Blue Carbon in the Middle East and North Africa (MENA)

What is blue carbon?

Blue Carbon: Carbon stored in coastal and marine ecosystems, such as mangroves, salt marshes, and seagrass beds.

Blue carbon as a climate solution

The MENA region will experience increasing impacts of climate change.

Climate change damages are expected to reach between 1.1 and 1.9% of the regional Gross Domestic Product (GDP) by 2050.

Conservation, restoration, and sustainable management of blue carbon ecosystems contribute to climate change mitigation and adaptation and help conserve biodiversity and other ecosystem services.

Mitigation: Blue carbon ecosystems can sequester and store up to 5 times[1] more carbon than terrestrial ecosystems.

Adaptation: Blue carbon ecosystems protect coasts from flooding and erosion, contribute to food security, and support livelihoods for local communities.

Blue carbon ecosystems in MENA[6]

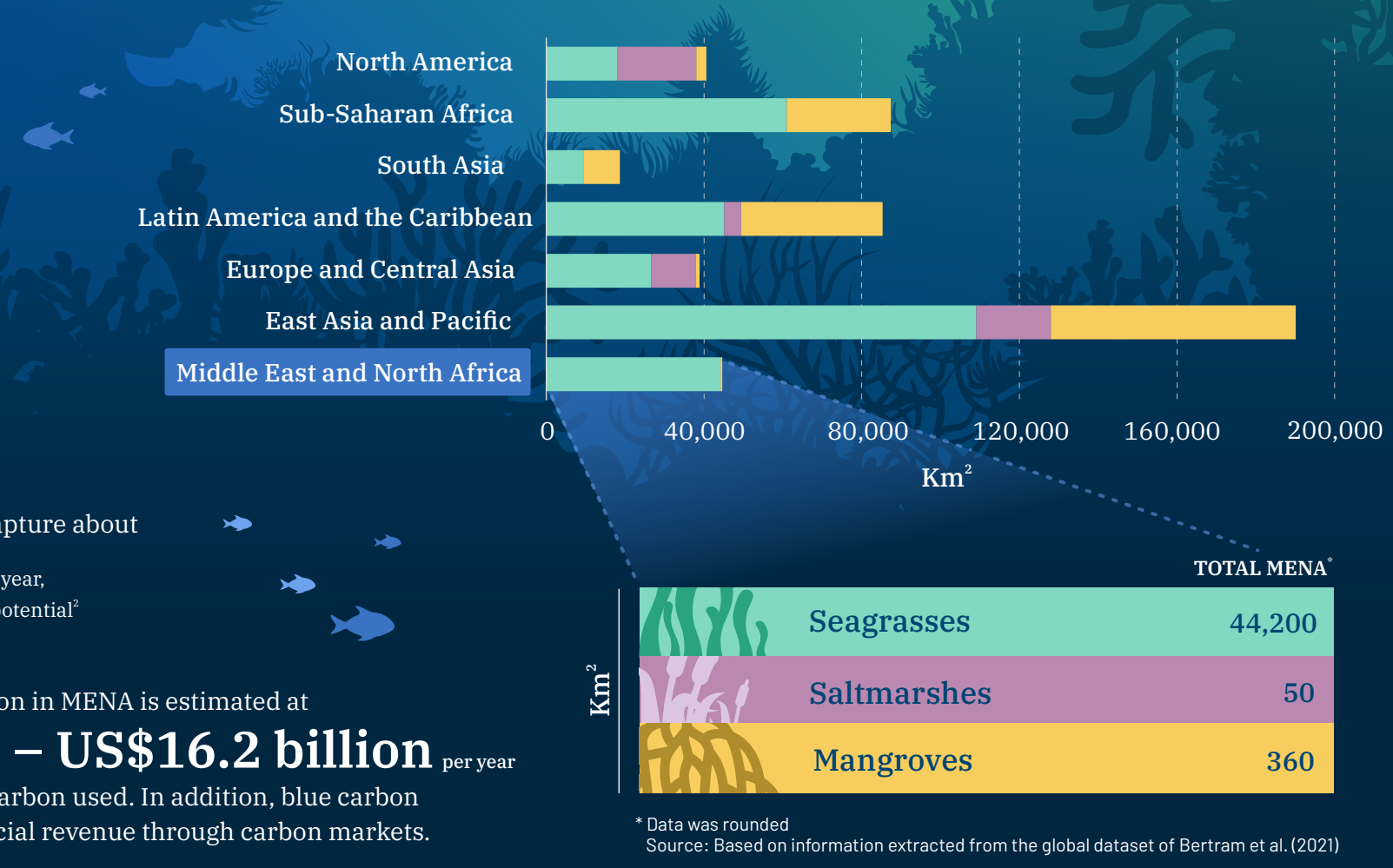
MENA's blue carbon ecosystems cover around **44,600 km^2,**

