

# Coastal and Ocean Observations for Climate Adaptation



## WORKSHOP

BLUE PLANET 4 - 7 March 2024, Nairobi, Kenya

Ocean Observation and Prediction for  
Coastal Sustainability in Africa



Louis Celliers on behalf of many  
Climate Service Center  
Helmholtz-Zentrum Hereon, Germany




# Botswana 2022 – Ghana 2022 – Chile 2023 – Korea 2023 – Tanzania 2023

**NAPexpo | 2022**  
TRANSFORMATIONS TO ADAPT

Interactive Workshop UNFCCC NAP Expo 2022: Coastal adaptation for LDCs

**Coastal adaptation for LDCs: Why it matters. (and how to do it!)**

Date: August 26, 2022




**GEO Blue Planet 6<sup>th</sup> Symposium**

Digital Solutions for Sustainable Oceans

OCT 31 ~ NOV 2, 2023 A Pullman Hotel, Seoul, South Korea

**Ocean and Coastal Observations for National Adaptation Plans**

Thursday 2 November 2023. Seoul, Korea

Workshop hosts: Joy Chakrabarty (GEO Blue Planet), David Cabana (GERICS), Emily Smail (GEO Blue Planet)



**GEO Blue Planet 5<sup>th</sup> Symposium**

24 - 28 Oct 2022 | Accra, Ghana

*Local action in support of global traction*

**Ocean and Coastal Observations for National Adaptation Plans**

Thursday 27 October 2022  
Accra, Ghana

Workshop Hosts: Louis Celliers (GERICS), David Cabana (GERICS), Emily Smail (GEO Blue Planet), Nikelene Mclean (NOAA), Pierre-Yves La Traon (Mercator Ocean), Fabrice Messal (Copernicus Marine), Sara Venturini (GEO)



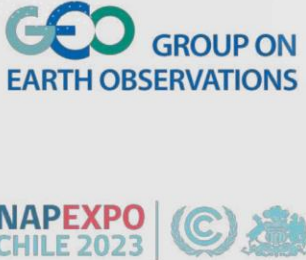
**2.2.1 Towards new guidance to develop and implement coastal adaptation integrating climate science**

**PARALLEL SESSION: TRANSFORMATIONS IN APPROACHES, THEMES AND SYSTEMS**

28 March 2023  
11:00 – 12:30

**GEO GROUP ON EARTH OBSERVATIONS**

**NAPEXPO CHILE 2023**




# Answering 3 simple questions

- Why adaptation?
- What are NAPs?
- How do we? (support adaptation and NAPs using observation and climate information services)



# The importance of including the coast and ocean in NAPs

*Adaptation to support the Blue Economy and reduce loss*



## Blue Economy Sectors

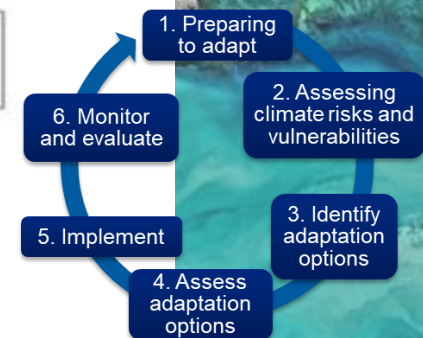
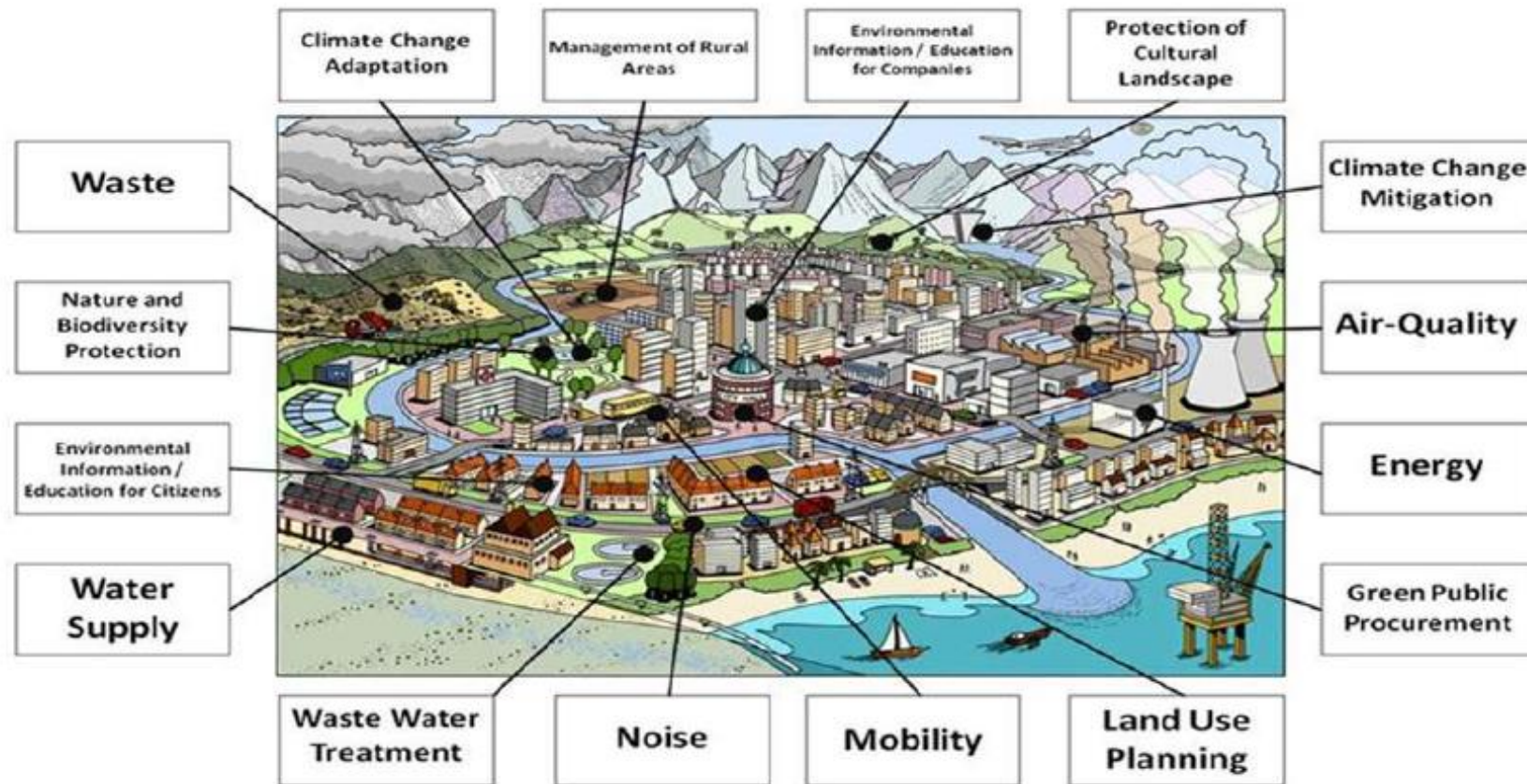
- Blue biotechnology
- Coastal tourism
- Desalination
- Marine living resources
- Marine non-living resources
- Marine Renewable Energy
- Maritime defence
- Maritime transport
- Ocean energy
- Port activities
- Research and innovation
- Shipbuilding and repair

