GERICS
Climate Service Center
Germany

An institution of Helmholtz-Zentrum **Hereon**

How should and can we adapt?

Addressing coastal and water resilience on the land-sea interface

EMB 9th Forum

2 April 2025, Brussels

Louis Celliers, with many others

Outline

- Positionality*(in what way do I frame the issues?)
- Adaptation where of what and to what?*(talking generalities)
- Universal wisdom for adaptation*(in pursuit of meaning, significance and relevance)
  - 1 Context matters
  - 2 Acceleration
  - 3 DIKW and inversion
  - 4 Social innovation
- How can/How should?*(in reality)
  - 6 & 7 A case study
  - 8 Guidance
- Q&A

Adaptation where, of what, and to what?

Solar Energy

Research and development

Education

Water management

Finance and insurance

Healthcare

Urban planning

Transportation

Farming

Agriculture

Port operations

Mineral resources extraction

Offshore energy

Aquaculture

Shipbuilding

Shipping and maritime transportation

Fisheries

Tourism

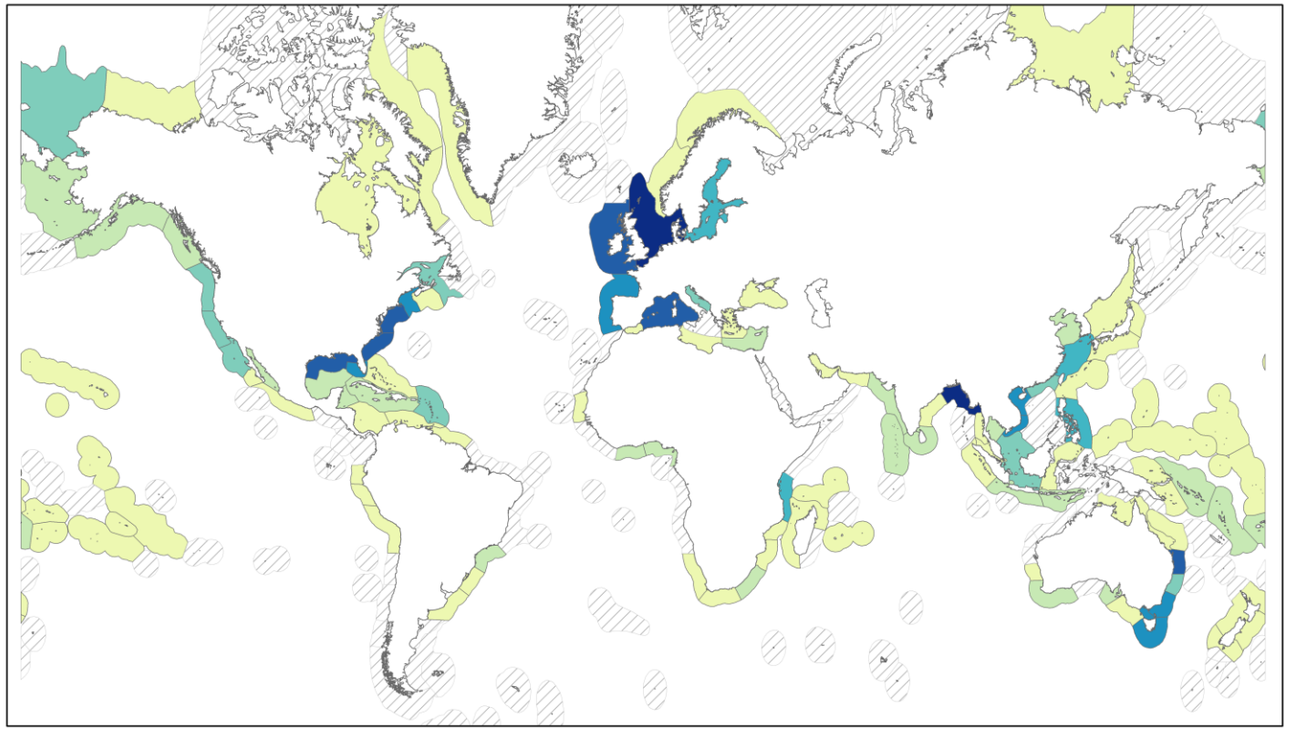
Coastal management

Forestry

Dalle3 Generated

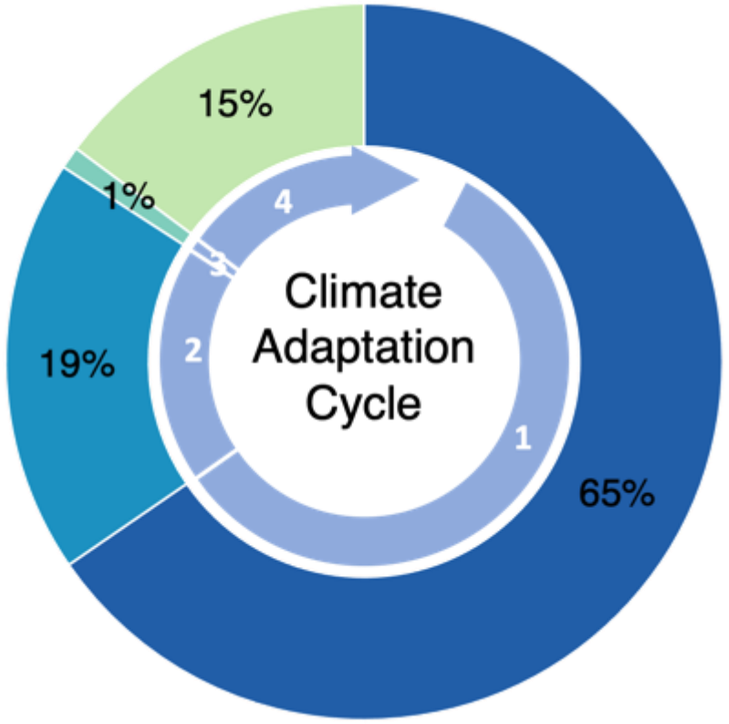
1. Context matters

Spatial scale and distribution of adaptation knowledge across the marine ecoregions are not equal

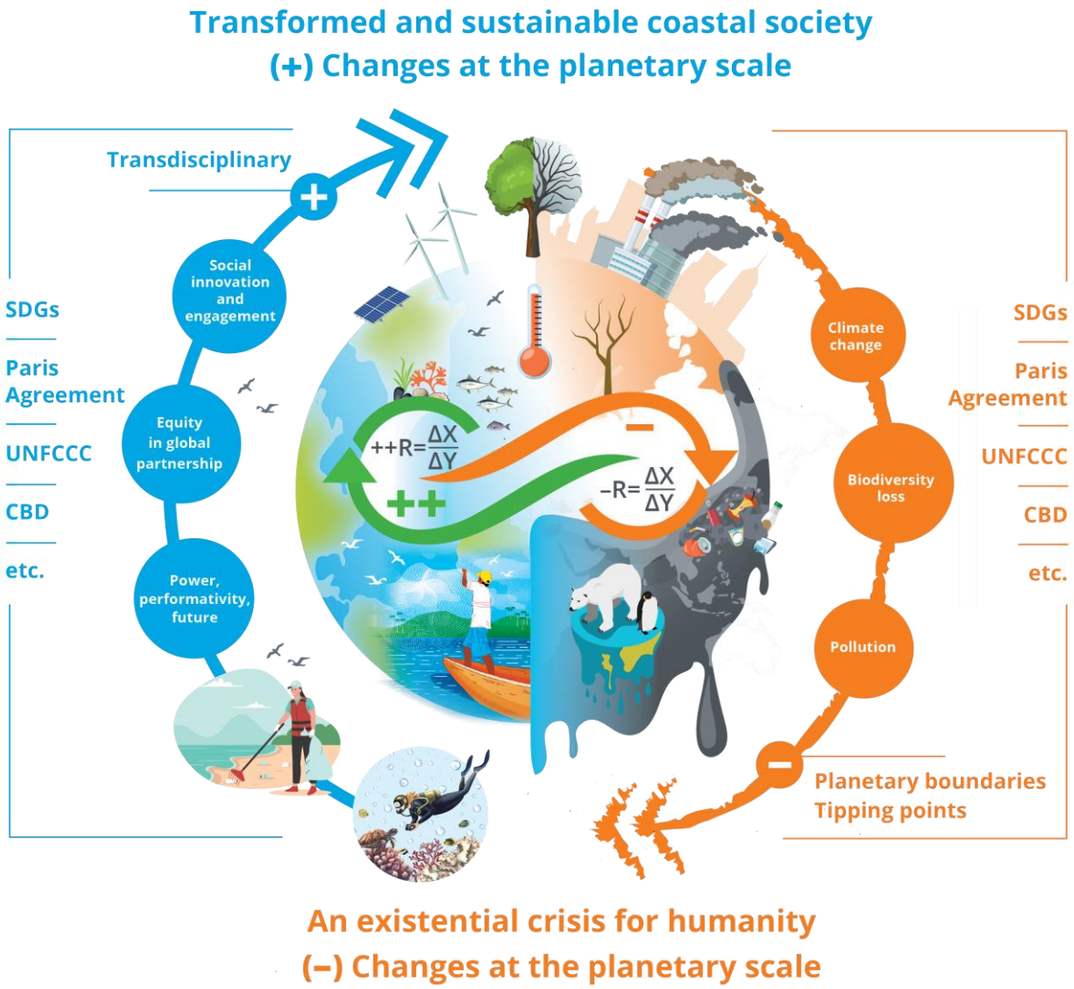


Cabana, D, et al. 2023. Enabling climate change adaptation in coastal systems: A systematic literature review. Earth's Future, 11, e2023EF003713. https://doi.org/10.1029/2023EF003713

