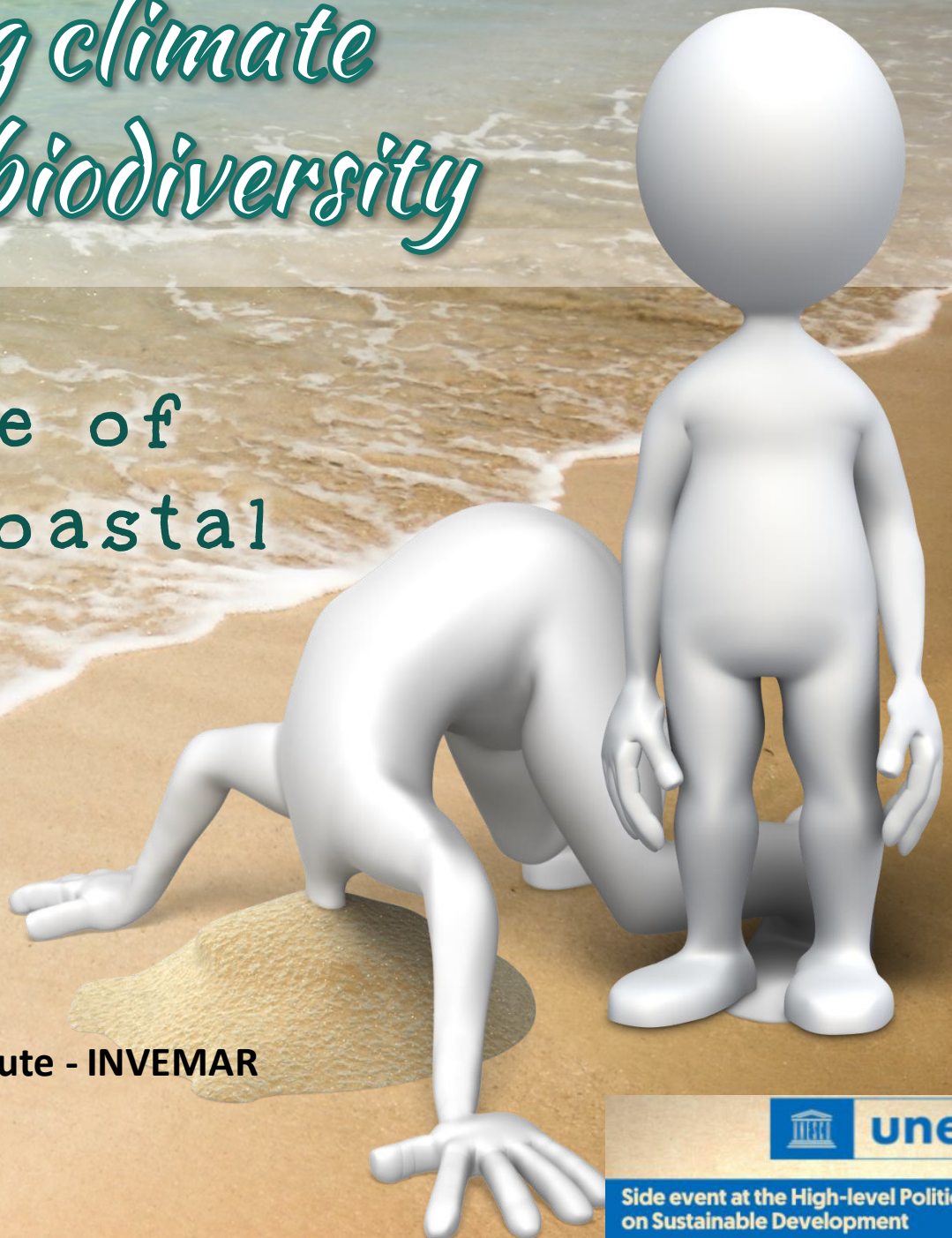
Addressing climate change and biodiversity

Are the role of marine & coastal ecosystems ignored?