- The BAD NEWS is the expected Impacts of climate on coasts and urban settlements (WG II, AR6). “Regardless of climate and socio-economic scenarios, many Cities and Settlements face severe disruption to coastal ecosystems and livelihoods by 2050 – and across all C&S by the Sea by 2100 and beyond – caused by compound and cascading risks, including submergence of some low-lying island states”
- “Realising global aspirations for climate resilient development depend on the extent to which coastal Cities & Settlements institutionalise key enabling conditions and chart place-based adaptation pathways to close the coastal adaptation gap”

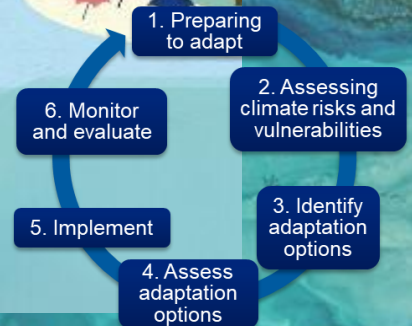
(IPCC AR6 WG II)



# Integrated Coastal (Zone) Management



# Marine Spatial Planning

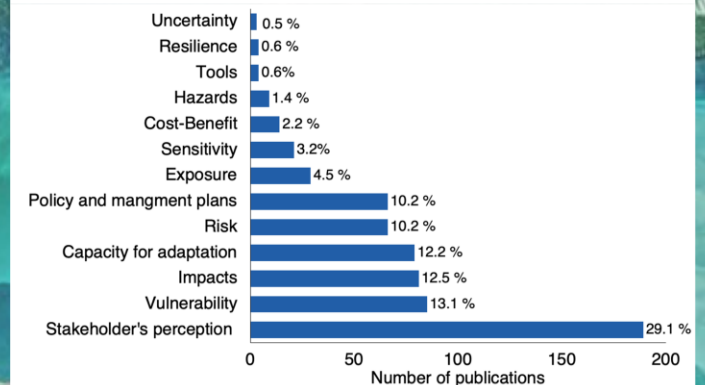
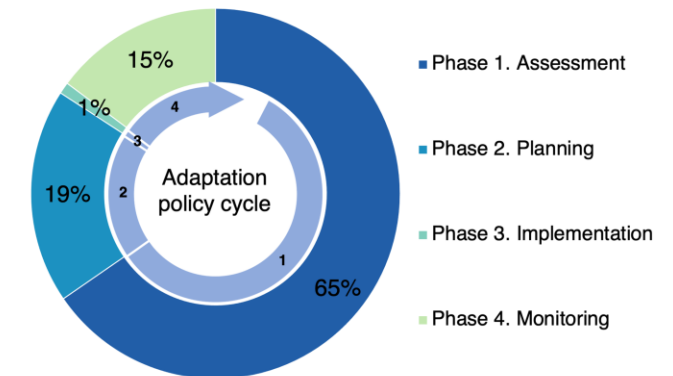
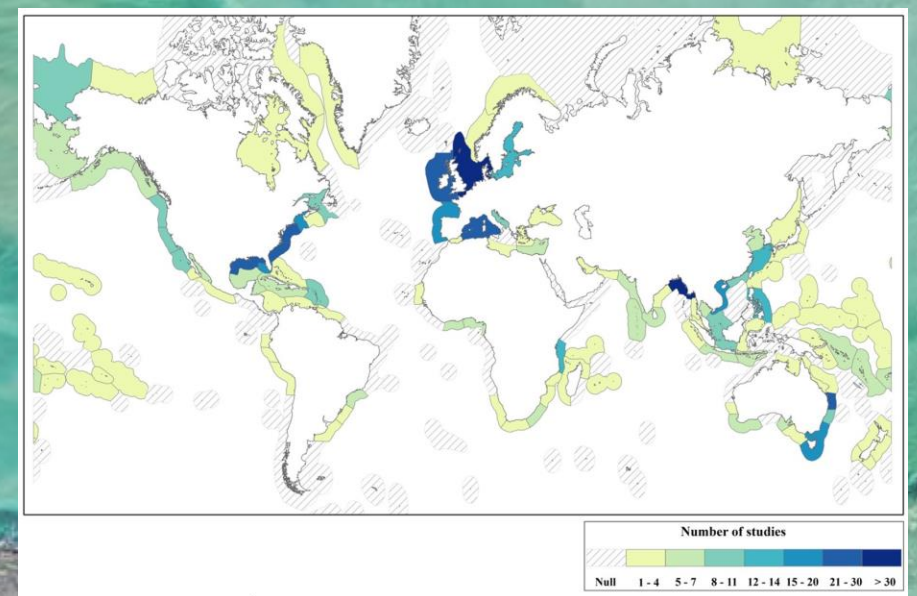


