Climate-Informed Fisheries Management Strategies

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Climate Change Awareness Workshop

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Talk overview

- The climate change risk assessment framework: a practical roadmap towards resilience.
- Introduction to climate-resilient fisheries management approaches.
- Exploring adaptive management, harvest strategies, and ecosystem-based approaches.
- Climate change adaptation strategies for the fisheries sector

Climate change Risk Assessment Framework (IPCC, 5AR)

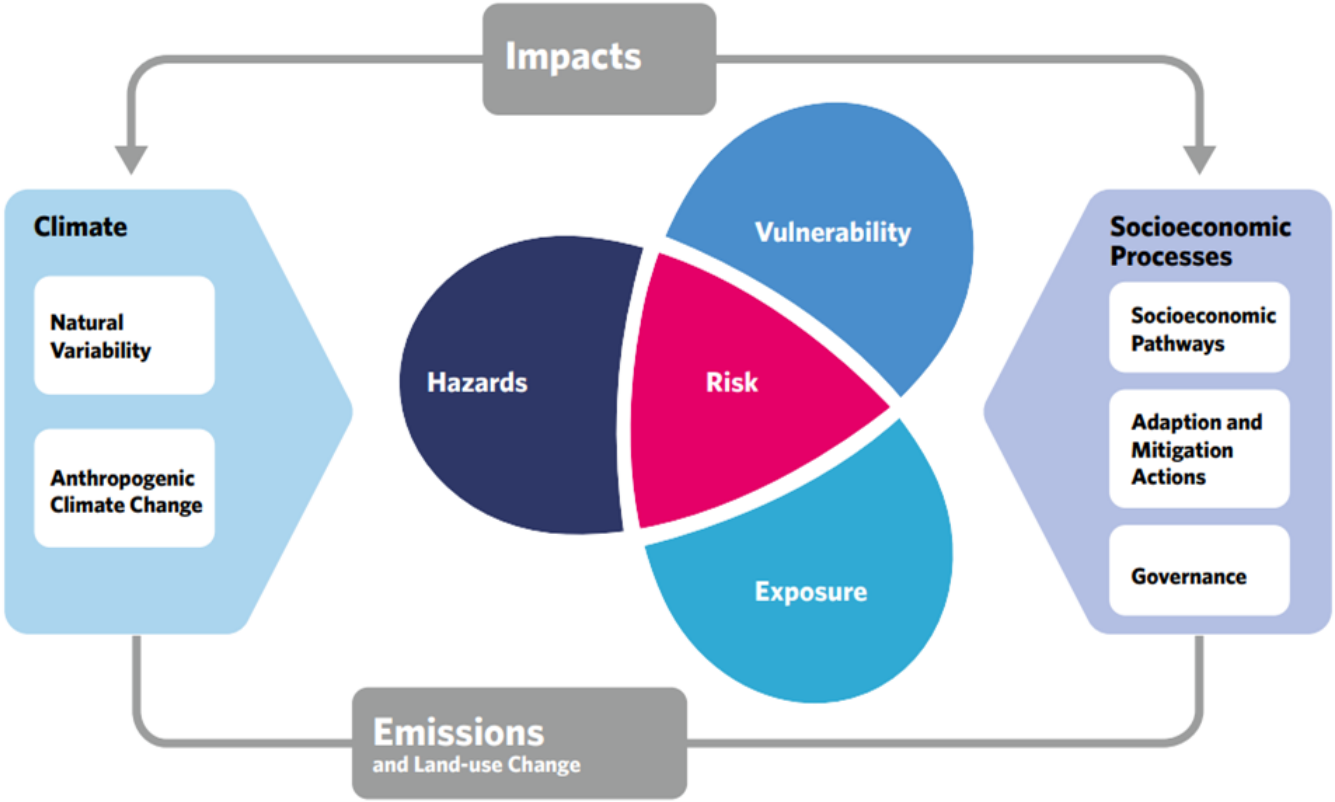
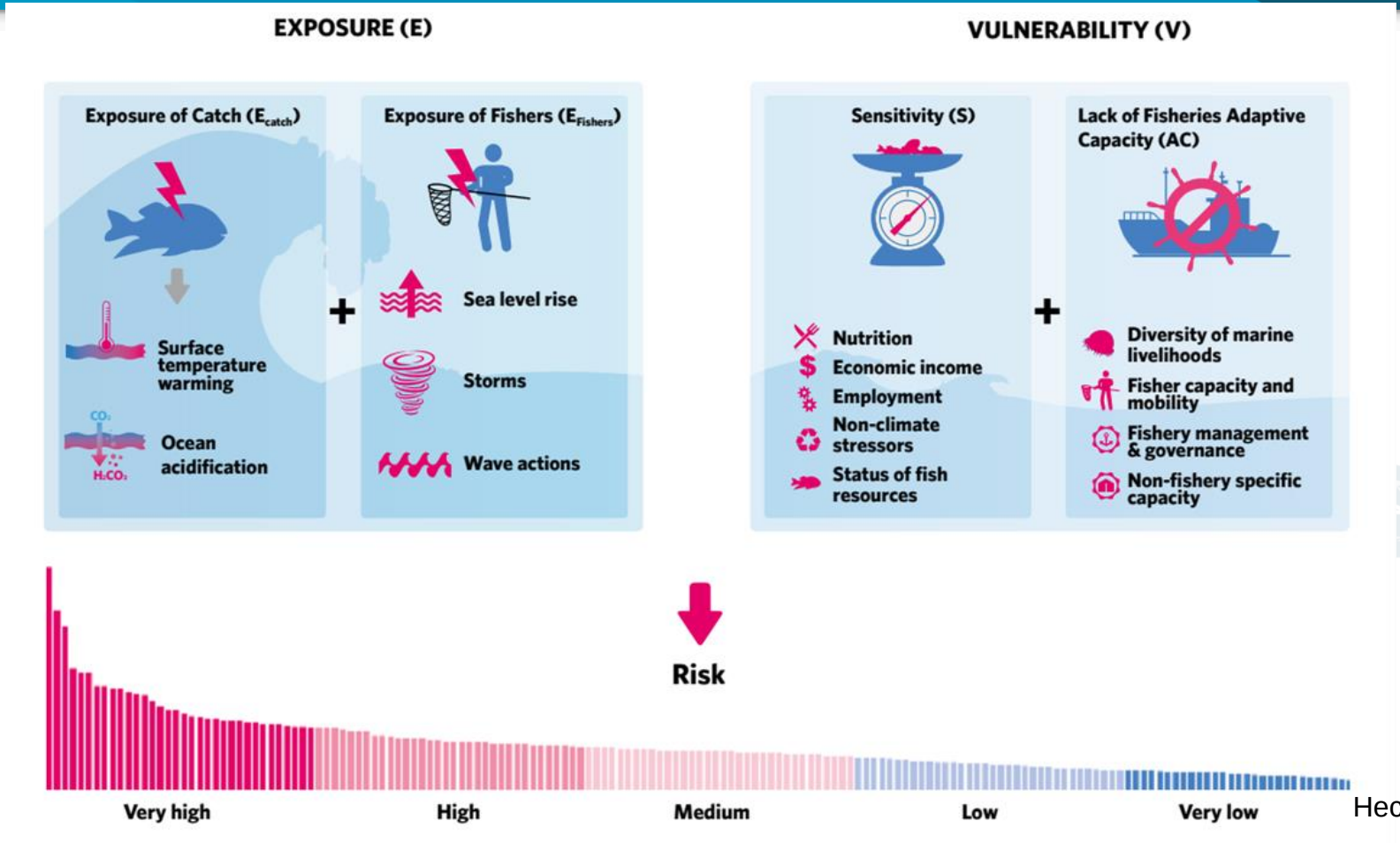


Figure 1: Risk Framework (IPCC 2014)