Contribution of knowledge to different stages of the adaptation policy cycle is not equal



2. Accelerate (speed up)

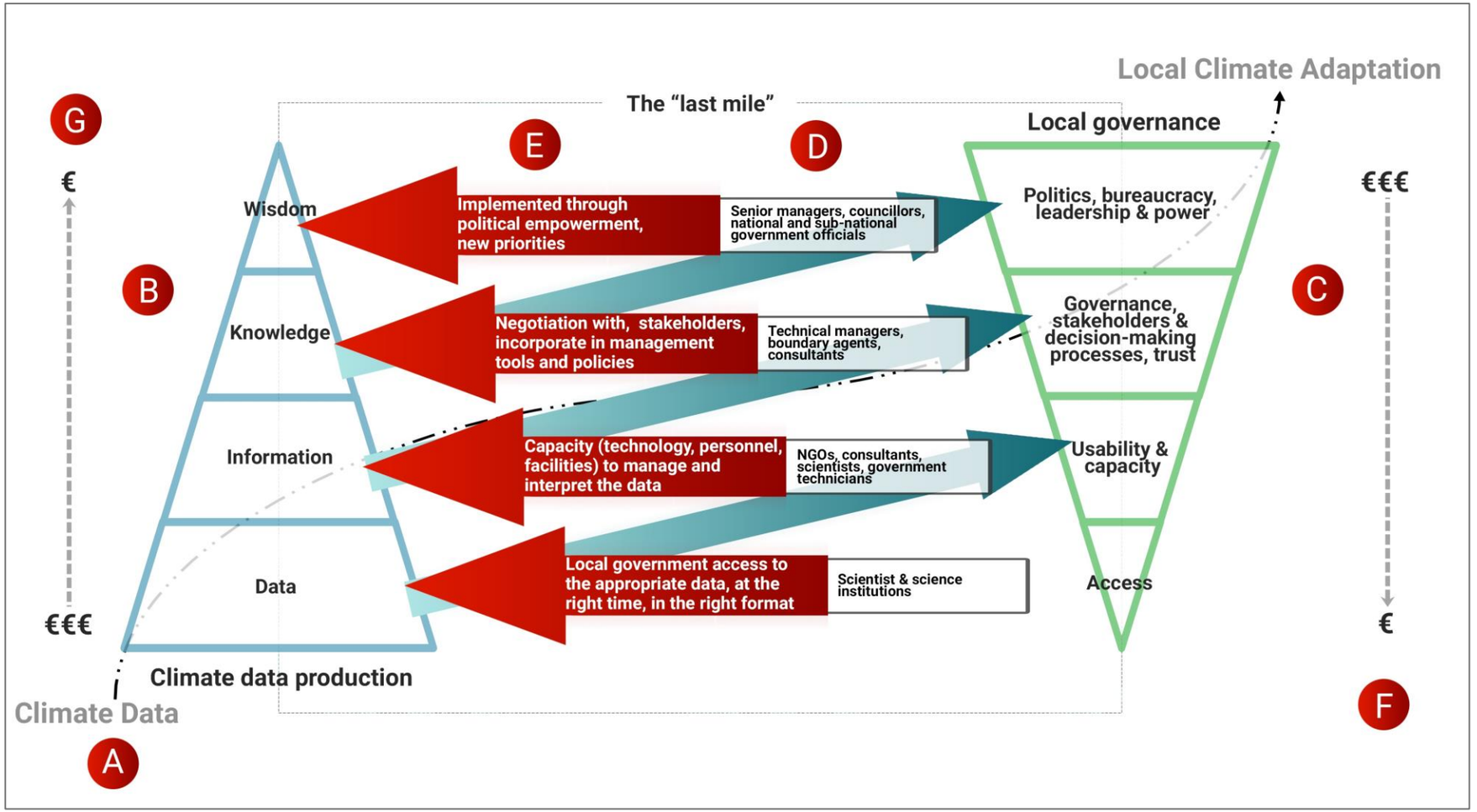


Celliers L, et al (Submitted) New rationalities, inner logic, and hope for sustainable future coasts. Global Sustainability

