

Economic and Social Commission for Western Asia

Climate Change Impacts on Biodiversity in Freshwater Ecosystems

Protecting Water Quality and Biodiversity for Improved Water Management

UN House – Beirut, Lebanon

9& 10 July 2024



Shared Prosperity **Dignified Life**

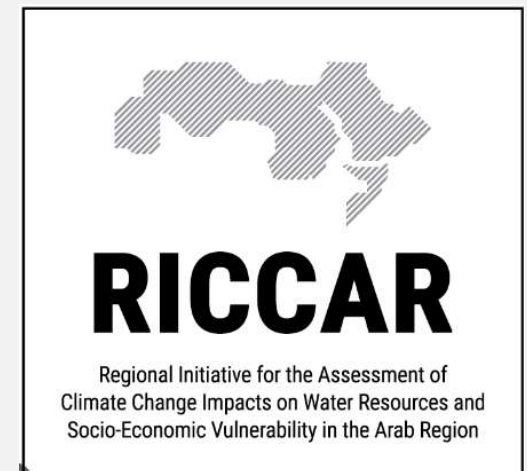


Dual Global Challenges

- ❑ The world is facing the dual change of **climate change** and **biodiversity loss**
- ❑ These challenges are **strongly interlinked**
- ❑ Proposed solutions need to address **jointly these challenges**

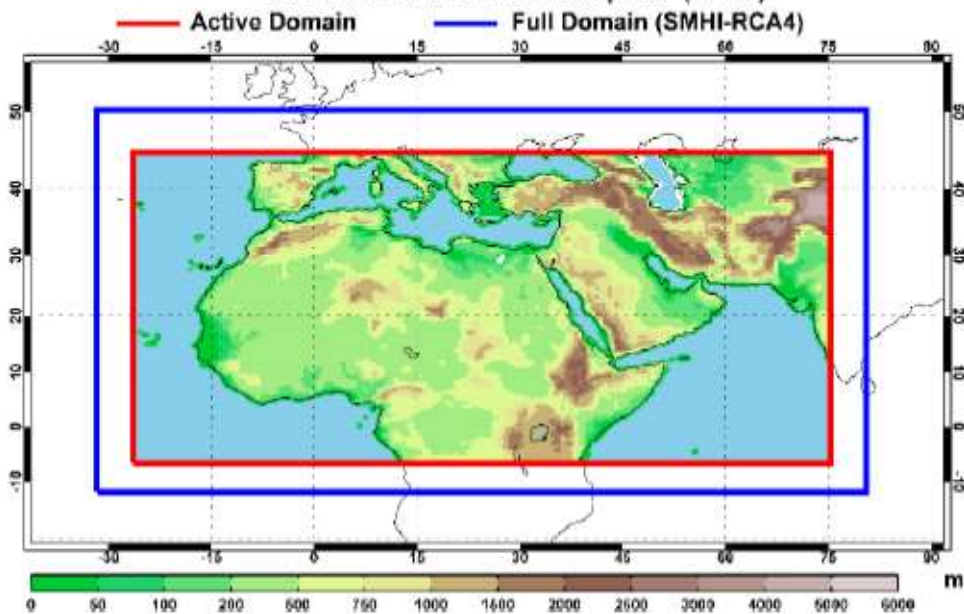
Climate change impact increasing....

- Projections outcomes generated under RICCAR for hydrometeorological parameters have demonstrated important changes in **temperatures** and **precipitation** patterns across the Arab region.



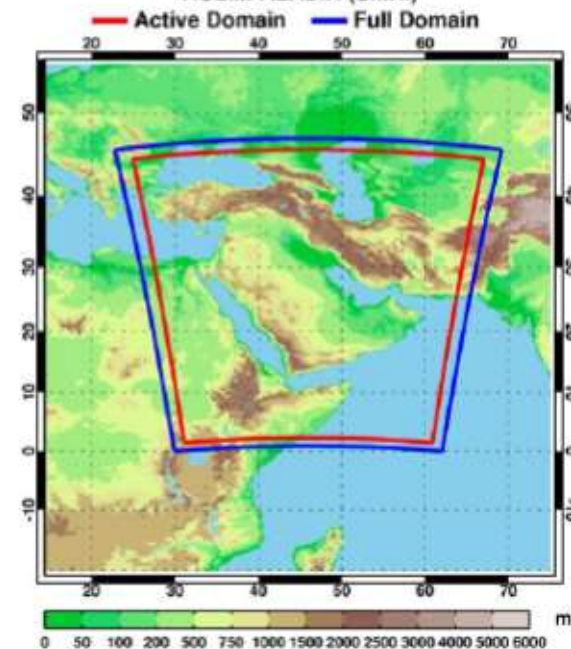
RICCAR Regional Domains

CORDEX-MENA/Arab Domain | 0.44° (50 km)



- CMIP5 Models
- RCP Scenarios (RCP4.5 and RCP8.5)
- 50 km resolution
- Bias-adjusted outputs
- Domain vetted by the WCRP Coordinated Regional Climate Downscaling Experiment (CORDEX)
- Time period: 1986-2100

RICCAR Mashreq Domain | 10km | MSH-10
HCLIM-ALADIN (SMHI)

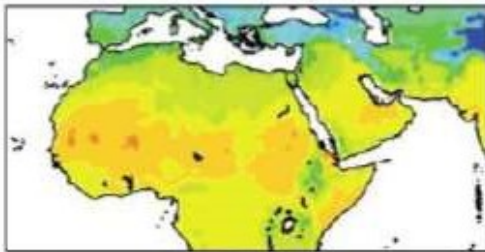


- CMIP6 Models
- SSP Scenarios (SSP2-4.5 and SSP5-8.5)
- 10 km resolution
- Bias-adjusted output
- Time period: 1995-2060

Average Temperature projected to increase 2.6°C by mid-century and up to 4.8°C by end-century compared to reference period (1986-2005) in region

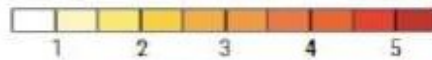
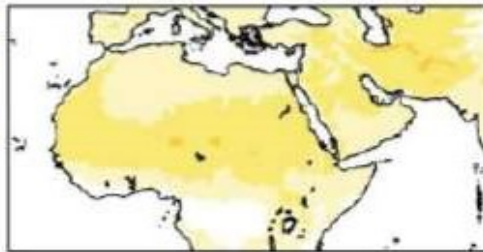
RCP 4.5

1986-2005



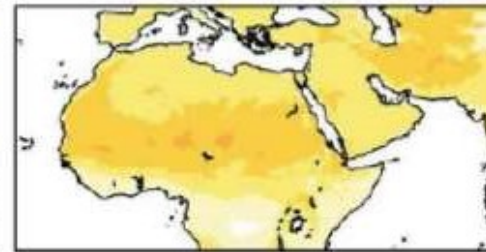
Reference Period Temperature
($^{\circ}\text{C}$)