# Contemporary Issue in Academic Literature!

Cabana, D., Evadzi, P., Rölfer, L., Celliers, L., 2023. Enabling Climate Change Adaptation in Coastal Systems: A Systematic Literature Review. *Earth's Future*.

Magnan, A.K., Bell, R., Duvat, V.K.E. et al. 2023. Status of global coastal adaptation. *Nat. Clim. Chang.* 13, 1213–1221 (2023).

Alexandre K. Magnan et al. 2023. Strengthen climate adaptation research globally. *Science* 376, 1398–1400 (2022).





# Why & What of NAPs?

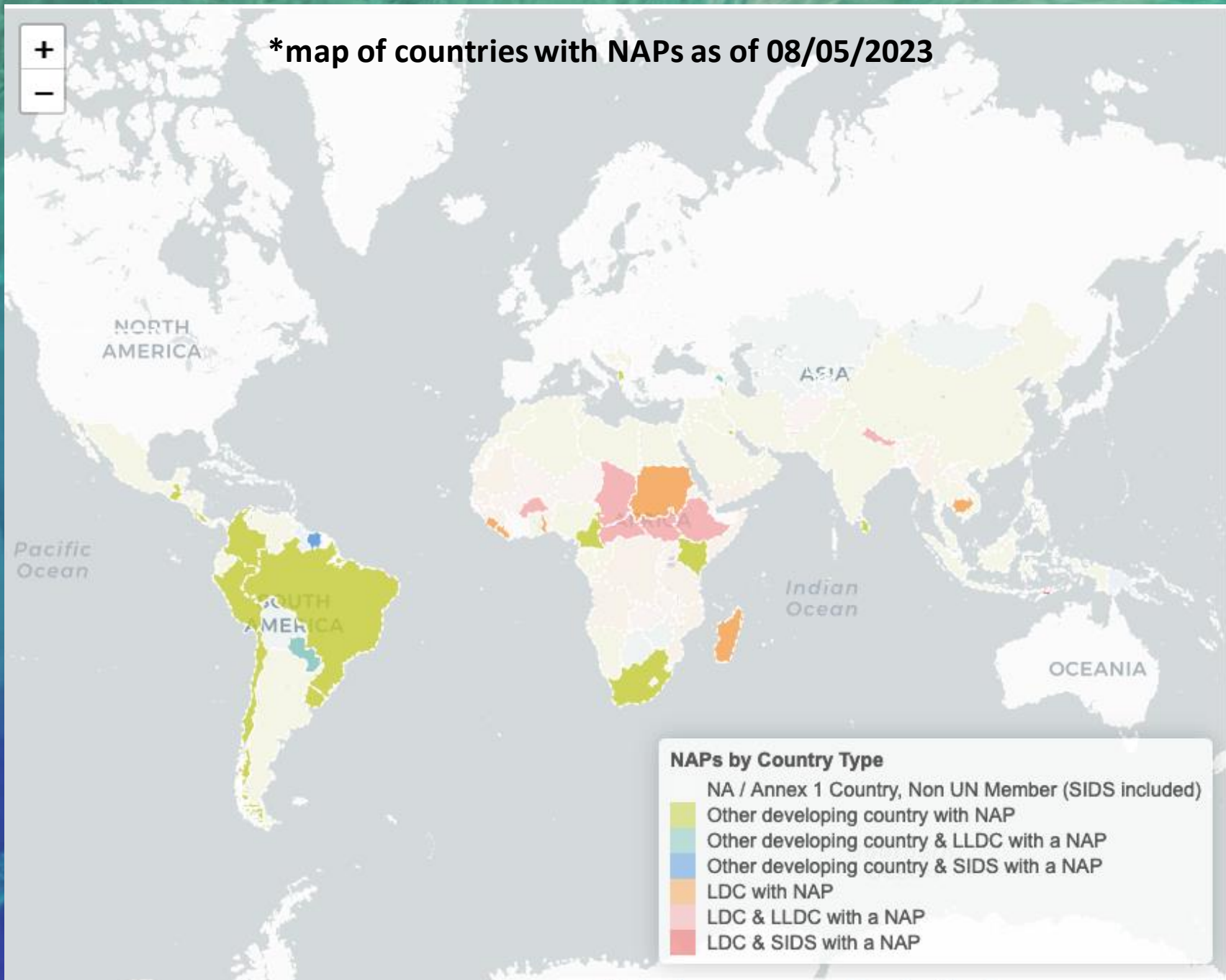
- What is the UNFCCC NAP process?
- Why do we believe that there is a need for more guidance on (ocean and coastal) adaptation