The escalating pace of global warming (Johnson and Lyman 2020, IPCC 2021), the rise in sea levels (Nicholls et al. 2021, Becker et al. 2023), the loss of biodiversity (Jaureguiberry et al. 2022, Penn and Deutsch 2022), especially the loss of coral reefs (Eddy et al. 2021), sandy beaches (Luijendijk et al. 2018, Brooks 2020), seagrass (Dunic et al. 2021) and mangrove cover (Otero et al. 2016, Bryan-Brown et al. 2020), as well as ocean pollution, (Jouffray et al. 2020, Landrigan et al. 2020, Riechers et al. 2021) are some of the scientifically confirmed trajectories which confront us.

The rate and extent of corrective societal action (i.e., adaptation, policies, laws, practices, valorising local knowledge etc.) should at least keep pace with the projected rate of loss and environmental degradation.

3. Data, Information, Knowledge and Wisdom requires Inversion



The steps of access (to data); usability (of information); governance (of knowledge) and politics (of wisdom) provide a foundation for building a bridge between scientific results and their use in society, especially at the local level.

These balancing elements and their relatedness coincide with newer models of innovation policy at European and international levels stress interaction between stakeholders across the different levels of governance, including stakeholder expectation levels, transparency and accountability (IPCC, 2018, 2019).

Celliers L, et al.2021. The 'last mile' for climate data supporting local adaptation. Global Sustainability. 2021;4:e14. https://doi:.org/10.1017/sus.2021.12

4. Social Innovation

There are types of social innovation that are fundamental for establishing and maintaining the connection between people and the coast, which could result in achieving higher degrees of sustainability, now and in the future.

The six types of social innovation are (a) authentic engagement; (b) artful and engaging communication; (c) urging and compelling change; (d) governance for social-ecological systems; (e) anticipation in governance; (f) and, lived experiences and values.

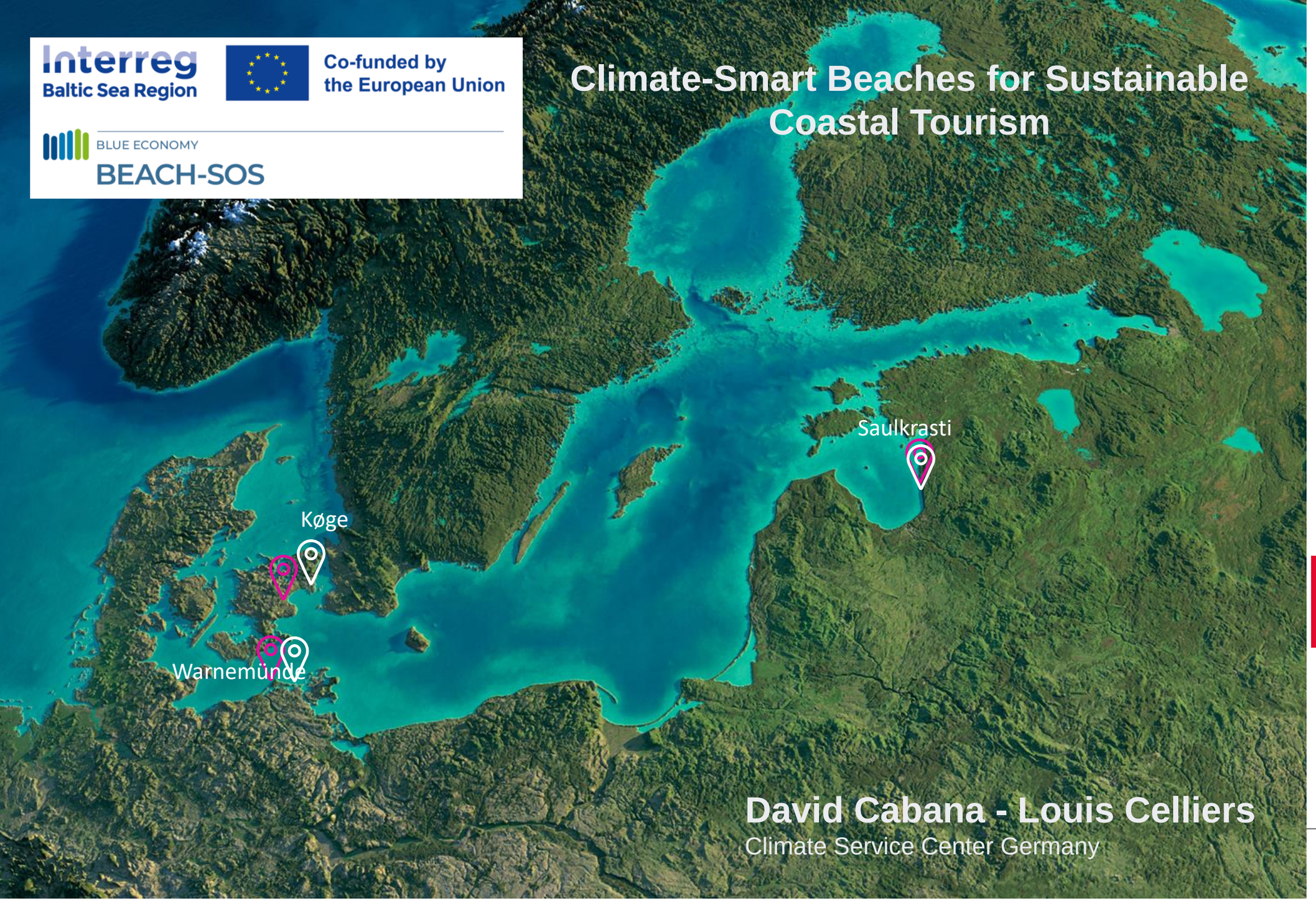
Celliers L, et al. 2023. Social innovation that connects people to coasts in the Anthropocene. Cambridge Prisms: Coastal Futures.;1:e24. https://doi.org/10.1017/cft.2023.12