Paula Cristina Sierra-Correa, PhD
Marine and Coastal Research Institute - INVEMAR

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Ocean vs climate related-trends

- ✓ The global ocean covers **71%** of the Earth surface and contains about **97%** of the Earth's water.
- ✓ **All people on Earth** depend on the Ocean (i.e. climate regulation)
- ✓ **4,7 billón of U$** exposed annually to coatal inundation
- ✓ **680 million** people in low-lying coastal zones (65 million SIDS; at least 10% indigenous people)
- ✓ By 2050, projected to reach **more than one billion**.
- ✓ CO2 emissions from human activities are causing **ocean warming** (SLR), **acidification**, **oxygen loss**; changing nutrient cycle & primary production.
- ✓ Affecting marine biodiversity at multiple trophic levels & Observed changes in biogeography – community composition
- ✓ Biodiversity stress is exacerbated by non-climate pressures from human activities
- ✓ **Climate** continues to be **looming risks** to humanity (GRR, 2021)

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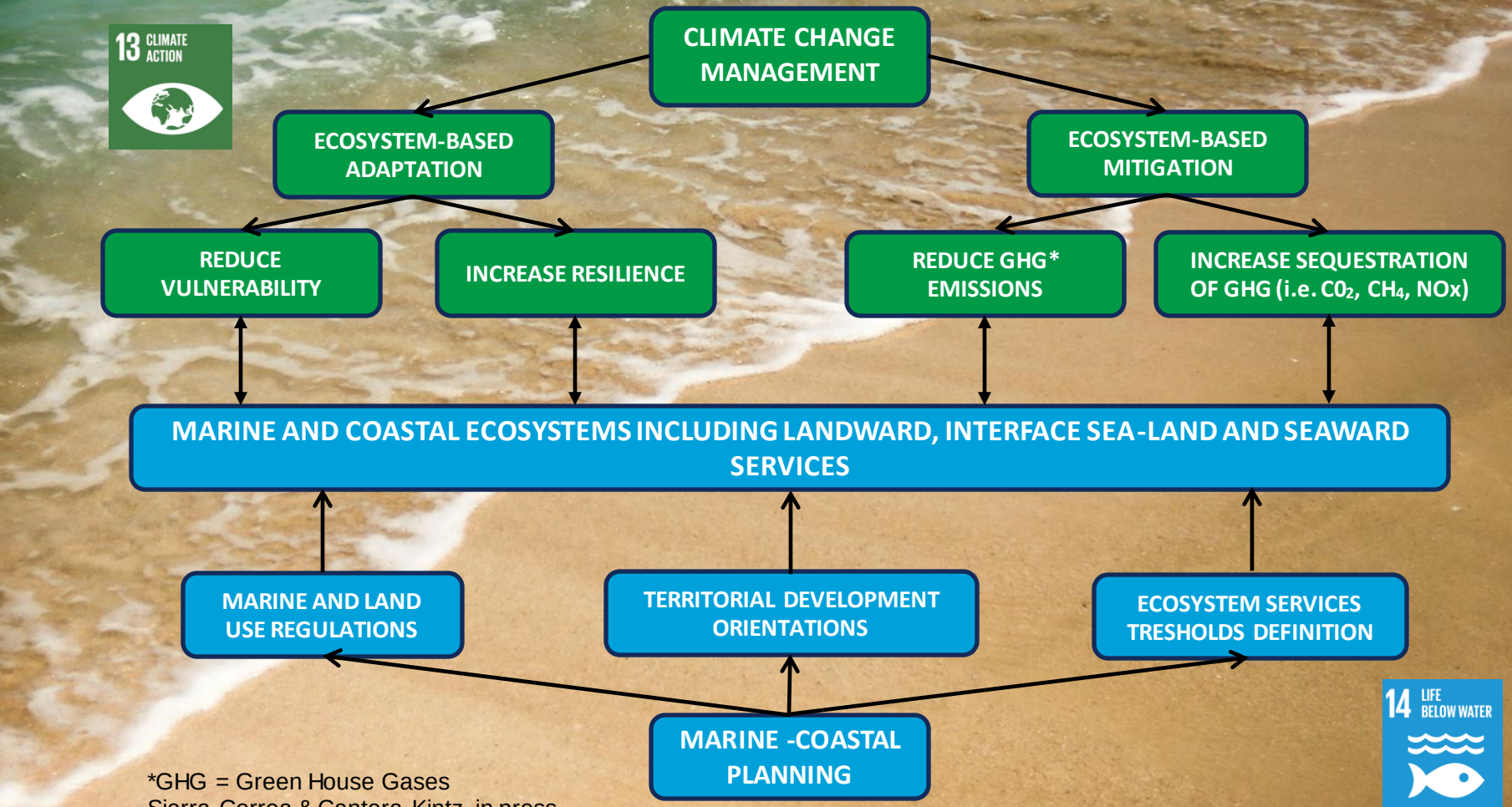
Marine & Coastal Ecosystem Services

