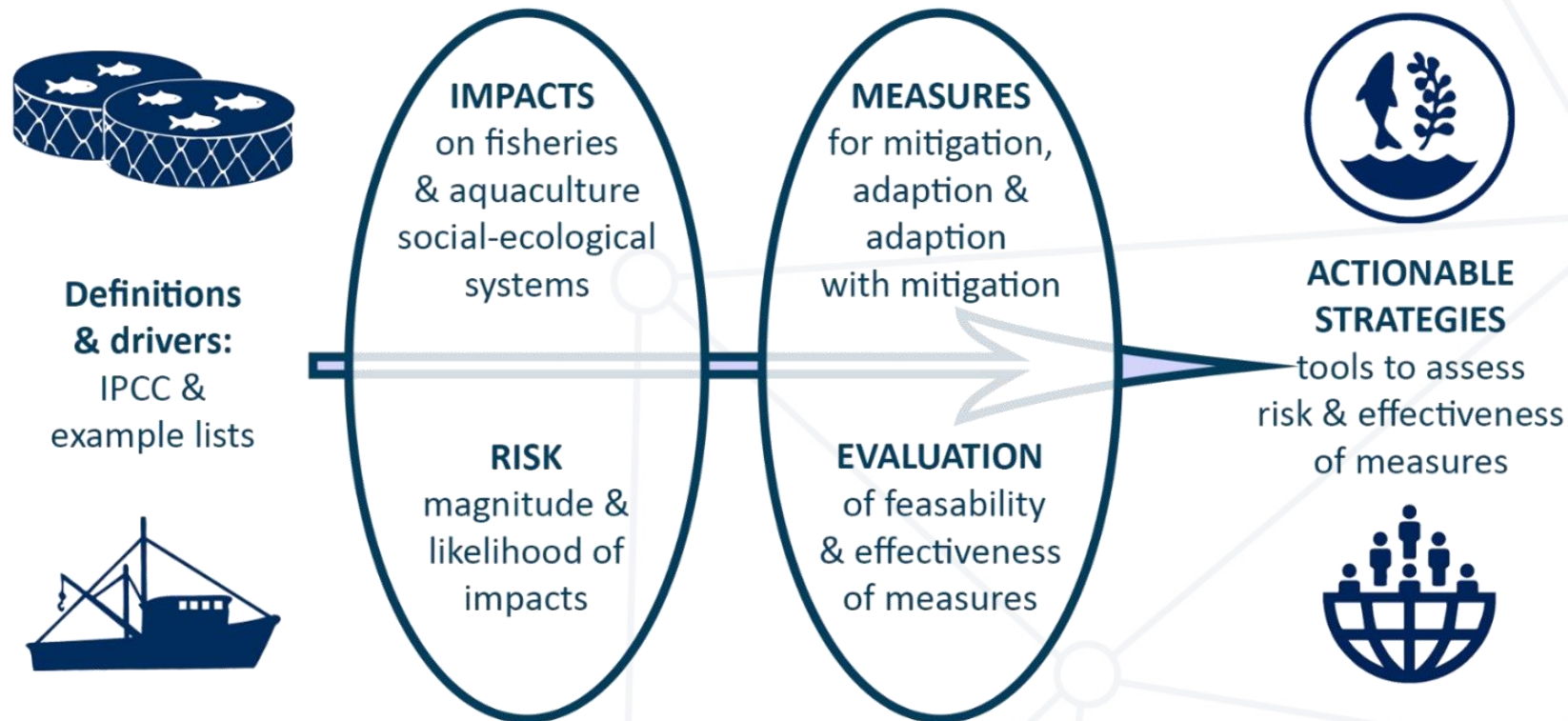


Adaption - attributes of climate resilience in fisheries systems



Climate-informed advice

Constructing actionable strategies & approaches that are appropriate for advice to managers of fisheries.



When considering management of a fishery in a social-ecological system...

Evaluate risks & measures across ecological, social-economic & governance components.

Need for precaution is clear.

In Europe – our governance structure is more inflexible & seems less responsive than our ecosystem, industries & markets.

Our knowledge base can inform us when change is occurring, but can the management system adapt?



Summary

- Change is & will continue to occur, but dramatic evidence for action largely absent in EU seas
- Climate risk to communities varies by region
- Governance & management system is formalised & rigid, climate change is challenging this system
- Reform must be cross jurisdictional & accounting for impacts of wider system



ClimeFish

<https://climefish.eu/>



<https://ceresproject.eu/>