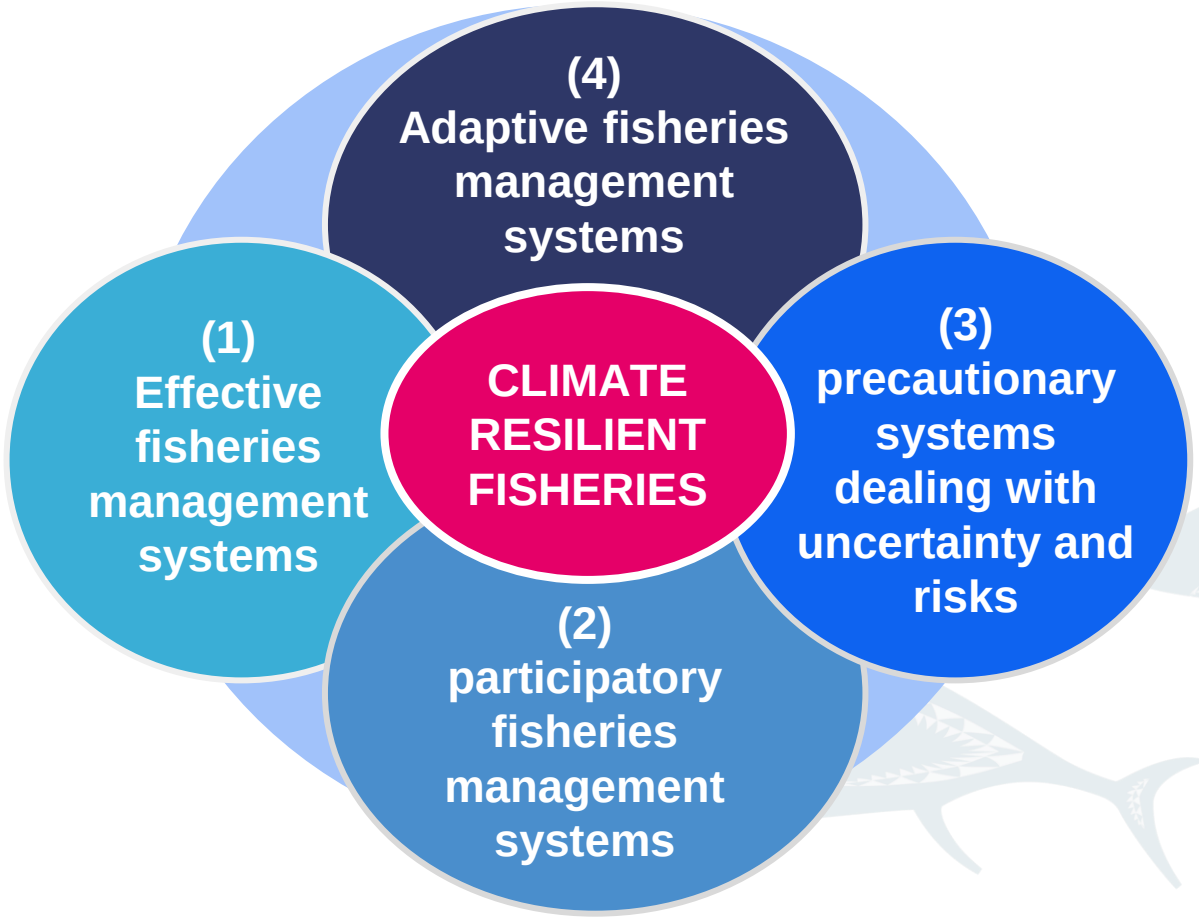


Heck, N et al., 2020

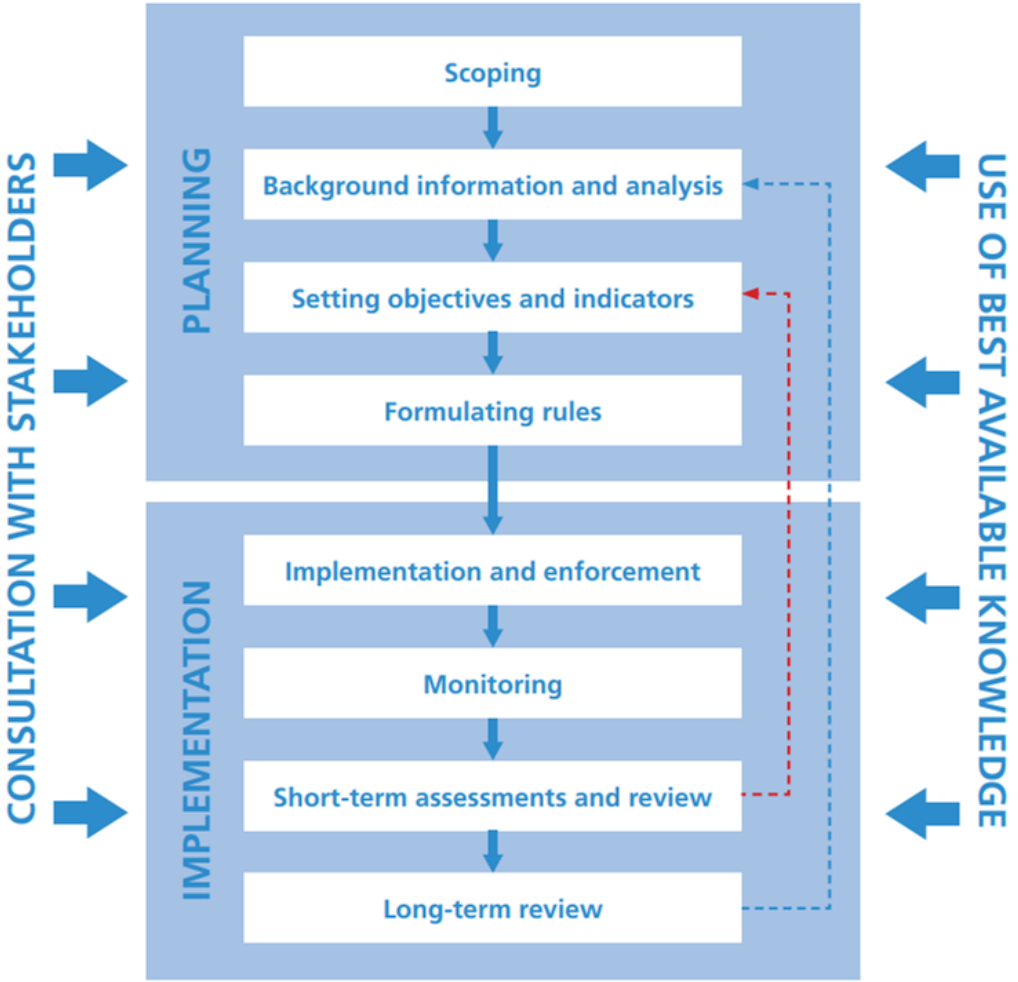
Resilience:

In fisheries systems, resilience is the ability to **anticipate**, **prepare for**, **resist**, **cope with, recover from** or **adapt** to a given stressor, to ensure the sustainability of marine ecosystems, fishery resources and human benefits.

Introduction to climate-resilient fisheries management approaches



(1) Effective fisheries management systems



(1) Effective fisheries management systems

With climate-adaptive characteristics	• **Ecosystem-based fisheries management** • **Adaptive Fisheries Management** • **Fisheries Co-Management** • **Zone based limits**
Strategies to integrate climate change	• **Integrated ecosystem assessments,** • **Marine spatial planning, ,** • **Transboundary cooperative fishery management regimes,** • **Adaptive fishing technique**

(2) participatory fisheries management systems

Table 2. Examples of precautionary actions that can be taken in the *planning and implementation* phases of the fisheries management cycle (Figure 1) to cope with climate change (adapted from FAO, 1996; Cochrane, 2002).

- Understand the overall exposure of the fishery to climate drivers and expected impacts, including the potential species composition and yield for a fishery as climate change progresses.
- Assess risks to identify priority issues and vulnerability factors related to climate change.
- Use best available information for setting objectives and management strategies, including scientific and local/traditional knowledge.
- Identify the capacities of science, stakeholders and fisheries managers, and ensure goals and expectations of the fishery are aligned appropriately.
- Define goals, objectives, indicators, targets, constraints, management measures and procedures that are appropriate to apply in the face of climate change, and allow for adjustment of management measures as
- Have an agreed harvest control rule for a fishery response when a reference point is breached.
- Give priority to rebuilding overfished stocks, avoidance of overfishing, and avoidance of excessive harvesting capacity.
- Ensure broad acceptance of precautionary actions through appropriate consultations with stakeholders.