All people on the Earth ("ocean planet") will benefit in a healthy & resilient ocean, and by preserving their services

SDG's: Climate & Marine-Coastal Planning



*GHG = Green House Gases
Sierra-Correa & Cantera-Kintz, in press

SUSTAINABLE DEVELOPMENT GOALS KNOWLEDGE PLATFORM

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VIDA MANGLAR:
Successful bluecarbon initiative in Colombia

Vida Manglar:
Scientific and traditional
mangrove knowledge in practice

Authors: Sierra-Correa, P.C., Diazgranados M.C., Zamora, A.P., Espinosa, R.H. and Caicedo, D.

Vida Manglar is a science and community based initiative. First **REDD+** project, which seeks certification of actions related to the reduction of carbon emissions due to Unplanned Deforestation and the Conservation of Intact Wetlands in about **7,645.7 ha** of mangrove forests initially.

Project objective

To achieve the reduction of Greenhouse Gas (GHG) emissions through the identification, prioritization and implementation of actions to:

- Ensuring the proper management of **mangroves** in the area.
- Promoting **sustainable development** through economic and alternative initiatives.
- Strengthening **local governance.**
- Contributing to the protection of high community **conservation and biodiversity** values.

Main benefits of Vida Manglar and Blue Carbon Project

- International leadership of Colombia.
- Contributing to Colombian Development Plan.
- Contributing Biological Diversity and Climate Change Conventions (Paris Agenda & Nationally Determined Contributions).
- Strengthening of the governance capacity of the Environmental Authority and the community.
- Scalability to other coastal regions of Colombia and around the world.
- Co-benefits acquired by communities through ecosystem - based adaptation.

"Scientific and Traditional Knowledge in place for best suitable practices."

Timeline

Blue Carbon *with local communities to conserve / restore Mangroves.*

2013
CVS – Environmental authority - INVEMAR
MPA establishment and management plan development
The area became a national priority ("Scoping")
Scientific monitoring activities with community active participation.

2014 -2015
GEF SAMP – INVEMAR
REDD+ guidelines for mangrove ecosystems and communities.
Initial discussions of long-term financial opportunities.

2015 -2018
INVEMAR – CVS – MAPCO (EU)
"Feasibility assessment" for a potential carbon project (Plan Vivo).

2019
CI – CVS – INVEMAR – Omacha (Apple)
"Project Design/ Description Document (PDD)" with VERRA methodology, with South Pole advice.
Collecting additional carbon data from specific sites (Invemar – CI).
Defining an adequate governance structure and in-site conservation activities.

2020
CI – CVS – INVEMAR – Omacha (Apple)
Finalizing the PDD & Monitoring (MR) in place.
VVO (Validation and Verification)
Verra approved the Wetland module used.