- <https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans>
- <https://www4.unfccc.int/sites/napc/Pages/Home.aspx>

# The agreed objectives of the UNFCCC national adaptation plan process are:

1. To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience;
2. To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

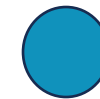
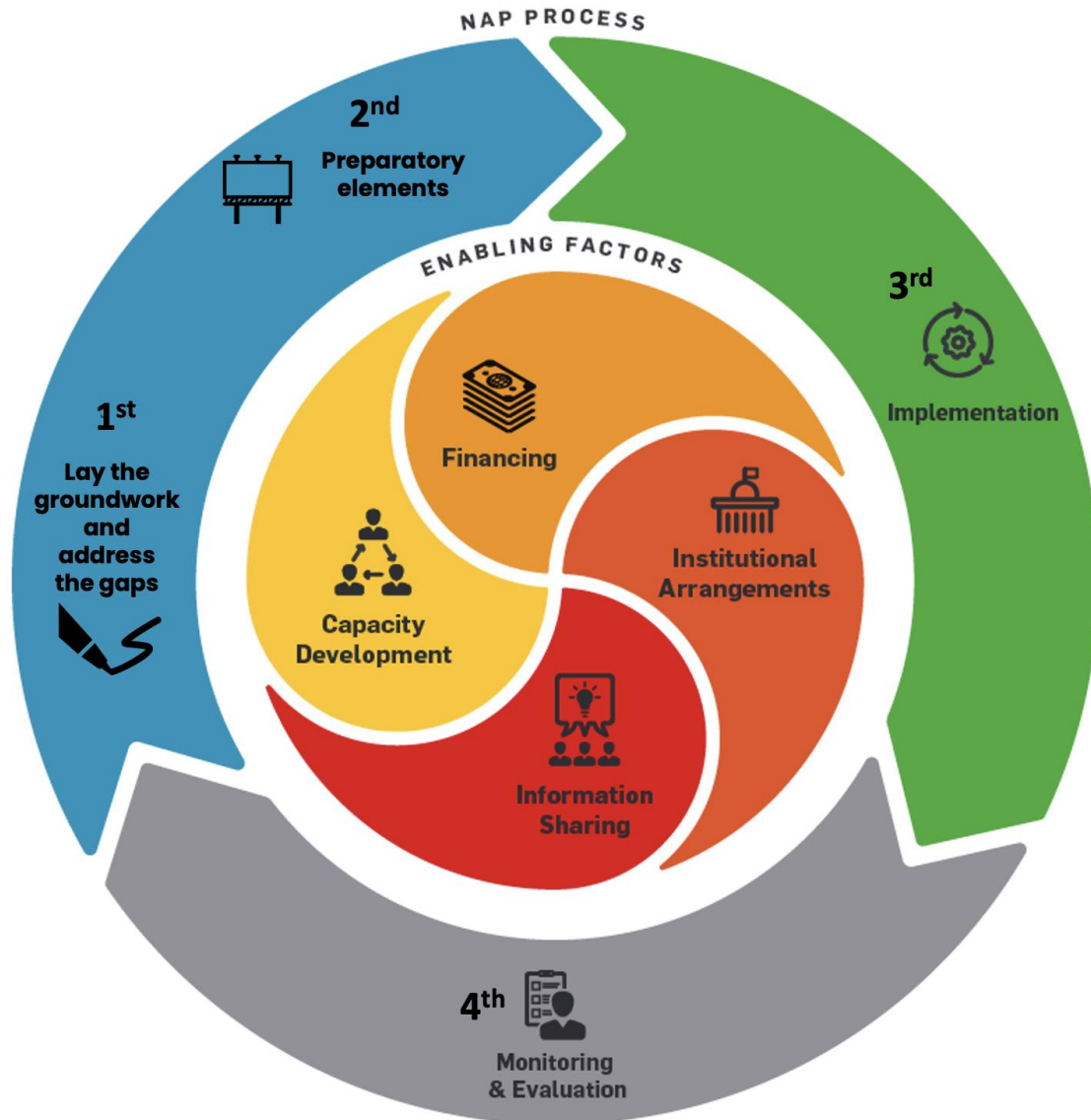
\*map of countries with NAPs as of 08/05/2023