2046-2065



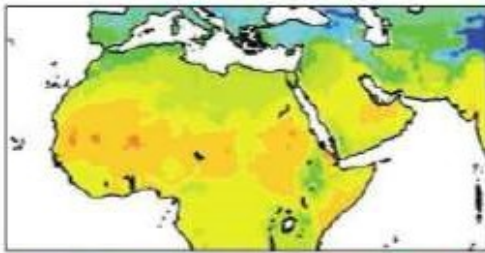
Change in Temperature
($^{\circ}\text{C}$)

2081-2100

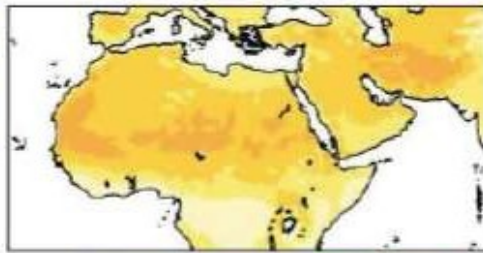


RCP 8.5

1986-2005

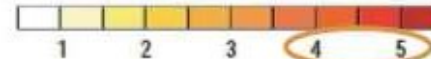
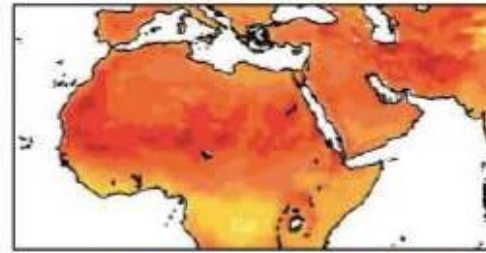


2046-2065

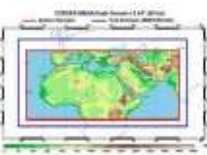


Change in Temperature

2081-2100



Moderate
Emissions
Reduction
Scenario



Business-
as-Usual
Emissions
Scenario

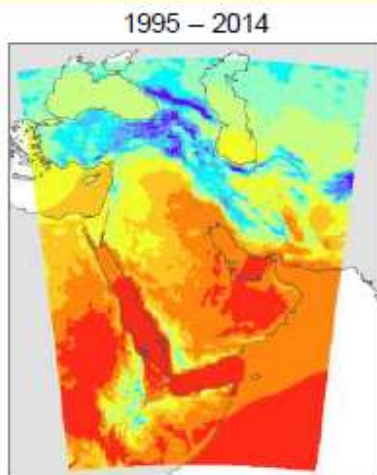
Average
Temperature in
the region is
already
 0.8°C
higher
than the
reference period
at the **start of**
this century



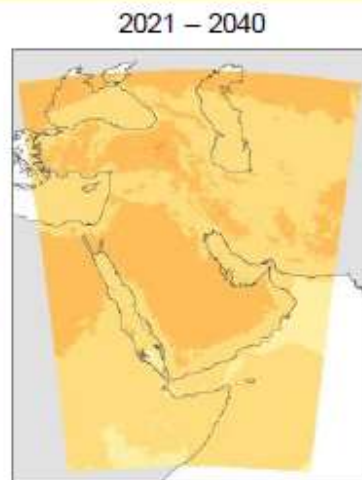
Projected Change in Annual Temperature – Mashreq Domain

SSP2-4.5

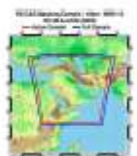
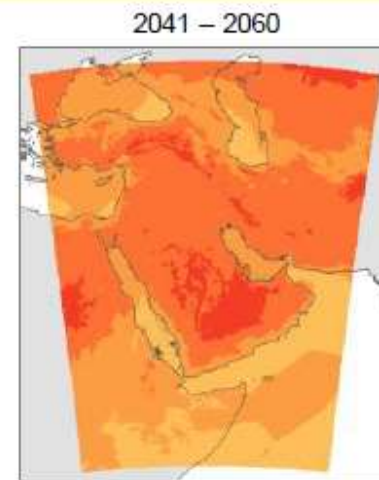
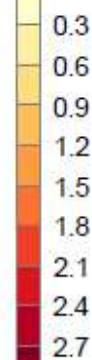
Temperature
(° C)



Change in
Temperature
(° C)



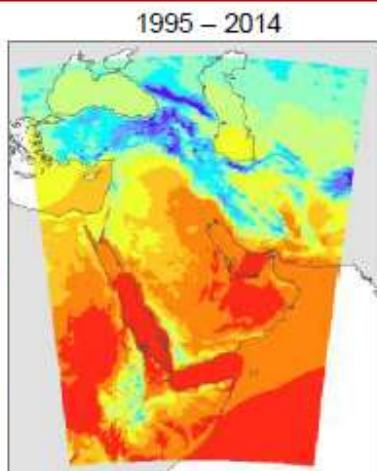
Change in
Temperature
(° C)



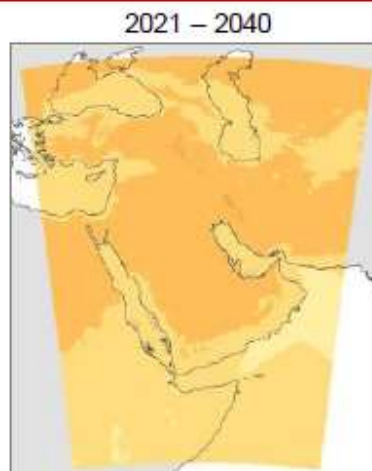
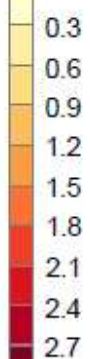
10 x 10 km
high-scale
resolution
projections

SSP5-8.5

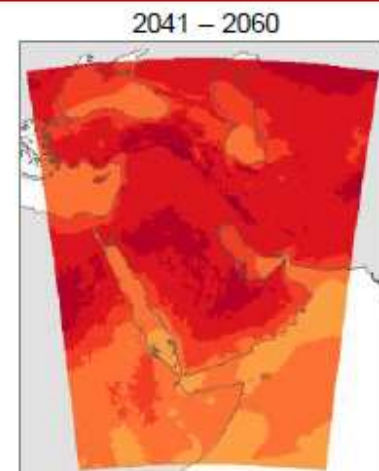
Temperature
(° C)