(3) precautionary systems dealing with uncertainty and risks

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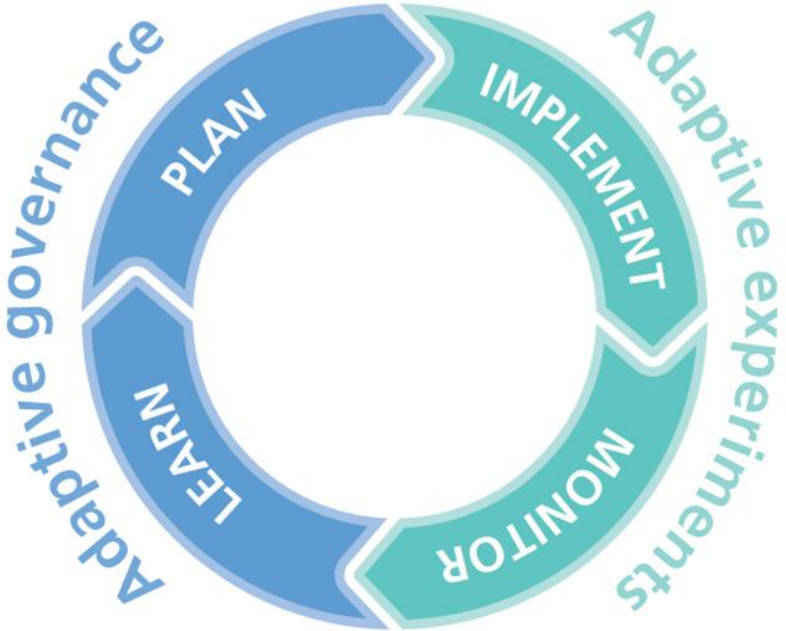
- Ensure the management programme can be implemented given the capacity of scientists, stakeholders and managers.
- Collect all information necessary to ensure that the management plan is being executed and that it is achieving the desired results, including environmental and socio-economic data (e.g. community-based data collection programmes).
- Use best available information to monitor the fishery, including scientific and local/traditional knowledge.
- Implement fishery-dependent or -independent data-gathering systems (monitoring) that can track changes in the geographic range of species and potentially provide advanced warning of changes in fish distributions and species composition.
- Set up procedures for assessing the state of stocks, rule setting, economic assessments, and communication of decisions and rationale for communities and the fishing industry.
- Design and implement contingency rules to ensure compliance with targets in the face of major adverse events from climate- and non-climate-related stressors.

(3) precautionary systems dealing with uncertainty and risks

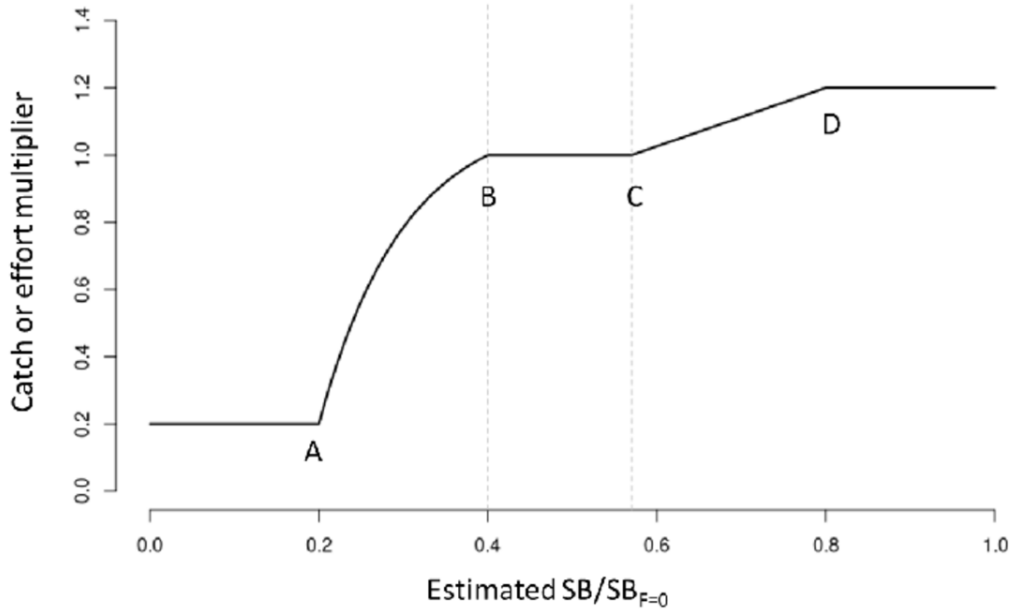
- Ensure appropriate systems to incentivize compliance, and facilitate enforcement and penalties for non-compliance.
- Periodically re-evaluate and revise management measures to assess potential impacts of climate change and other changes.
- Use simple rules-based systems based on common-sense indicators for under-resourced systems or systems without established response-based fisheries management.