- 48 NAPs
- 32 NAPs coastal countries
- 8 SECTORAL NAPs

### GAPS IDENTIFICATION





Assessment and Planning

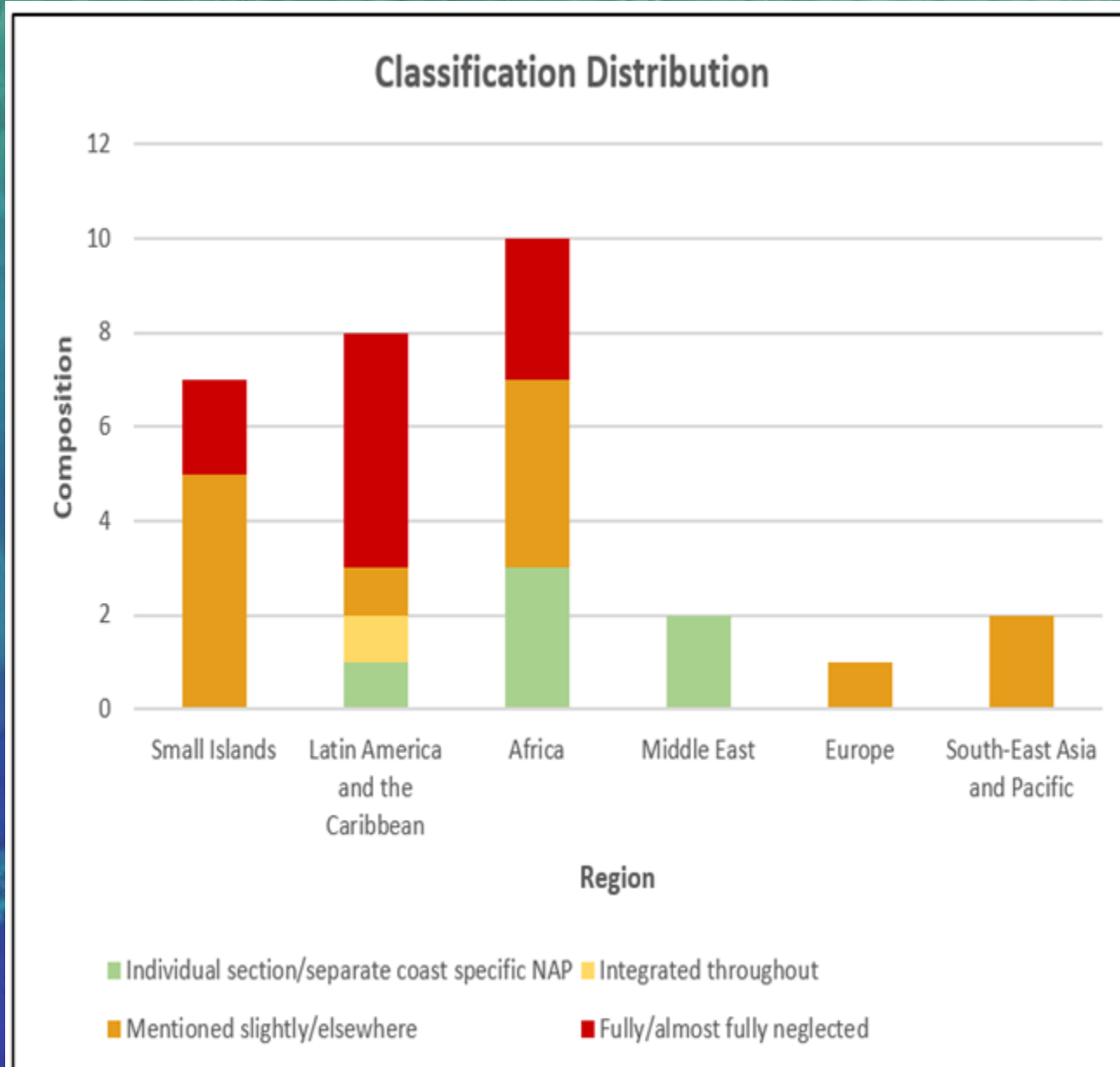


Implementing



Monitoring

# Overview of Analysis of the Inclusion of coasts and oceans in existing NAPs (2023)

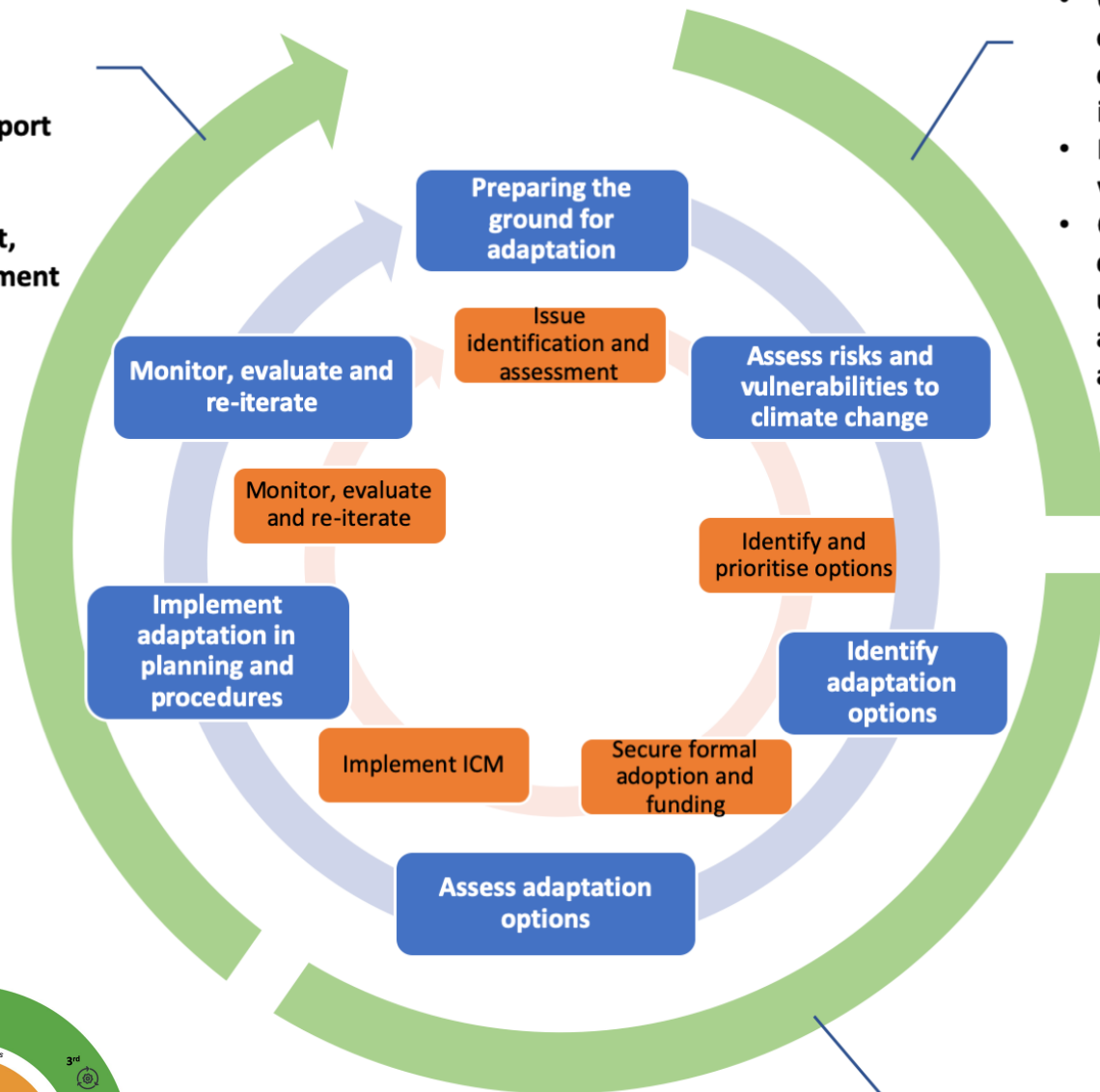


1. Fully/almost fully neglected [10]
2. Mentioned slightly/elsewhere [13]
3. Integrated throughout [1]
4. Individual section/separate coast specific NAP [6]

# Limitations

- **1. Planning - Laying the groundwork** and **4. Monitoring and Evaluation** are largely lacking detail.
- Generic language used across most NAPs.
- Lack of stakeholder identification across most sections.
- Failure to incorporate local knowledge into the creation of NAPs.
- Failure to identify context specific capacity gaps and weaknesses in creating and implementing the NAPs process outside of generalised overviews of poor infrastructure, resources, and funding.
- Limited use of earth observations and climate services.

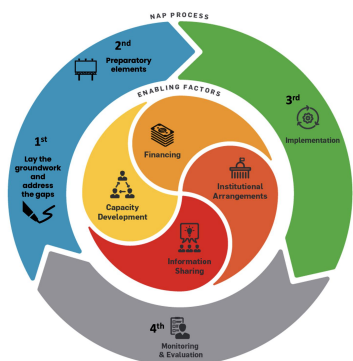
- Monitoring services, decision-support tools
- Capacity development, user engagement and societal awareness



- Coastal observations, data and information
- Risk and vulnerability
- Capacity development, user-engagement and societal awareness