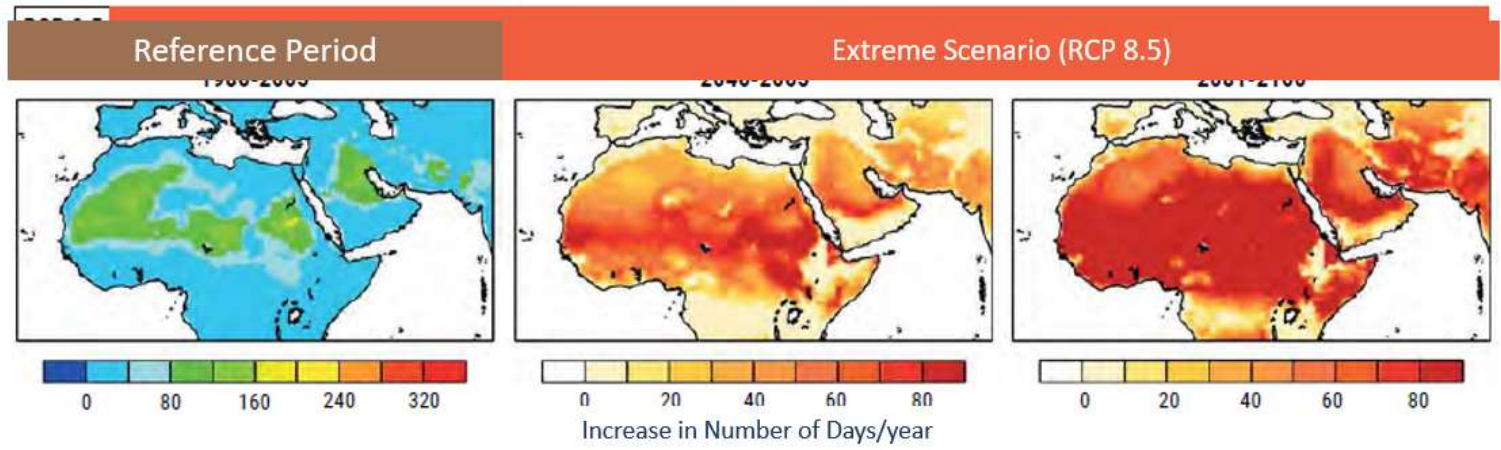
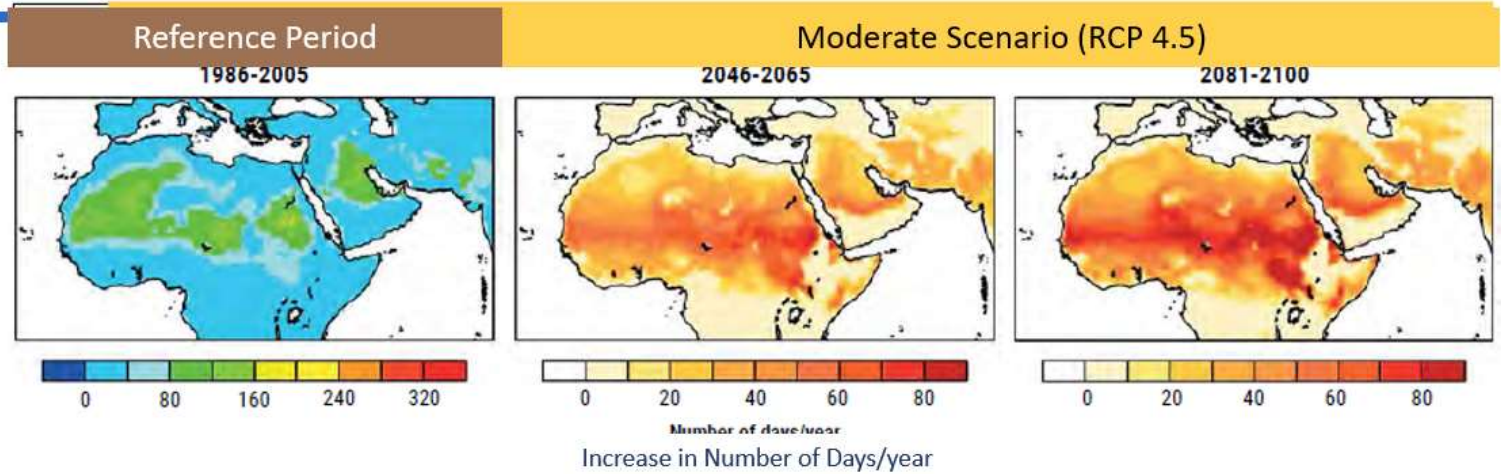
Change in
Temperature
(° C)



Change in
Temperature
(° C)



Dramatic increases in the number of “Very Hot Days” > 40°C per year



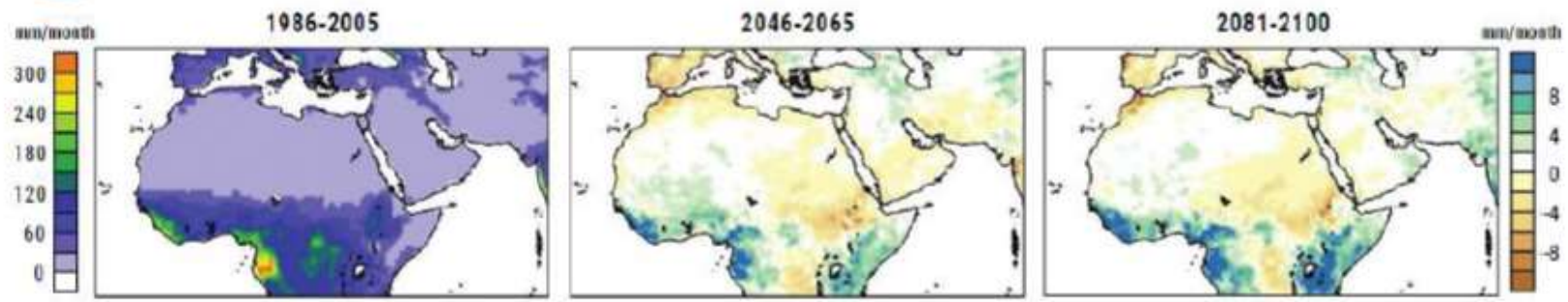


Precipitation Projected to be more Variable

Precipitation trends are largely decreasing across the region, though limited areas expected to exhibit an increase in the intensity and volume of precipitation