Interreg
Baltic Sea Region

Co-funded by
the European Union

BLUE ECONOMY
BEACH-SOS

Climate-Smart Beaches for Sustainable Coastal Tourism



David Cabana - Louis Celliers
Climate Service Center Germany

Frilufts Rådet

EUCC-D

FEE LATVIA

Gdański Ośrodek Sportu

Saulkrasti

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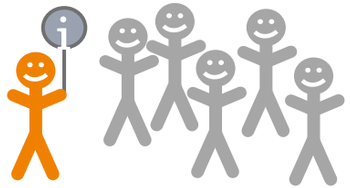
6. Blue Economy: Coastal Tourism and Beach Management

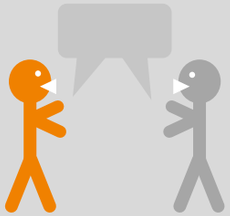
Cross-sectoral, Multi-level Coast & Climate Governance

1. Initiating Contact. Listening coastal stakeholders



2. Establishing a trustful cooperation

3. Identifying problems



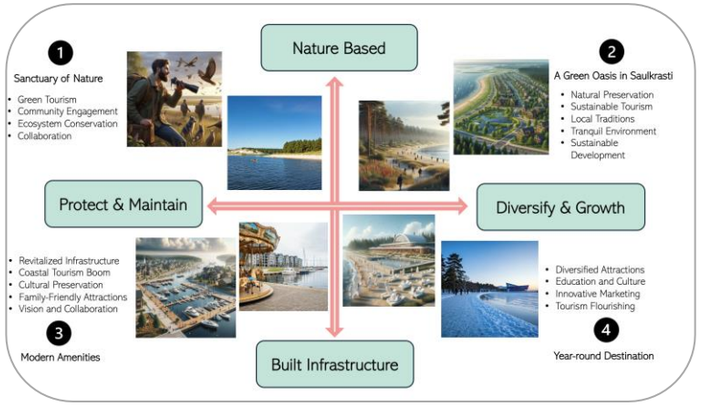
Cabana and Celliers 2025. Climate Information to Action: Challenges for Baltic Beach Management" Ocean and Coastal Management (submitted).

4. Co-production of solutions with stakeholders

5. Benefits

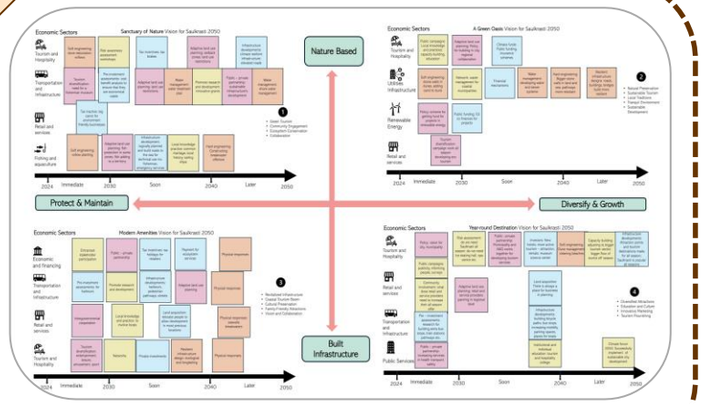
Climate-resilient coastal tourism development

Collaborative Mapping



Visioning

Comm. Vul. Ass.



