Addressing climate change and biodiversity

Are the role of marine & coastal ecosystems ignored?

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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 coastal 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)
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**

Climate Change Management

- **Ecosystem-Based Adaptation**
  - Reduce Vulnerability
  - Increase Resilience

- **Ecosystem-Based Mitigation**
  - Reduce GHG* Emissions
  - Increase Sequestration of GHG (i.e. CO₂, CH₄, NOₓ)

Marine and Coastal Ecosystems Including Landward, Interface Sea-Land and Seaward Services

- Marine and Land Use Regulations
- Territorial Development Orientations
- Ecosystem Services Thresholds Definition

*GHG = Green House Gases
Sierra-Correa & Cantera-Kintz, in press
VIDA MANGLAR: Successful blue carbon 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."
WORKING WITH PRIVATE SECTOR

### NEW SCIENTIFIC QUESTIONS

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<thead>
<tr>
<th>ITEMS</th>
<th>CARIBBEAN</th>
<th>PACIFIC</th>
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<tbody>
<tr>
<td>Aerial biomass</td>
<td>64.8 Mg C ha(^{-1})</td>
<td>16.3%</td>
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<tr>
<td>Roots</td>
<td>25.8 Mg C ha(^{-1})</td>
<td>4.9%</td>
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<tr>
<td>necromass</td>
<td>13.1 Mg C ha(^{-1})</td>
<td>2.5%</td>
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<tr>
<td>Soils</td>
<td>417.4 Mg C ha(^{-1})</td>
<td>80.1%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>521.3 Mg C ha(^{-1})</strong></td>
<td><strong>80.1%</strong></td>
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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).

Seagrass blue carbon stocks and sequestration rates in the Colombian Caribbean

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 ± 119 Mg C ha\(^{-1}\) (mean ± SE) in the top 1 m-thick soils, accumulated at rates of 32.2 ± 8.8 and 33.7 ± 7.1 C ha\(^{-1}\) year\(^{-1}\) over the last 70 years and up to 2000 years, respectively. The tropical climate of the Caribbean Sea and associated sediment runoff, together with the relatively high primary production of T. testudinum, influencing benthic and abiotic drivers of C\(_{org}\) storage led to seagrass and soil respiration rates, explores 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 determined in the relative contribution of C\(_{org}\) sources to the soil C\(_{org}\) pool (seagrass, algae, macroalgae, macrophytes and snails) and the content of soil particles >0.064 mm binding C\(_{org}\) and enhancing its preservation. Despite the moderate annual extent of T. testudinum in the Colombian Caribbean (646 km\(^{2}\)), its seagrass is equivalent to 3.8% 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 benthic and abiotic environmental factors, while providing the basis for the implementation of seagrass blue carbon strategies in Colombia.
Coping with climate change

Ocean Resilience

MCE Services Conservation 30by2030

Capacities Development info & governance

Take actions now EbA & CbA

ICZM - NbS

Co-benefits from adaptation & mitigation using MCE Services

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

Side event at the High-level Political Forum on Sustainable Development
There is not another “Ocean Planet” as a Plan B.

THE ACTION IS NOW!

THANKS

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