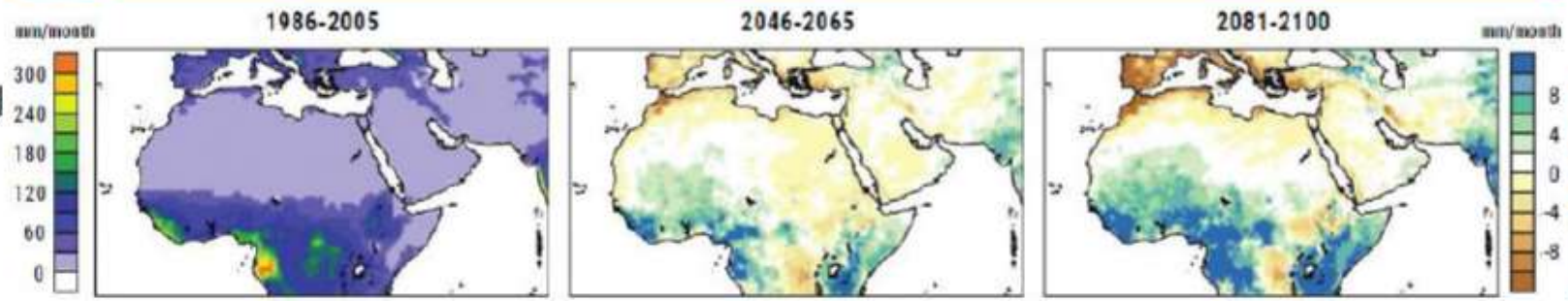
RCP 4.5

Moderate Climate Scenario



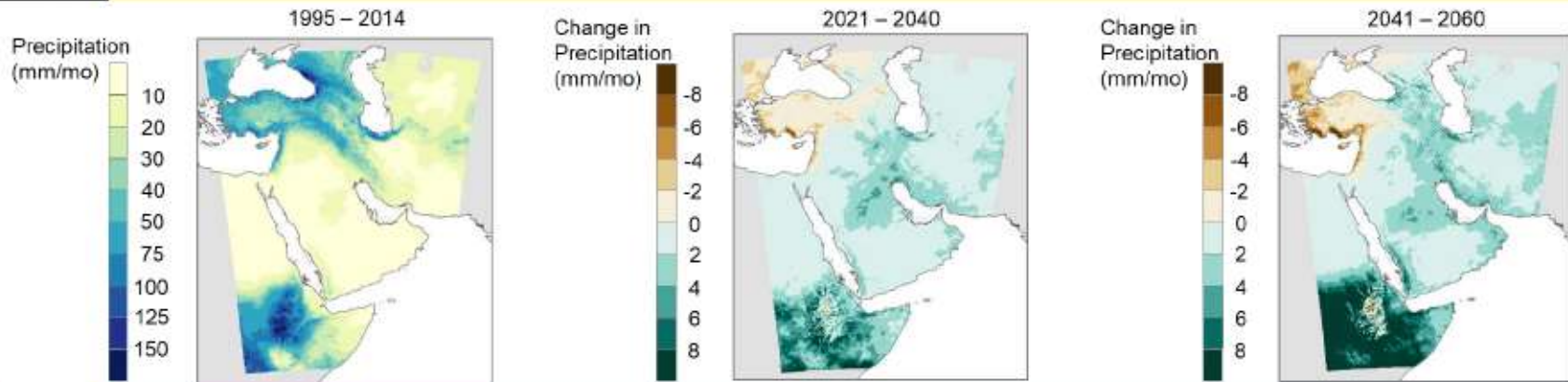
RCP 8.5

Business-as-Usual Climate Scenario

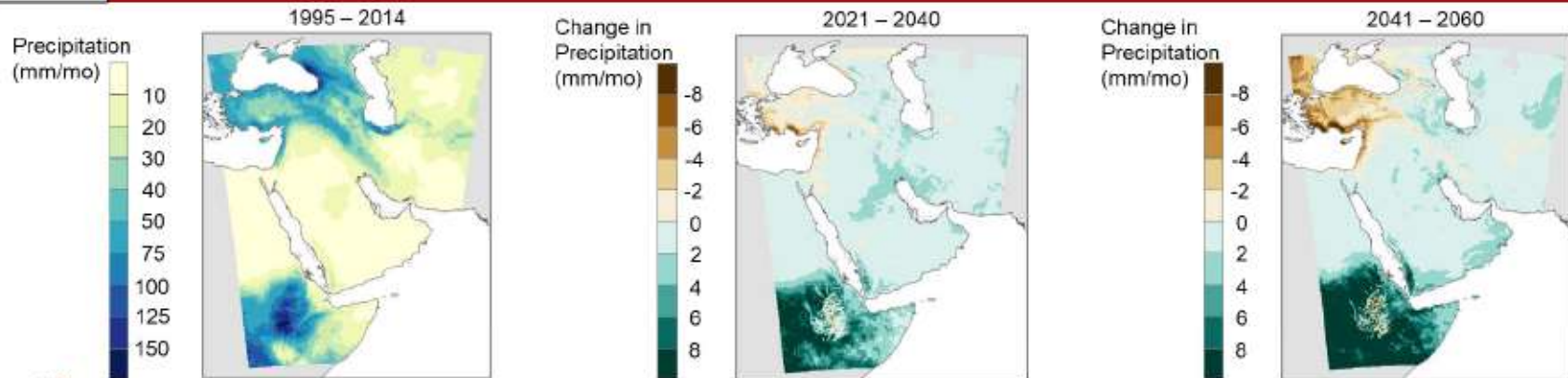


Projected Change in Annual Precipitation – Mashreq Domain

SSP2-4.5



SSP5-8.5



Although overall precipitation volume exhibits little projected change, increased interannual and seasonal variability is expected

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

KNOWLEDGE RESOURCES

The central aim of this Regional Knowledge Hub is to provide access to information that can facilitate cooperation, coordination, dialogue and exchange among Arab States, organizations

DATA PORTAL

The data portal allows interactive visualization of RICCAR maps and provides access to RICCAR data repository.



KNOWLEDGE NODES

Innovation of National, Regional and International Nodes for the Transfer and Sharing of Knowledge

PARTNERSHIPS

Strategic partnerships for supporting strategic objectives to implement climate change adaptation and mitigation programs at the national and regional levels

[Request Data](#)

Biodiversity degrading.....

- **Biodiversity degrading** at increasingly rapid rates
- **Trends in degrading biodiversity** will continue under current nature exploitation trends and exacerbated by climate change
- Loss in natural resources is **undermining the achievement of 80 percent of SDG** targets and goals related to poverty, hunger, health, water, cities, climate, oceans and land
- The **Arab region** is located in parts of the world facing **highest deterioration in biodiversity.**

NBS at the Climate/ Biodiversity Interface

What are NBS?

- NBS strengthen and **draw upon natural processes** through **protection, management and restoration** of nature to harness their environmental, social and economic **benefits** to support communities in addressing their **societal challenges**.
- **How? Where? What?**

Areas of priority interventions

- Ad-hoc selection of intervention areas cannot be maintained as such
- Need to carefully select intervention areas and prioritize **those of importance for various ecosystem services and functions**

CBD COP 14th , November 2018

II. VOLUNTARY GUIDANCE

Suggested steps for ..mainstreaming of PAs and OECMs across sectors

(a) Identify, map and *prioritize areas* important for essential *ecosystem functions* and *services*, including ecosystems that are important for *food production*..for *climate mitigation* ... for *water security*...that provide both surface and groundwater, for poverty alleviation and for *disaster risk reduction*...