9% of the world's total blue carbon area

Seagrass accounts for **99%** the blue carbon ecosystems in the region

These blue carbon ecosystems capture about **6.2 million tC** per year, or nearly **8%** of the world's blue carbon potential[2]

The economic value of blue carbon in MENA is estimated at **US$974 million – US$16.2 billion** per year depending on the social cost of carbon used. In addition, blue carbon has a potential to generate financial revenue through carbon markets.



* Data was rounded
Source: Based on information extracted from the global dataset of Bertram et al. (2021)

Seagrass meadows

Did you know....

Seagrass meadows occupy only **0.1%** of the total ocean floor but store up to **18%** of the global oceanic carbon[3]

Stopping the loss and degradation of seagrass meadows across the world can prevent the emission of **0.65 GtCO$_2$** per year[4]

Seagrass meadows play a crucial role in fisheries by providing nursery habitats. In the Mediterranean Sea for example, the direct contribution of seagrass to fisheries amounts to at least **€200 million** per year[5]

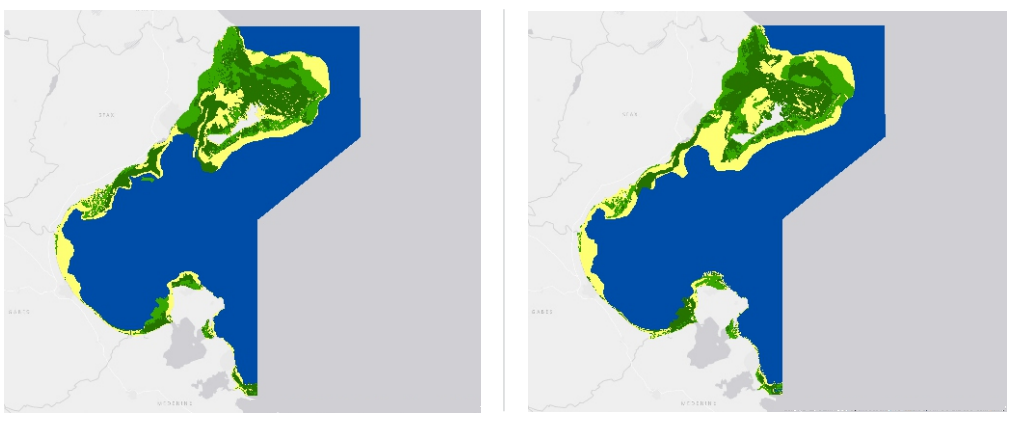
How to assess blue carbon ecosystems?

A case study in **Tunisia**

	2017	2022
Seagrass area	3,529 km^2	3,365km^2
Total carbon sequestered	1,422 (ton CO_2e)	1,356 (ton CO_2e)

Remote sensing is one of the techniques to map and monitor blue carbon ecosystems. In Tunisia, seagrass meadows in the Gulf of Gabes and around Kerkennah islands were mapped using remote sensing and in-situ data.

The seagrass meadows areas were assessed (accuracy of over 75%) and the total carbon equivalent sequestered by seagrass was estimated based on carbon sequestration rates for *Posedonia oceanica* and *Cymodocea nodosa* in the study area.