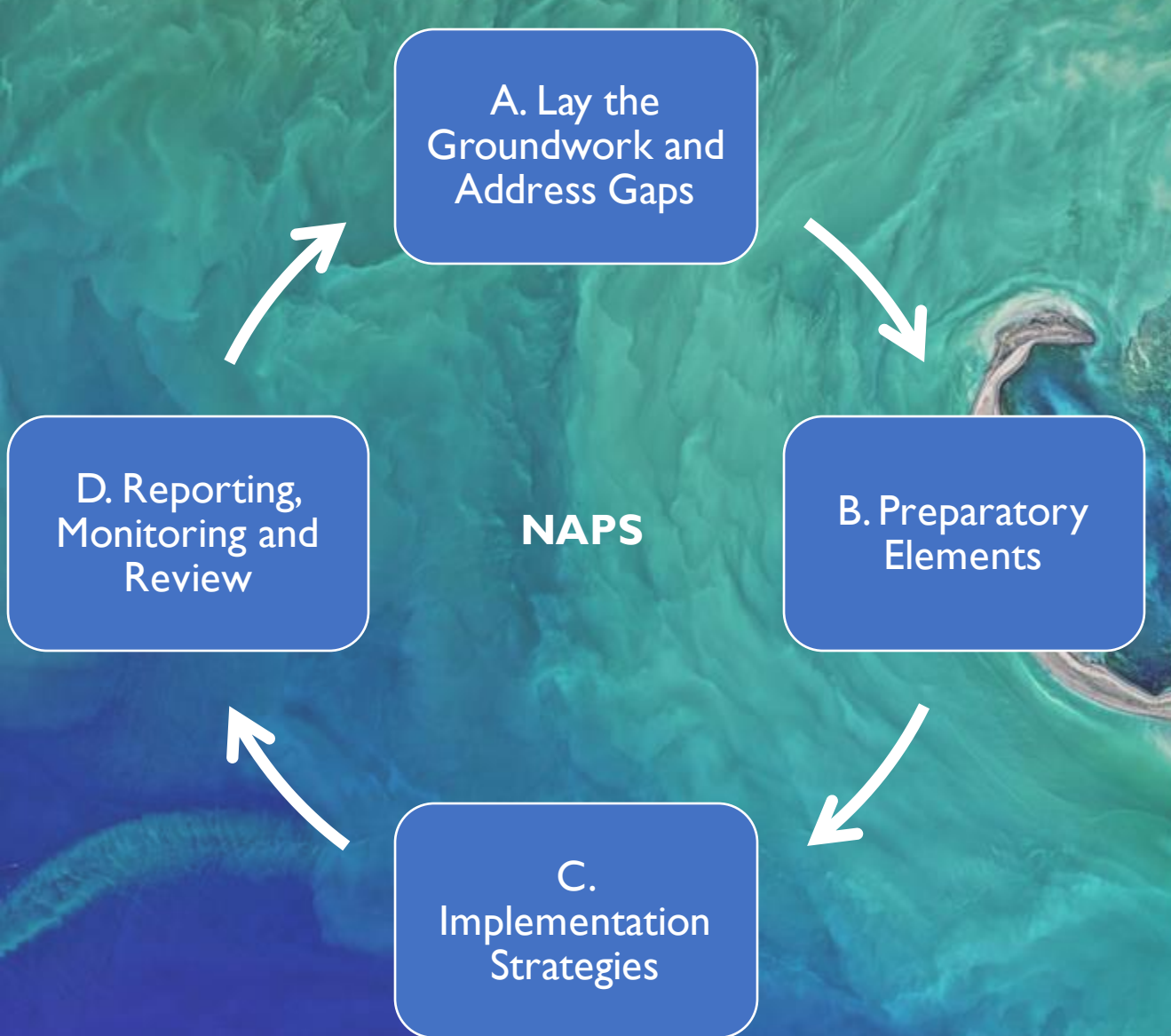
## Coastal and Ocean observations supporting the goals of:

- Integrated Coastal (Zone) Management
- Marine Spatial Planning
- Blue Economy implementation and
- Climate Change Adaptation



- Information services, decision-support tools

# Coastal and Ocean Observations for Adaptation



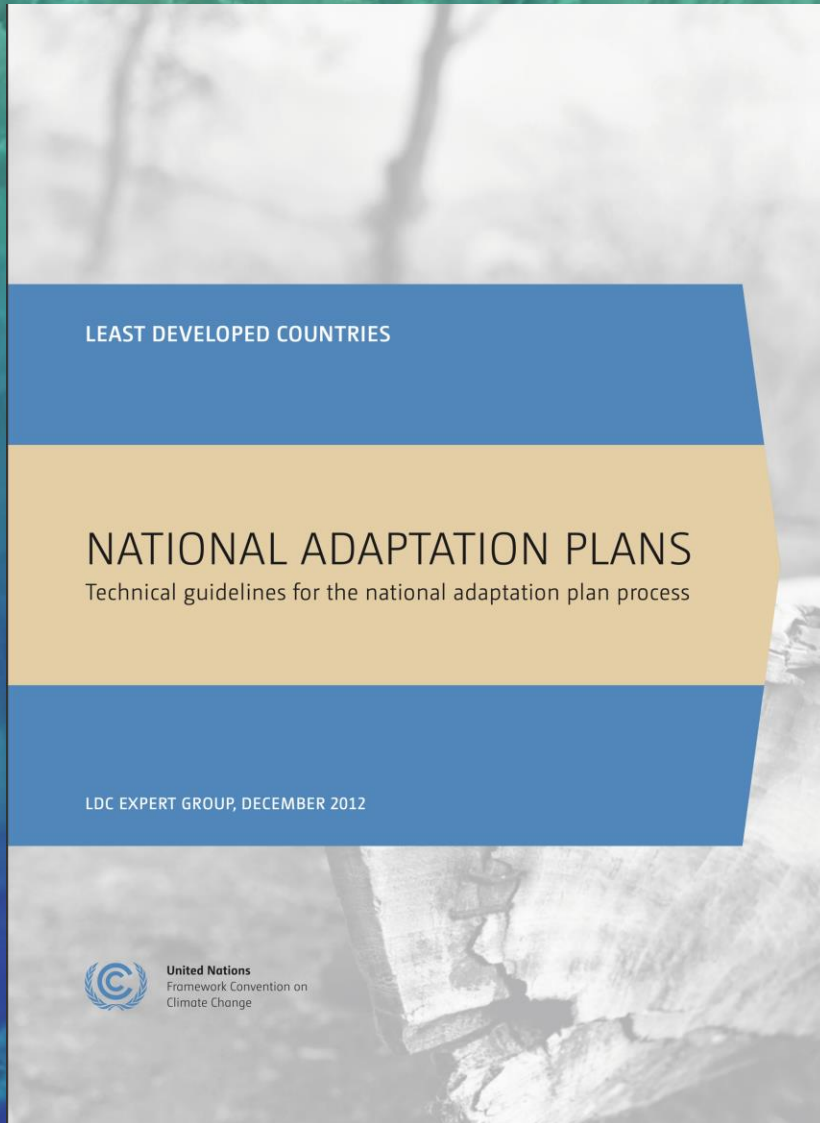
Observation Application	Links to Adaptation Options
Optical water types for coastal water quality monitoring	<ul style="list-style-type: none"> <li>• Food security, nutrition, sustainable agriculture</li> <li>• Management of water, quality and quantity</li> <li>• Sustainable use of ocean resources</li> </ul>
Species niche habitat distribution mapping	<ul style="list-style-type: none"> <li>• Food security, nutrition, sustainable agriculture</li> <li>• Sustainable consumption</li> <li>• Sustainable use of ocean resources</li> </ul>
Complementary multi-platform coastal bathymetry	<ul style="list-style-type: none"> <li>• Conserve and sustainably use the oceans, seas and marine resources for sustainable development</li> </ul>
Coastal inundation mapping and prediction, and storm surge risk assessment	<ul style="list-style-type: none"> <li>• Reduce risk to communities</li> <li>• Maintain infrastructure</li> </ul>
Extreme event monitoring	<ul style="list-style-type: none"> <li>• Drought and flooding management</li> </ul>