Advancing NBS in the Arab region



AIM

We attempt to identify relevant NBS approaches in mapped priority locations for joint **climate & biodiversity** benefits in the Arab region



METHODOLOGY

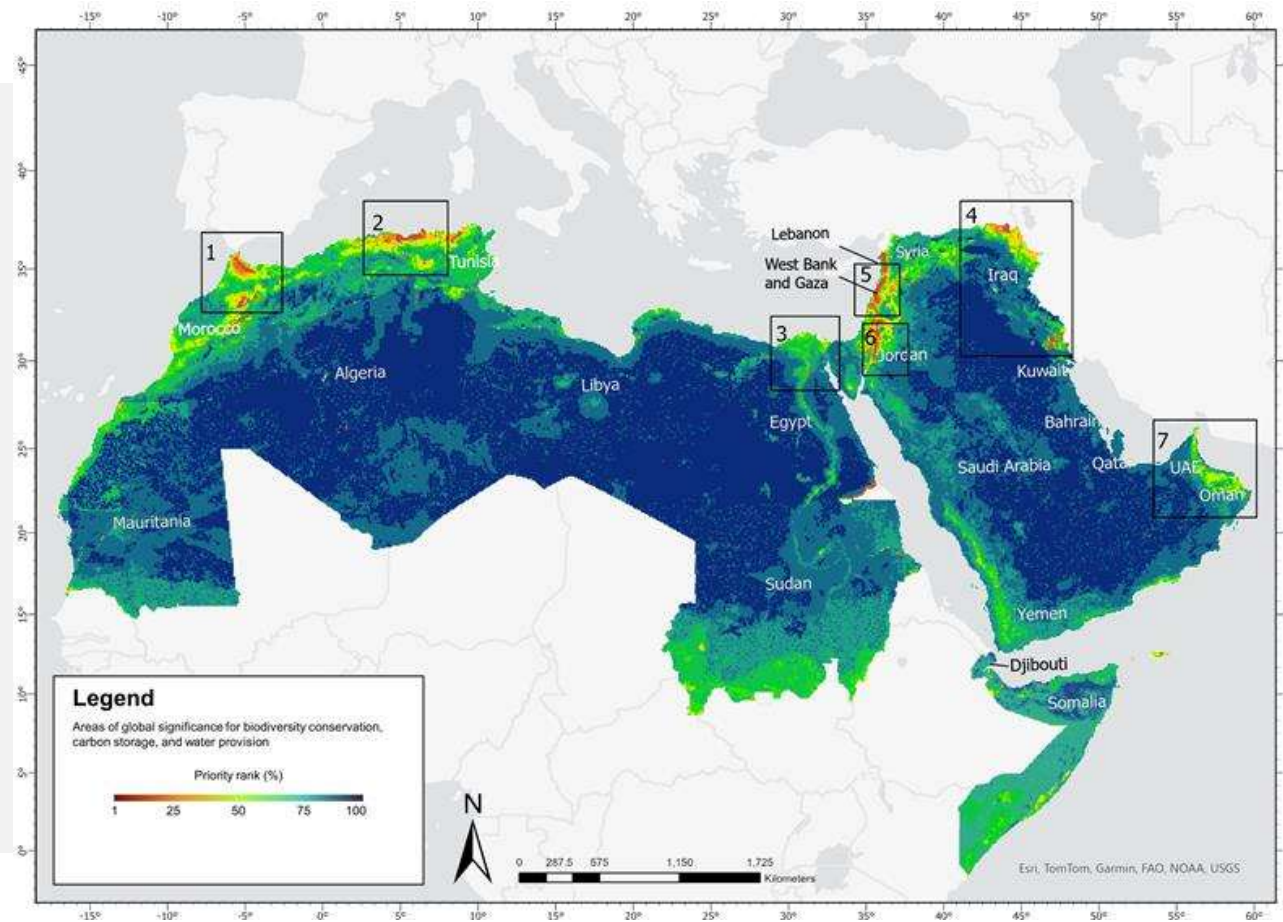
- I. Identify the areas of the Arab region with highest **priority for climate & biodiversity action** based on global optimization studies;
- II. Analyze **socio-economic context** and main sources of **stress & threats** in the identified priority areas



OUTCOME

Based on the above, we highlight most relevant and context specific **nature-based pathways** in each of the identified areas

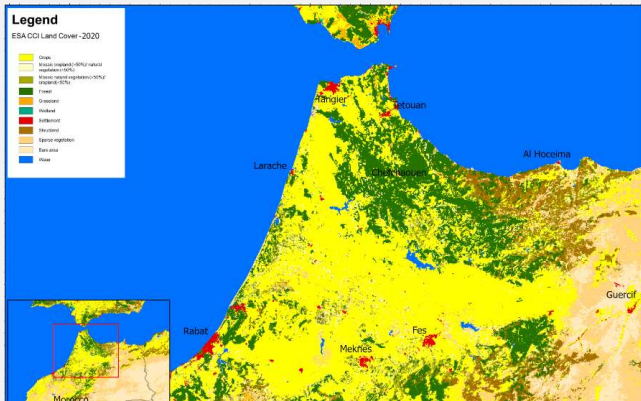
Priority areas for NBS intervention in the Arab region



Atlas mountains Hotspot in Morocco



High atlas Mountains; *Source:* Razoran/stock.adobe.com



Highest Socio-economic relevance

- Agriculture
- Pastoral
- Ecotourism

Source of Pressure

- Overgrazing
- Grass land conversion
- Drought & decline in precipitation
- Soil loss on mountain slopes

Main threats

- Degradation & Erosion
- Ecological fragmentation
- Desertification.

NBS Potential

- **NDC:** *Forest pathways* 4.3% of all GHG emission reduction (2020-2030).
- **GCF:** NBS through Agroforestry
- **Traditional NBS:** Khettaras and Agdal.

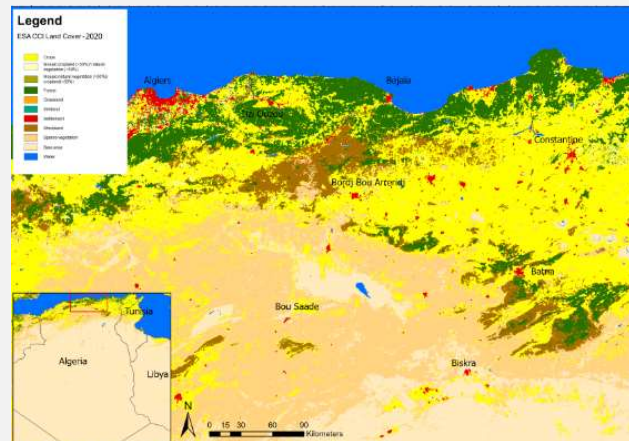
NBS focus

- Forest management, reforestation & agroforestry
- Pasture optimization
- **Slope stabilization-** Grading & terracing.

Atlas mountains in Algeria & Coastal wetlands Hotspot



Aures Mountains- Algeria; *Source:* Shutterstock



Land Use Land Cover, Algeria 2020; *Source:* ESCWA

Highest Socio-economic relevance:

- Agriculture production
- Grazing
- Salt mining

Source of Pressure

- Urbanization
- Overgrazing
- Grass land conversion
- Drought & decline in precipitation
- Water erosion

Main threats

- Forest degradation (60%)
- Soil degradation
- Ecological fragmentation
- Sand and dust storms
- Desertification.

NBS Potential in the identified area

- **NDC:** Reforestation (1.25 million ha over the period 2021-2030)
- Experience from the implementation of the **Green dam** to restore the degraded steppe ecosystem.