Conclusions

- Earth observation has a potential to map seagrass meadows, help establish a baseline and monitor changes and trends.
- However, limitations and uncertainties of the methodology need to be considered. Factors such as atmospheric conditions, water turbidity, disturbance from boats affect the accuracy of mapping results. In-situ data and local knowledge can improve accuracy and reliability.

Recommendations

Data and Analytics

Improve knowledge on the blue carbon ecosystems

Data on the blue carbon ecosystems is limited in MENA. National blue carbon opportunities should be assessed, including the area covered, the species compositions, the ecosystem health, and the carbon store. Earth observation can be a useful and cost-efficient tool for mapping blue carbon ecosystems and estimating carbon storage.

Enhance monitoring of blue carbon ecosystems

MENA's principal blue carbon ecosystem, seagrass meadows, is on the decline. In the Mediterranean Sea, seagrass declined by 20% between 1896-2016.[7] Monitoring should be strengthened to better conserve and manage the blue carbon ecosystems.

Policy and Institutions

Integrate blue carbon conservation in the blue economy strategies and roadmaps

Conservation and restoration of the blue carbon is a key component of blue economy development. Policies and regulations need to be strengthened to harness the benefits of blue carbon.

Establish Marine Protected Areas (MPAs), or Other Effective Area-Based Conservation Measures (OECMs) with management measures for blue carbon ecosystems

Globally only 1.5% of the blue carbon ecosystems are protected under MPAs.[8] MPAs can be designed to cover and manage blue carbon ecosystems.

Integrate blue carbon into nationally determined contributions (NDCs) under the Paris Agreement

A roadmap needs to be developed to include blue carbon ecosystems in national greenhouse gas inventories.

Finance

Use blue public expenditure review or blue economy satellite accounts

These tools help identify opportunities for mobilizing financing for blue carbon conservation and restoration.
https://documents1.worldbank.org/curated/en/789491639977748921/pdf/Blue-Public-Expenditure-Review-Guidance-Note.pdf

Leverage international funding and public-private partnerships

These could be used to further develop capacity and establish basic technical information, including mapping and carbon stock assessments.

Use the Blue Carbon Readiness Framework to assess your country's' blue carbon readiness

https://openknowledge.worldbank.org/entities/publication/304fe159-e9ea-40ef-b568-fa6e8e992bb4

[1] High Level Panel for A Sustainable Ocean Economy (2023) THE BLUE CARBON HANDBOOK Blue carbon as a nature-based solution for climate action and sustainable development. https://oceanpanel.org/wp-content/uploads/2023/06/23_REP_HLP_Blue-Carbon-Handbook_low-res.pdf
[2] Source: Author, based on information extracted from Bertram et al. (2021)'s global database.
[3] United Nations Environment Programme (2020). Out of the blue: The value of seagrasses to the environment and to people. UNEP, Nairobi.
[4] Hoegh-Guldberg, O., Jacob, D., Taylor, M., Bindi, M., Brown, S., Camilloni, I. et al. (2018). Impacts of 1.5°C Global Warming on Natural and Human Systems. In Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5. above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
[5] Jackson, E. L., Rees, S. E., Wilding, C., & Attrill, M. J. (2015). Use of a seagrass residency index to apportion commercial fishery landing values and recreation fisheries expenditure to seagrass habitat service. Conservation Biology, 29(3), 899-909.
[6] Bertram, C., Quaas, M., Reusch, T., Vafeidis, A., Wolff C. and Rickels, W. 2021. The blue carbon wealth of nations. Nature Climate Change. Vol. 11, August, p. 704 – 709.
[7] United Nations Environment Programme (2020). Out of the blue: The value of seagrasses to the environment and to people. UNEP, Nairobi.
[8] Zhao, Q. et al. Where marine protected areas would best represent 30% of ocean biodiversity. Biol. Conserv. 244, 108536 (2020).

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