Adaptation pathways

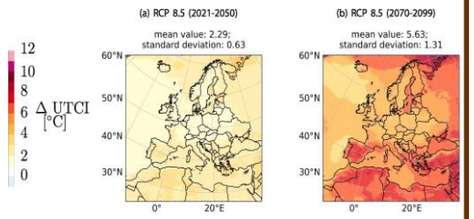
7. Coastal Climate Services for Adaptation at the Local Scale

6 May 2024

A resilient future for coastal communities

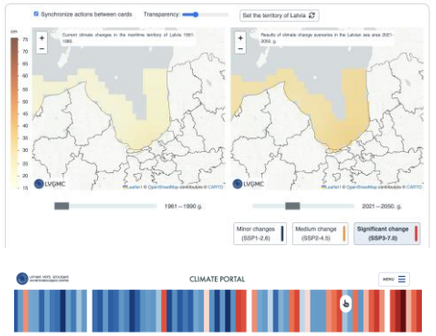
https://interreg-baltic.eu/top-news/a-resilient-future-for-coastal-communities/

Universal Thermal Climate Index

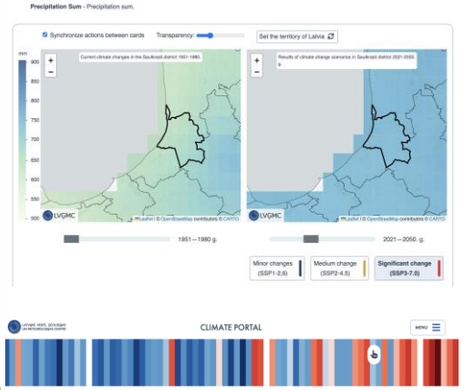


GERICS Climate Service Center Germany

Sea-level



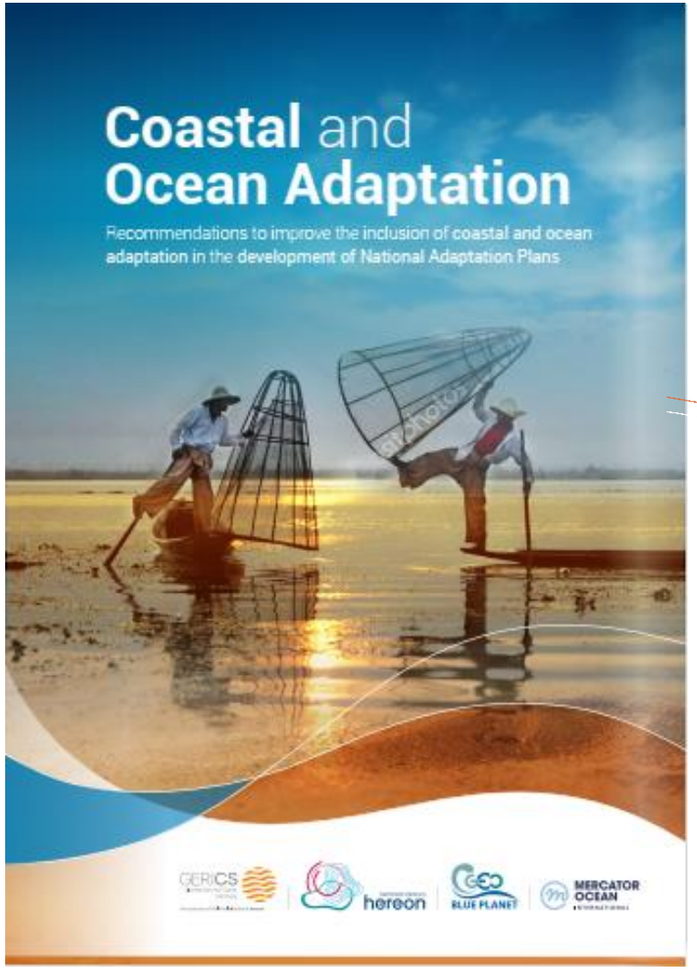
Rainfall



"By fostering collaboration and inclusivity, we aim to equip Saulkrasti with a robust framework to address climate challenges and promote sustainable tourism practices."