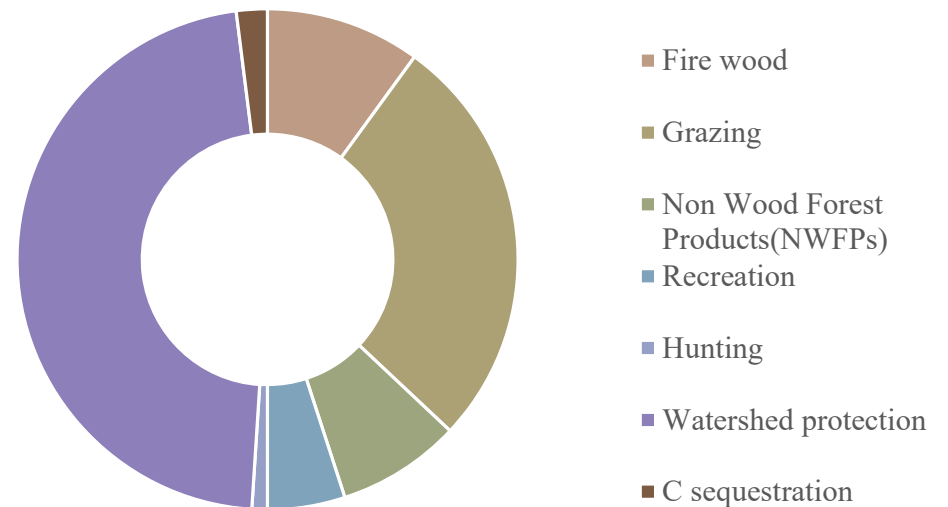
NBS Focus

- Forest management
- Pasture optimization
- Slope stabilization
- Coastal area conservation

Forest Pathways for enhanced water resilience

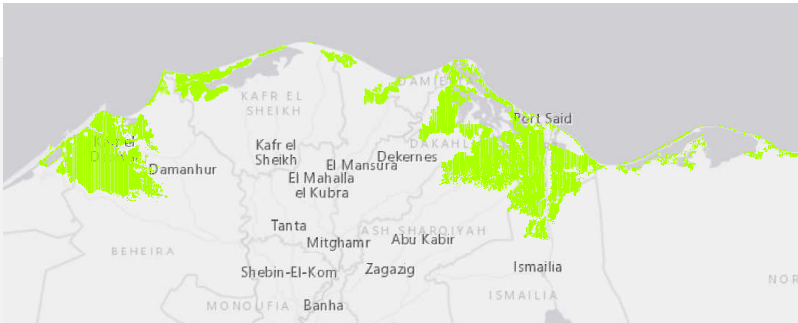
- The multiple benefits of nature-based solutions go well beyond biodiversity and climate change
 - Water-related benefits exceed other benefits

Breakdown of forest ecosystem services values (ESV) as percentage of total (%)

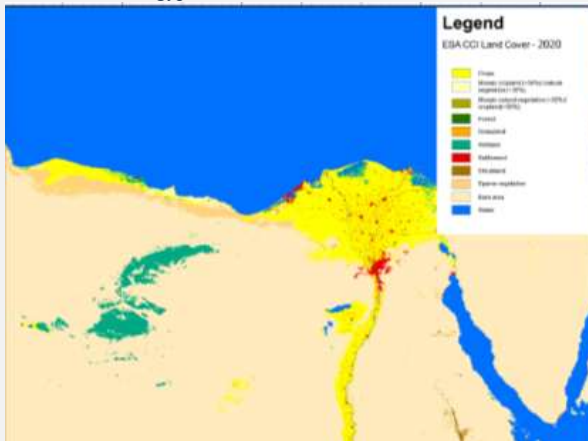


ESCWA compilation based on Croitoru, L. 2006 and Charbel, E. and Rahal, L., 2021.

Low-lying Nile Delta- Egypt Hotspot



Land projected to be below annual flood level due to 30 cm sea level rise (light green), Mediterranean Coast, Egypt. Source: ESCWA, ECLAC 2023.



Highest Socio-economic relevance:

- Highly urbanized
- Agriculture/ Fishing
- Industry
- Recreation/ tourism

Source of Pressure

- Sea level Rise
- Storm Surges
- Soil salinization
- Urbanization
- Overgrazing/excessive fishing
- Industrial discharges

Main threats

- Shoreline inundation and retreat
- Shrinkage in coastal lakes
- Fish stock depletion
- Loss of agricultural productivity
- Pollution from waste discharge .

Potential NBS in the identified area

- **NDC:** Sand dunes stabilization
- **GCF:** Hybrid Green/Grey infrastructure solution for coastal defense
 - *Outcome:* rehabilitated regions and improved livelihoods of fishermen



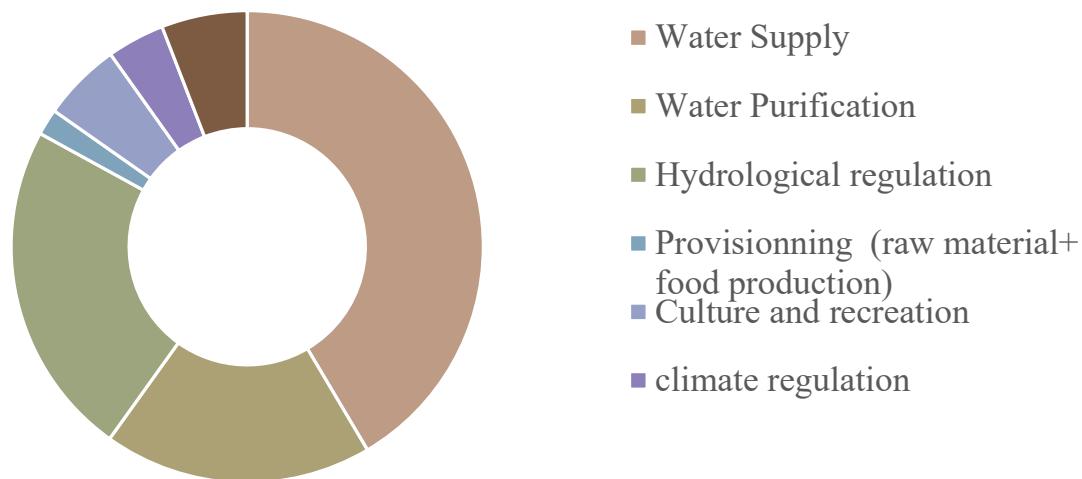
NBS Focus

- Conservation of main wetlands & dunes fixation

Wetlands pathways for enhanced water resilience

- The multiple benefits of nature-based solutions go well beyond biodiversity and climate change
 - Water-related benefits exceed other benefits

Assessment of ESVs by Idku, Burullus and Manzala lakes
(% of total)

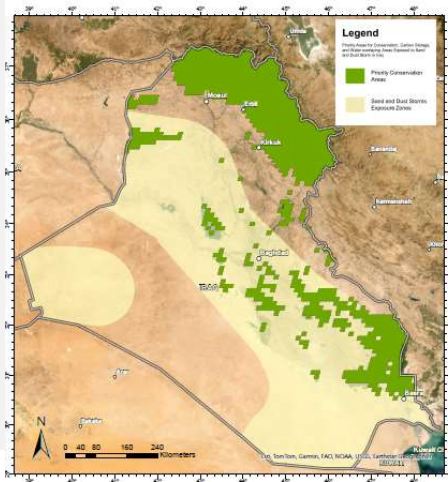


Source: Adapted from Abdel-Hamid, et. Al (2023). Impact Assessment of the Land Use Dynamics and Water Pollution on Ecosystem Service Value of the Nile Delta Coastal Lakes, Egypt. Article in Journal of the Indian Society of Remote Sensing March 2023

Iraq Mesopotamian floodplain Hotspot



Iraqi Marshlands, 2017. Source: Qahtan Abid.