(4) Adaptive fisheries management systems



Harvest strategies and cc

Harvest strategies can account for scientific uncertainty and variability, **including that associated with climate change**, therefore they can ensure that stocks are maintained at their target levels.

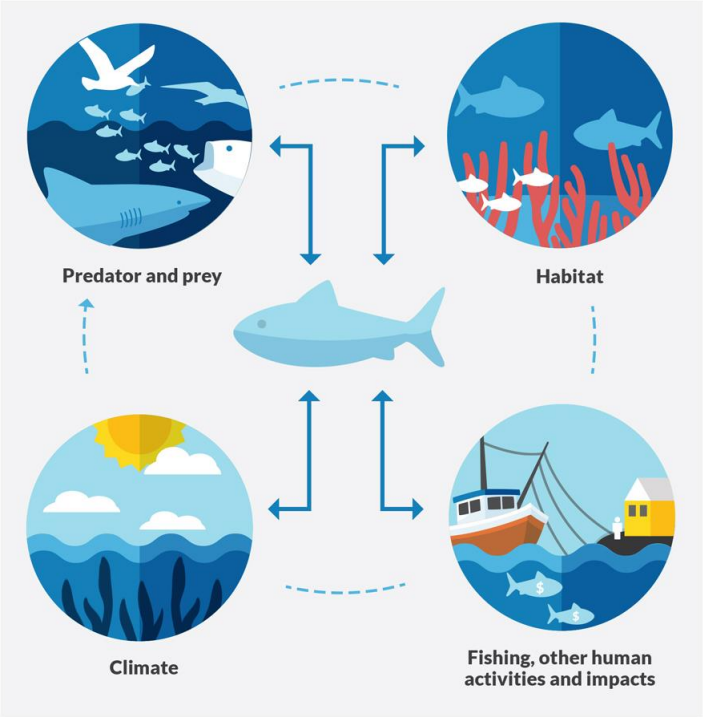


Ecosystem based management and cc

Figure 1

EBFM Accounts for the Ecosystem When Setting Rules and Measures for Each Population

How climate, habitat, human activities, fish populations and other species interact



Climate change adaptation strategies for the fisheries sector

Hazards (cc stressors)

+ mean ocean temperature
+ Marine heatwaves
+ Extreme events
+ Ocean acidification & Deoxygenation
+ Warm pool area

Impacts on oceanic and coastal ecosystems

Impacts on fishery resources

Distribution
Productivity
Sp composition

Risks to fisheries

~in catch rates
+yield variability
+costs of operations/ ~in catchability
+conflicts= +MCS challenges, cooperative management challenges

Risks to social and economic benefits

Food security
Government revenues
Livelihood and tuna-related employment

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Risks to fisheries

1) ~in catch rates
2) +yield variability
3) +costs of operations/ ~catchability
4) +conflicts= +MCS challenges, cooperative management challenges
5) Exposure of operations to extreme events

Risks to social and economic benefits

6) Food security
7) Government revenues
8) Livelihood and tuna-related employment

Adaptations options?