Rimants Lusis, Saulkrasti Municipality

8. Guidance for Coastal Adaptation



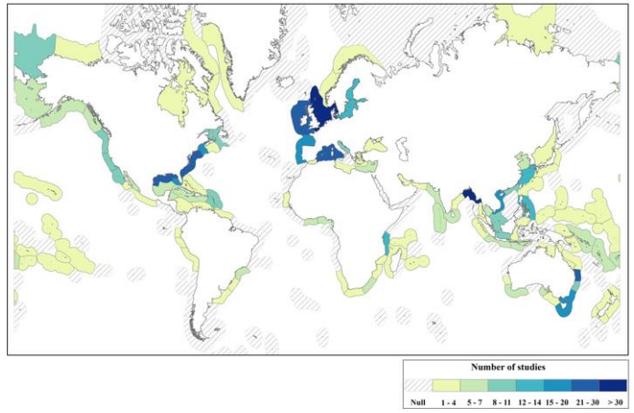
Four elements	Steps	Supplementary guidance	Actions
Lay the groundwork and address gaps Preparatory elements Implementation strategies Reporting, monitoring and review	Each element is broken down into a series of practical, manageable steps	For each step, a set of recommendations is provided to offer additional information and guidance	The A numbers represent specific actions and are included throughout the document. When you encounter an A number and want more details about a particular action, refer to Table 13.

Element A. Lay the groundwork and address gaps		
Steps	**Activities for coastal and oceans adaptation**	**Supplementary guidance**
e coasts and rting the omy, including livelihoods and well-being.	Establish the importance of coasts and oceans to the national and local economies. Consider the Blue Economy as subject to climate change and therefore requiring measures to adapt and ensure future and planned benefits. Designate the multisector, multilevel spearheading or coordinating institutions for coastal and ocean adaptation. Create or enhance a national vision and mandate for the inclusion of coasts and oceans in national adaptation. Operationalise multilevel and multi sector coastal and ocean adaptation through access to support. Define a coastal and ocean framework and strategy, including a roadmap. These should detail sequentialactivities to implement multisectoral and multilevel adaptation actions with a clearly defined timeline and a monitoring and evaluation plan.	National policy and strategic framework (national scale): Countries make decisions on the fundamental economic, ecological and social importance of coasts and oceans. These decisions consider the many sectors directly and indirectly dependent on coasts and oceans. In many instances this is understood as the Blue Economy. All countries with coastlines have economic activities dependent on the coasts and oceans, and a formal Blue Economy strategy might exist. Enhance or create a vision for coasts and oceans in NAPs, or as a stand-alone sectoral NAP. Draw on existing coastal or ocean governance policies. Incorporate ecosystem service values into national accounting. Consider the specific vulnerability of SIDS, if applicable. Institutional arrangements and coordination (national and subnational scales): Designate or create institutions and organizations to take responsibility for coastal and ocean adaptation. Ensure inclusion of actors across Blue Economy sectors. Coastal and ocean adaptation planning and implementation teams should develop an understanding of the "organizational universe" within the country, answering questions like: "who are the key actors across the levels of administration?" and "who are the key societal actors that must be consulted?" Adaptation actions are distributed across scales and different levels of administration will take responsibility for different actions. At the local level, civil society, non-governmental organizations (NGOs) and the private sector will all need to act. Identifying the key coastal and ocean sectors (public and private) that must adapt to climate change is essential. Community and equity considerations (local scale): Prioritise coastal resource contributions to poverty reduction and food security. Integrate traditional knowledge into adaptation planning, engaging local communities. Address gender inequalities in coastal resource access and control. Resource mobilisation and international cooperation (global and regional scales): Seek international climate finance for coastal/ocean adaptation projects. Promote cross-border cooperation on shared marine ecosystems. Explore innovative financing solutions for NbS and climate smart blue economy initiatives.
2. Stocktaking. Identify available information on coastal and ocean climate change impacts, vulnerability and adaptation. Assess gaps and the needs of the	Conduct a stocktake of ongoing and past coastal and ocean adaptation activities. Synthesise available analyses of the current and future coastal and ocean climate at the broad national and/or regional level. Conduct a gap analysis to assess strengths and weaknesses in relation to capacity, data and	Identifying and accessing data and information: Identify and establish relationships with national and regional organizations that provide or facilitate access to climate data and Earth observations. This may include meteorological services, United Nations agencies, universities, NGOs and the private sector. Establish access to information about coastal and ocean climate hazards, risk and vulnerability. FAIR information is fundamentally important to prioritise adaptation action. An important consideration is to identify and establish access to appropriate climate change data and information, climate services and Earth observation products and services. This may include data and information from various sources, including academia, research institutions, government agencies, the private sector and civil society. Also identify national or regional climate service providers that can provide support with bespoke scientific information services. …ccessible, reliable and long-term preservation of coastal and ocean climate data, including quality control and metadata standards. …nal knowledge on coastal and ocean climate change. …nitiatives (objectives, areas, activities and funding). …imate impacts on coastal and ocean species, habitats and services. …he Blue Economy and the risk and vulnerability that must be considered in adaptation planning. …and ocean environment" assessment provides critical baseline information to establish adaptation goals and track progress. …r coastal and ocean adaptation, focusing on key stakeholder groups (e.g. government officials, local communities and the private …to build the capacity of key stakeholders in coastal and ocean adaptation. …of best practices on coastal and ocean adaptation through regional workshops, training programmes and online platforms. …cal assistance and support to local communities and small businesses in implementing adaptation measures. …e considerations into coastal and marine education curricula, at all levels. …must be considered, as well as the capacity (human, financial resources, etc.) to implement coastal adaptation options. …he implementation of coastal and ocean adaptation at a national level is to use and improve existing governance mechanisms (e.g. …nagement of set-back lines, coastal development regulations, estuaries, coasts and shorelines can be an effective tool for Such mechanisms can be effective once the adaptation options are selected and agreed but require policy support and practical implementation. It may also be necessary to strengthen existing and draft new policy and legislation to support and implement adaptation options. The development of realistic timelines for implementation, coupled with monitoring and evaluation of implementation and the success of adaptation, are critical parts of the NAP process. Coastal and ocean adaptation action requires people, organizations, coordination and planning. Available capacity (human and financial resources) will determine how roles and responsibilities in adaptation planning and implementation will be allocated or decided. Financial resource mobilisation: Assess the financial resources required for coastal and ocean adaptation and explore opportunities for mobilising domestic and international funding.