2021
CI – CVS – INVEMAR – Omacha (Apple)
Verra Certification - May 6.
Carbon credits auction in process.

NEW SCIENTIFIC QUESTIONS

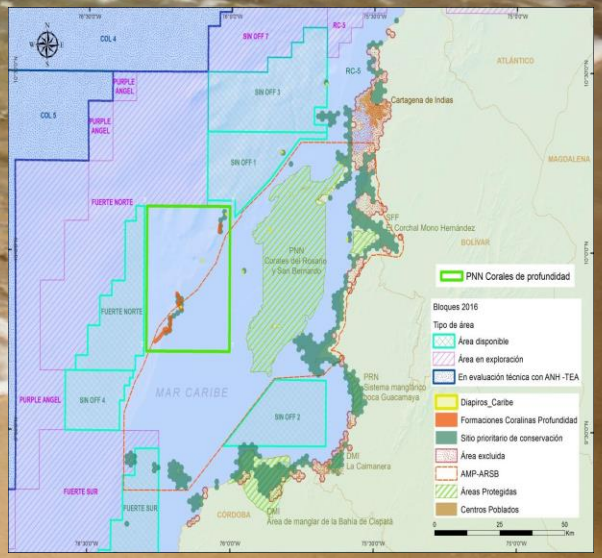
WORKING WITH PRIVATE SECTOR

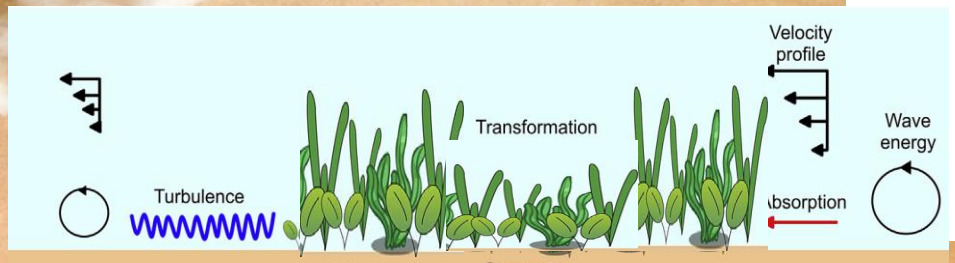
ITEMS	CARIBBEAN		PACIFIC	
Aerial biomass	64,8 Mg C ha^{-1}	16,3%	71,9 Mg C ha^{-1}	32,6%
Roots	25,8 Mg C ha^{-1}	4,9%	2,7 Mg C ha^{-1}	2,7%
necromass	13,1 Mg C ha^{-1}	2,5%	2,9 Mg C ha^{-1}	2,9%
Soils	417,4 Mg C ha^{-1}	**80,1%**	142,2 Mg C ha^{-1}	**64,5%**
TOTAL	**521,3 Mg C ha^{-1}**		**220,24 Mg C ha^{-1}**	

DRMI Cispata (Caribbean coast) **8570,9 ha with 555.795,93 Mg C** (Yepes et al., 2015).

Bahía Málaga (Pacific coast) **3470,45 ha with 764.887,2 Mg C** (INVEMAR, 2015).

samp
Subsistema de Áreas Marinas Protegidas





scientific reports

OPEN

Seagrass blue carbon stocks and sequestration rates in the Colombian Caribbean

Oscar Serrano[1,2✉], Diana Isabel Gómez-López[3], Laura Sánchez-Valencia[3], Andres Acosta-Chaparro[3], Raul Navas-Camacho[3], Juan González-Corredor[3], Cristian Salinas[1], Pere Masque[1,4], Cesar A. Bernal[3] & Núria Marbà[1]

Seagrass ecosystems rank amongst the most efficient natural carbon sinks on earth, sequestering CO_2 through photosynthesis and storing organic carbon (C_{org}) underneath their soils for millennia and thereby, mitigating climate change. However, estimates of C_{org} stocks and accumulation rates in seagrass meadows (blue carbon) are restricted to few regions, and further information on spatial variability is required to derive robust global estimates. Here we studied soil C_{org} stocks and accumulation rates in seagrass meadows across the Colombian Caribbean. We estimated that *Thalassia testudinum* meadows store 241 ± 118 Mg C_{org} ha^{-1} (mean ± SD) in the top 1 m-thick soils, accumulated at rates of 122 ± 62 and 15 ± 7 g C_{org} m^{-2} $year^{-1}$ over the last ~ 70 years and up to 2000 years, respectively. The tropical climate of the Caribbean Sea and associated sediment run-off, together with the relatively high primary production of *T. testudinum*, influencing biotic and abiotic drivers of C_{org} storage linked to seagrass and soil respiration rates, explains their relatively high C_{org} stocks and accumulation rates when compared to other meadows globally. Differences in soil C_{org} storage among Colombian Caribbean regions are largely linked to differences in the relative contribution of C_{org} sources to the soil C_{org} pool (seagrass, algae *Halimeda tuna*, mangrove and seston) and the content of soil particles < 0.016 mm binding C_{org} and enhancing its preservation. Despite the moderate areal extent of *T. testudinum* in the Colombian Caribbean (661 km^2), it sequesters around 0.3 Tg CO_2 $year^{-1}$, which is equivalent to ~ 0.4% of CO_2 emissions from fossil fuels in Colombia. This study adds data from a new region to a growing dataset on seagrass blue carbon and further explores differences in meadow C_{org} storage based on biotic and abiotic environmental factors, while providing the basis for the implementation of seagrass blue carbon strategies in Colombia.