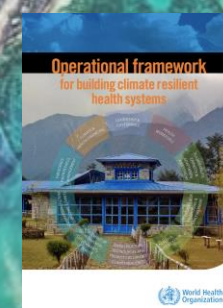
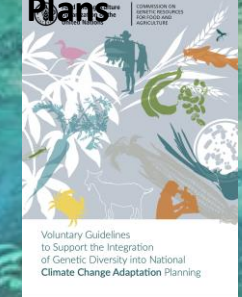
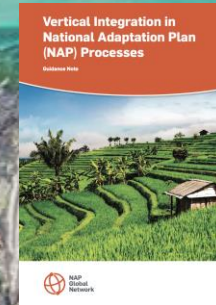
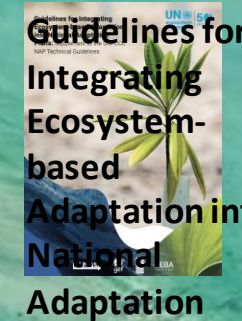
TABLE 1 (Continued) Example list of Essential Climate Variables from various types of current and future sensors and their key characteristics, along with suggested applications for each of the Paris Agreement's objectives.

<i>Objective</i>	<i>Domain</i>	<i>Variable/ Climate indicators</i>	<i>Example sensors</i>	<i>Temporal resolution</i>	<i>Spatial resolution</i>	<i>Sensor types</i>	<i>Potential application</i>
<i>Adaptation</i>	<i>Urban and rural areas</i>	<i>LST, urban green areas/materials</i>	<i>ASTER-TIR, Landsat-TIR, Sentinel-2, Planet, CHIME, ENMAP, ECOSTRESS</i>	<i>Daily to bi-weekly</i>	<i>&lt; 100 m</i>	<i>Thermal infrared radiometers</i>	<i>Urban heat island effect, evapotranspiration</i>
	<i>Agriculture</i>	<i>Proxies and indices for vegetation (e.g., NDVI)</i>	<i>Landsat, Sentinel-2, Pléiades, SPOT, PRIMSA, CHIME, EnMAP</i>	<i>5–15 days</i>	<i>10–100 m</i>	<i>Visible/infrared radiometers</i>	<i>Vegetation status and health</i>
	<i>Coastal areas</i>	<i>Sea state</i>	<i>Altimetry, SWIM</i>	<i>Monthly</i>	<i>100 km</i>	<i>Radar altimetry</i>	<i>Coastal flooding</i>
	<i>Oceans</i>	<i>Ocean roughness</i>	<i>Sentinel-1</i>	<i>12 days</i>	<i>5 m</i>	<i>Radar</i>	<i>Fishing industry</i>
	<i>Snow</i>	<i>Snow extent, snow mass, snow conditions (dry/wet)</i>	<i>VHRR, AVHRR, MODIS, VIIRS, SAOCOM, NISAR, ROSE-L, Sentinel-1,-2,-3, CHIME, SSM/I, CIMR</i>	<i>Daily</i>	<i>1–4 km</i>	<i>Optical, Radar, microwave radiometers</i>	<i>Water resources, seasonal forecasts of drought and flood events, snow tourism</i>

# Technical Guidelines



# Supplementary Material to the Technical Guidelines



- CBD - Convention on Biological Diversity
- CI - Conservation International
- CCAFS - CGIAR Research Program on Climate Change, Agriculture and Food Security
- FAO - Food and Agriculture Organization of the United Nations
- GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit
- GWP - Global Water Partnership
- IFRC - International Federation of Red Cross and Red Crescent Societies
- IIED - International Institute for Environment and Development
- IPACC - Indigenous Peoples of Africa Coordinating Committee
- ITU - International Telecommunication Union

# SUPPLEMENTARY MATERIALS TO THE NAP TECHNICAL GUIDELINES



Biodiversity and  
Ecosystems



Agriculture and  
Forestry



Health



Fisheries



Water



Urban Settlements



Communication



Science



Oceans &  
Coasts

*Analysis focus on economic sectors and activities*

# Supplementary Material Features

Based on modern scientific approach and best practices available.

Should enhance the cross-sectoral integration of the sectoral NAPs

Provide guidance to overcome the identified knowledge gaps and barriers.



How can Earth Observation (EO) help Developing countries in Coastal NAP process ?

Thank you



# WORKSHOP

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**GERICS**  
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Germany



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