Highest Socio-economic relevance

- Agriculture
- Fisheries
- Tourism

Source of Pressure

- Expanding urbanization
- Drainage of wetlands/ land reclamation
- Climate change impacts

Main threats

- Desertification
- Loss of soil cover
- **Sand and Dust Storms**

Potential for NBS in the identified area

- Cross border collaboration (Iraq-Kuwait):
 - **green belts and vegetated sand dunes.**
- National Reforestation program & reflooding for the restoration of marshland systems.

NBS Focus

- Establishing green belts & vegetating sand dunes
- Marsh restoration & wetland management

South-eastern parts of the Arabian Peninsula Hotspot



Jubail mangrove park



Highest Socio-economic relevance:

- Food products
- Grazing
- Fisheries
- Culture & tourism

Source of Pressure

- Urban encroachment
- Pollution
- Climate change impacts

Main threats

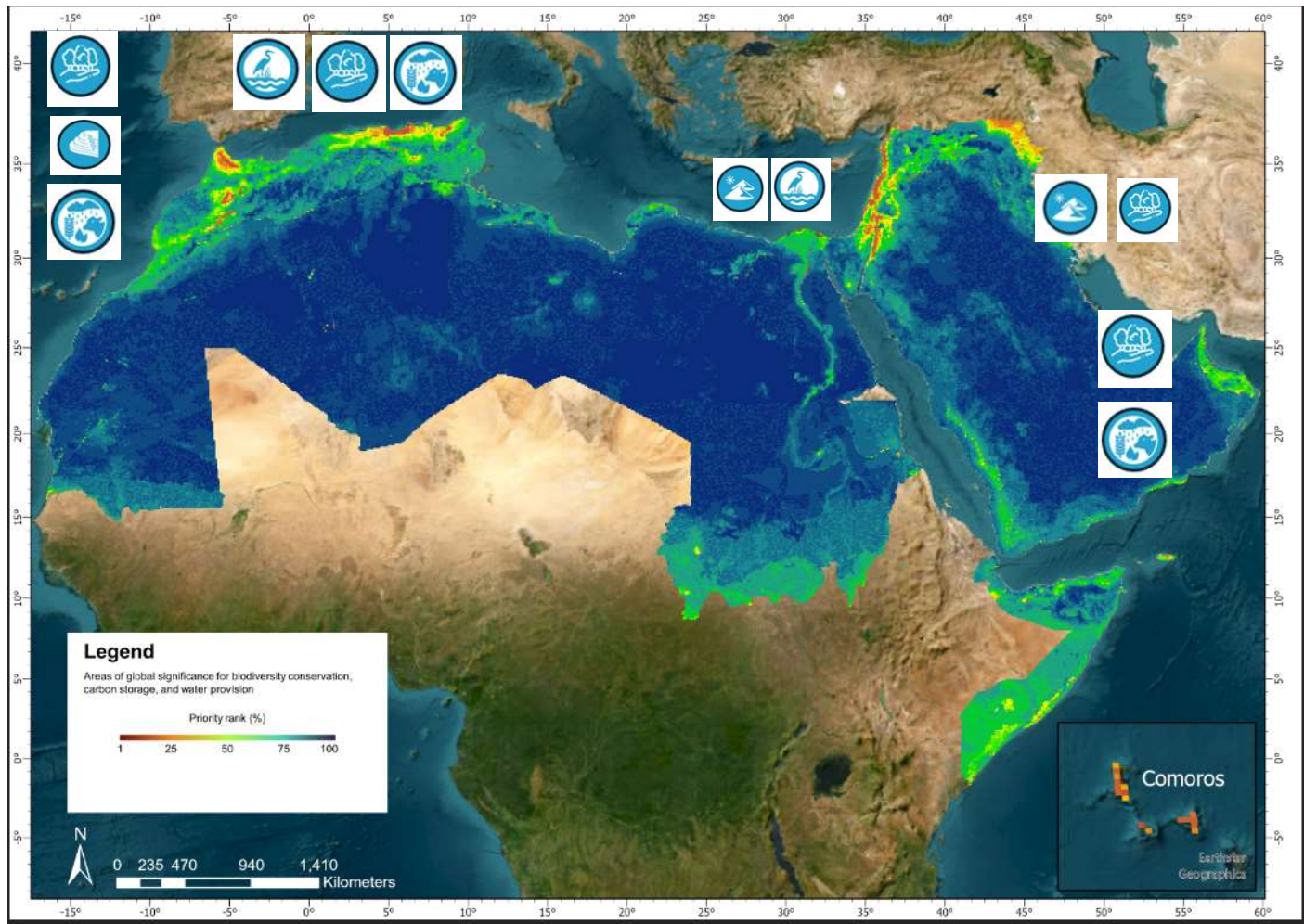
- Forest degradation
- Loss in agricultural productivity
- Coastal erosion.

Potential for NBS in the identified area

- **NDC** : Mangroves are acknowledged in UAE as an avenue for carbon sequestration.
- **Abu Dhabi Mangrove Demonstration project**: improved understanding of CSS and other Ecosystem Services provided by mangroves
- **Mangroves in Oman** – highest sequestration rates in the region.

NBS Focus

- Mangrove forest conservation and restoration and optimization of grazing.



- Sand Dunes Fixation
- Slope Stabilization
- Agroforestry
- Pasture Optimization
- Forest Pathways
- Wetland Stabilization



Conclusion

NBS have a confirmed role in consolidating the biodiversity/climate interface, but,

.....have important benefits that enhance climate resilience, particularly for hydrometeorological risks:

- Watershed protection provided by forest pathways
- Shore stabilization and water quality through mangroves pathways
- Hydrological regulation in wetlands.