1) access higher-value markets/widen targeted sp
2) Have robust climate informed Harvest strategies in place; Implement insurance schemes; implement forecast/warning systems
3) reduce costs/increase efficiency?; rely on FADs; implement forecast/warning systems
4) implement flexible allocation and access schemes; Generate new cooperative management frameworks that consider climate change projections to anticipate the effects on tuna stocks
5) Develop and implement labour standards that account for climatic hazards
6) Implement EBFM, and have flexible management systems which would allow new target sp
7) Transboundary cooperative management schemes that account for climate variability
8) diversify livelihoods

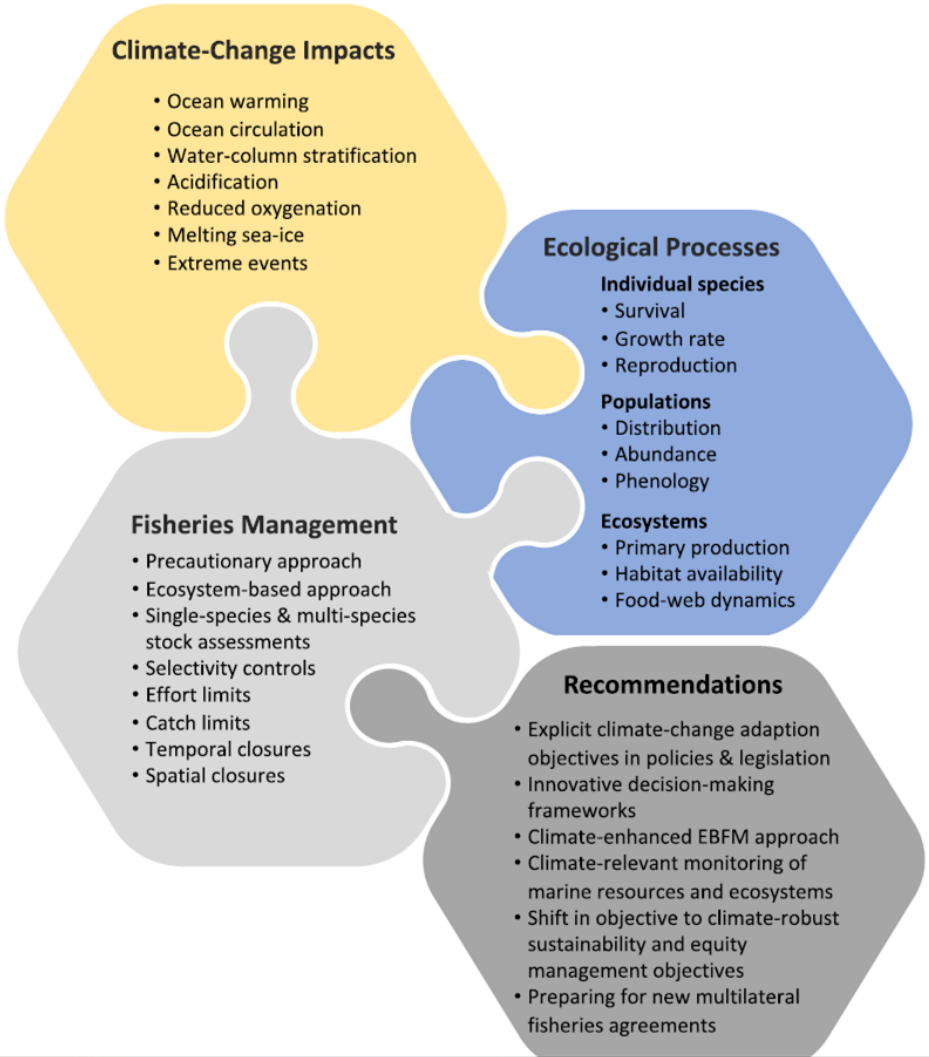

FIGURE 2 Overview of climate change impacts on marine ecosystem processes and fisheries management, and recommendations to achieve climate-adaptive fisheries management. Figure appears in colour in the online version only

Useful resources

https://www.oceansfutures.org/methodology

https://fisherysolutionscenter.edf.org/tools/climate-vulnerability-assessment