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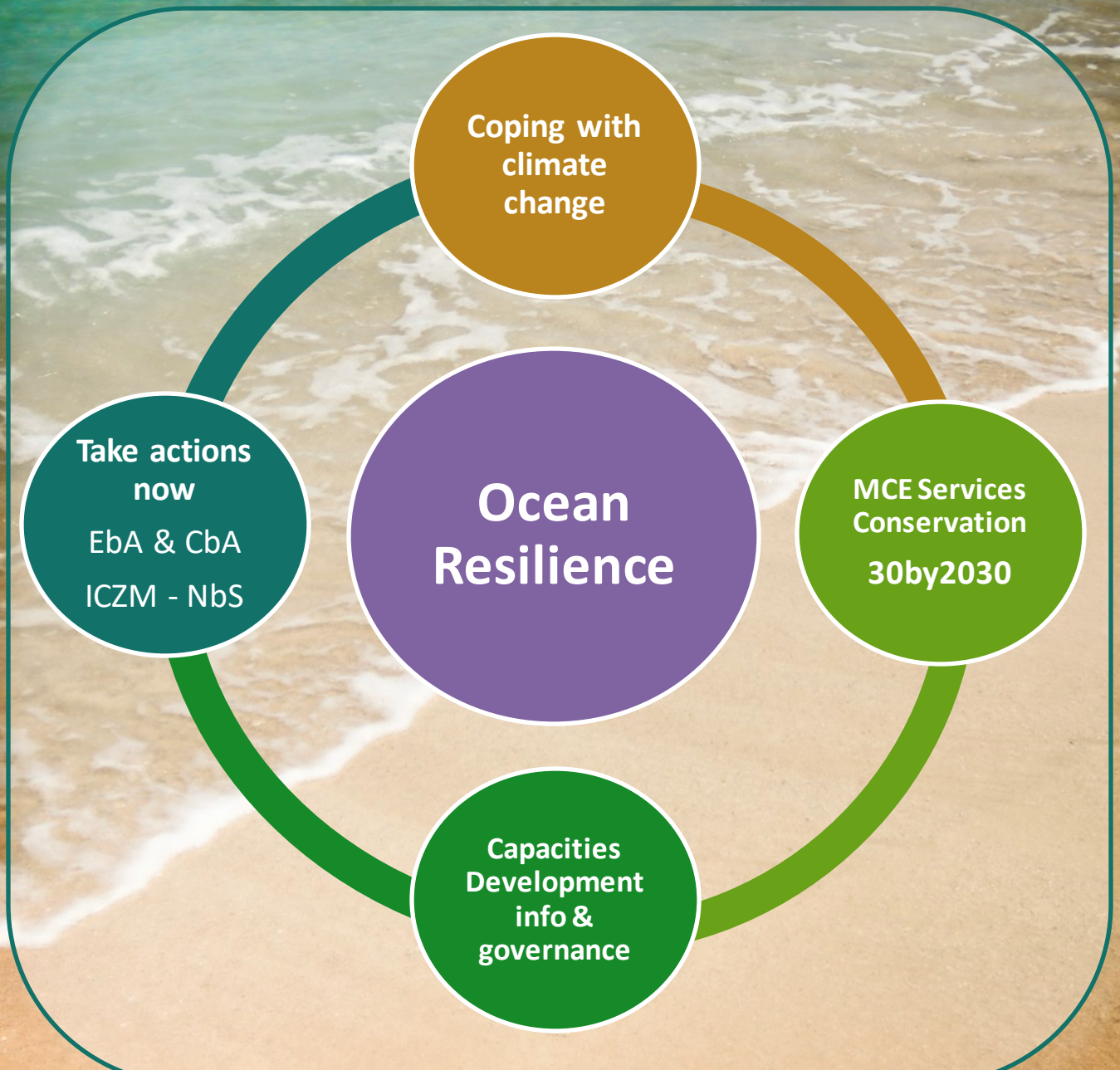
Key messages



Co-benefits from adaptation & mitigation using MCE Services

Ocean Resilience: Scientific, traditional knowledge & public-private alliances working togheter

United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
2021 2030 United Nations Decade of Ocean Science for Sustainable Development
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THANKS

There is not another "Ocean Planet" as a Plan B

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THE ACTION IS NOW!