Celliers L, et al. 2025. Coastal and Ocean Adaptation. Recommendations to improve the inclusion of coasts and ocean adaptation requirements in the NAP development process. Technical Report. GERICS, GEO Blue Planet.

Sources

Literature Reviews



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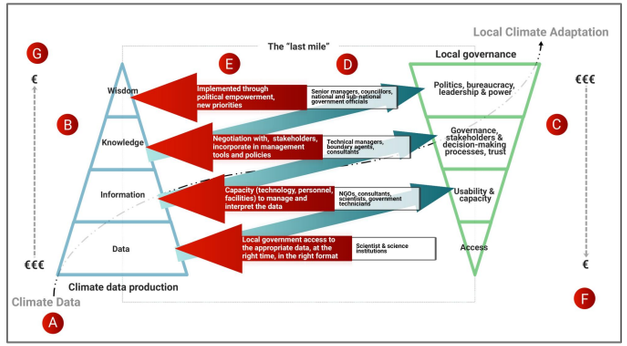
Theory & Concepts



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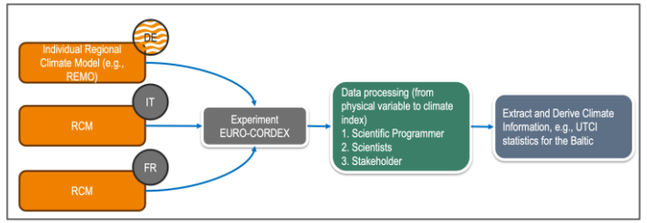
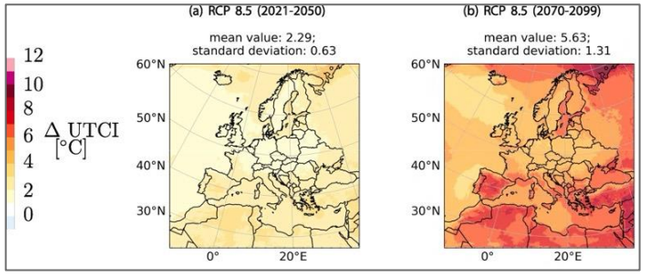
Data, Information and Knowledge





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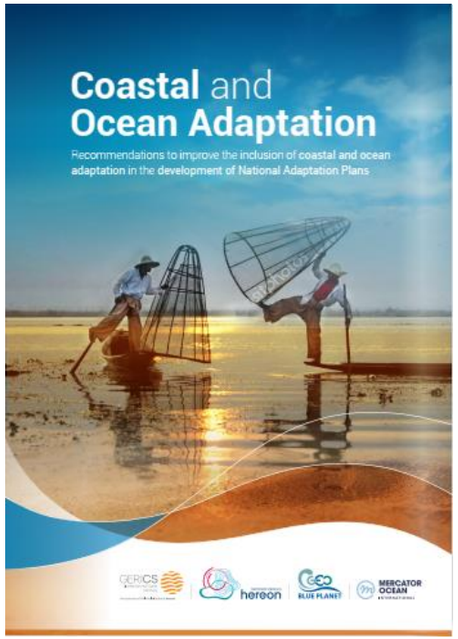
Policy Contribution



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