Shared Prosperity Dignified Life

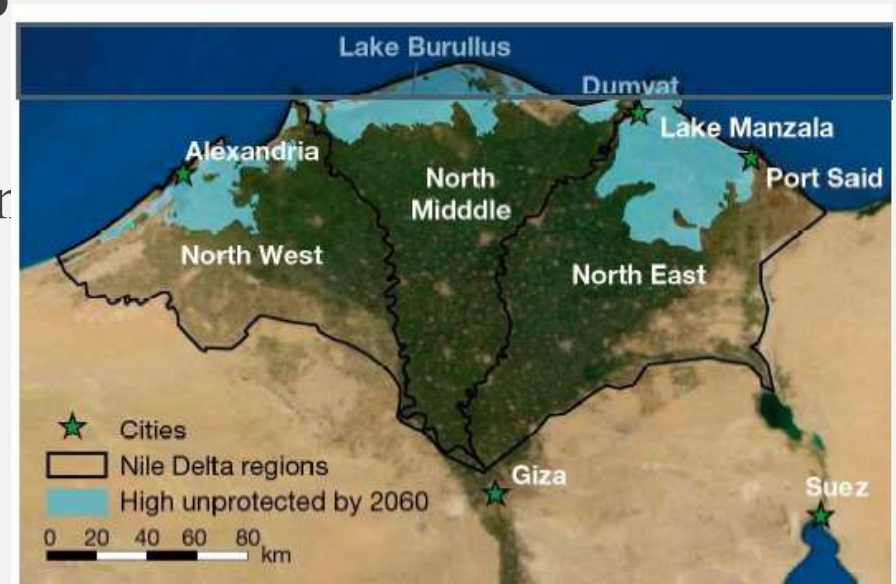


Thank you

More effective approaches needed

More effective approaches are needed to:

- Address these global challenges
- Enhance synergies at the biodiversity ar
-



Hotspot 6: Jordan river Valley



Jordan Valley. Source: Stock photos



Revival of the Hima practice. Source: Abraham, C., 2017.

Priority Area 6:

Highest Socio-economic relevance:

- Agriculture production
- Pastoral activities
- Tourism
- Culture

Source of Pressure

- Expanding urbanization
- Overgrazing
- Drainage of wetlands/ land reclamation for agriculture
- Climate change impacts

Main threats

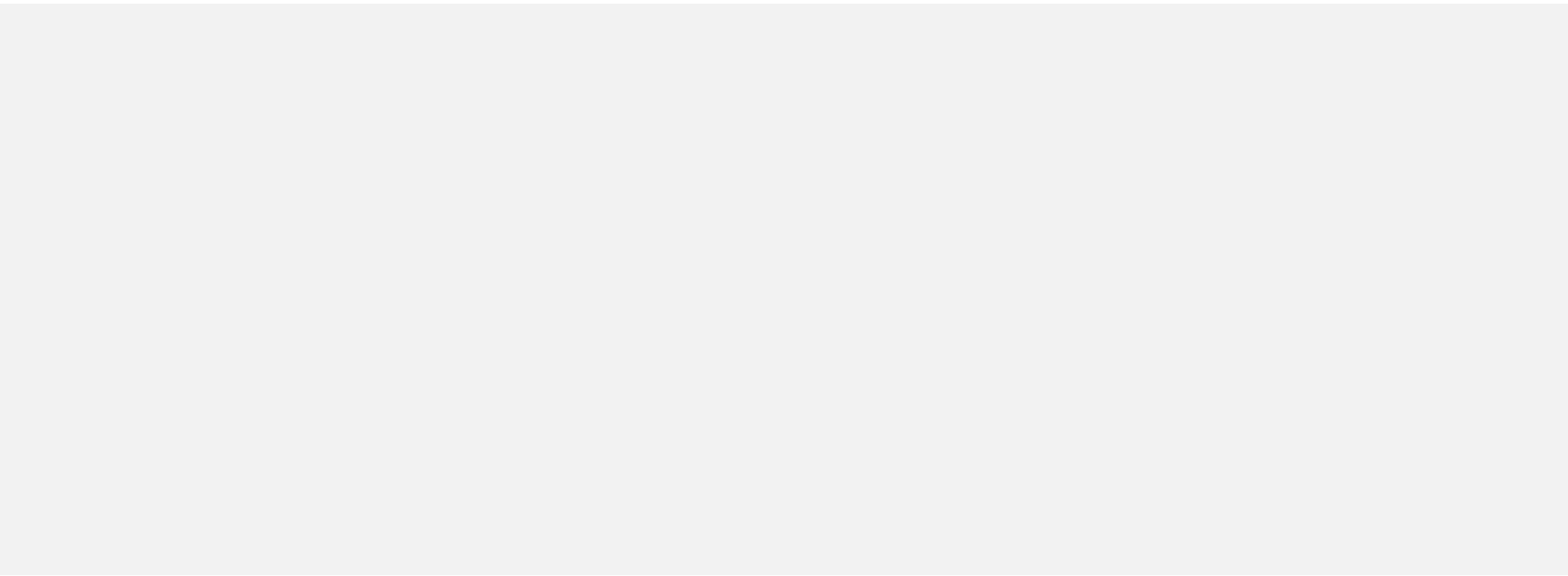
- Rangeland degradation
- Loss in agricultural productivity
- Loss in habitat
- Desertification.

Potential for NBS in the identified area:

- **NDC & NAP:** Explicit recognition of NBS for the preservation of biodiversity and agricultural productivity.
- **Traditionally implemented NBS:** “Hima” governance system of pastoral land

Proposed NBS interventions

- Pasture management & optimization
- Agroforestry



Hotspot 5: Coastal areas of eastern Mediterranean



Chouf reserve, Lebanon

Potential for NBS in the identified area

- NDC: Mitigation and adaptation to climate change impacts
- National Reforestation plans & program.

Proposed NBS interventions

- Forest management
- Reforestation
- Pasture optimization
- Agroforestry

Highest Socio-economic relevance:

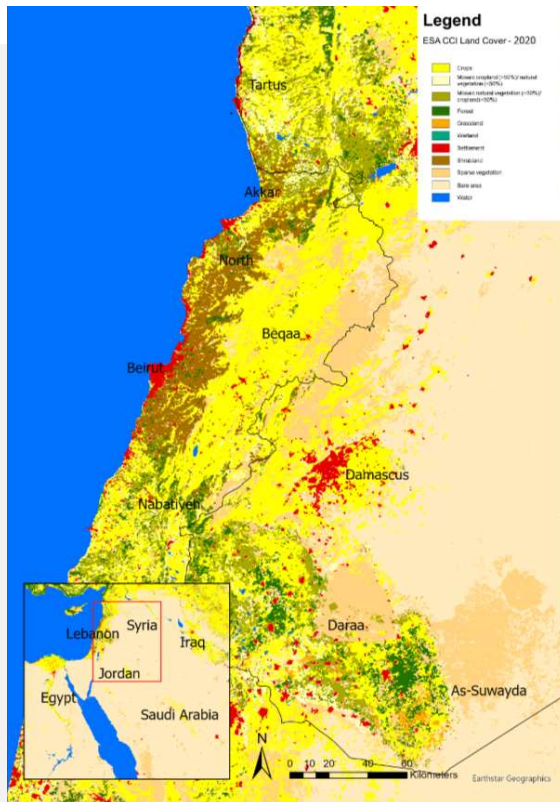
- Agriculture production
- Pastoral activities
- Tourism
- Culture

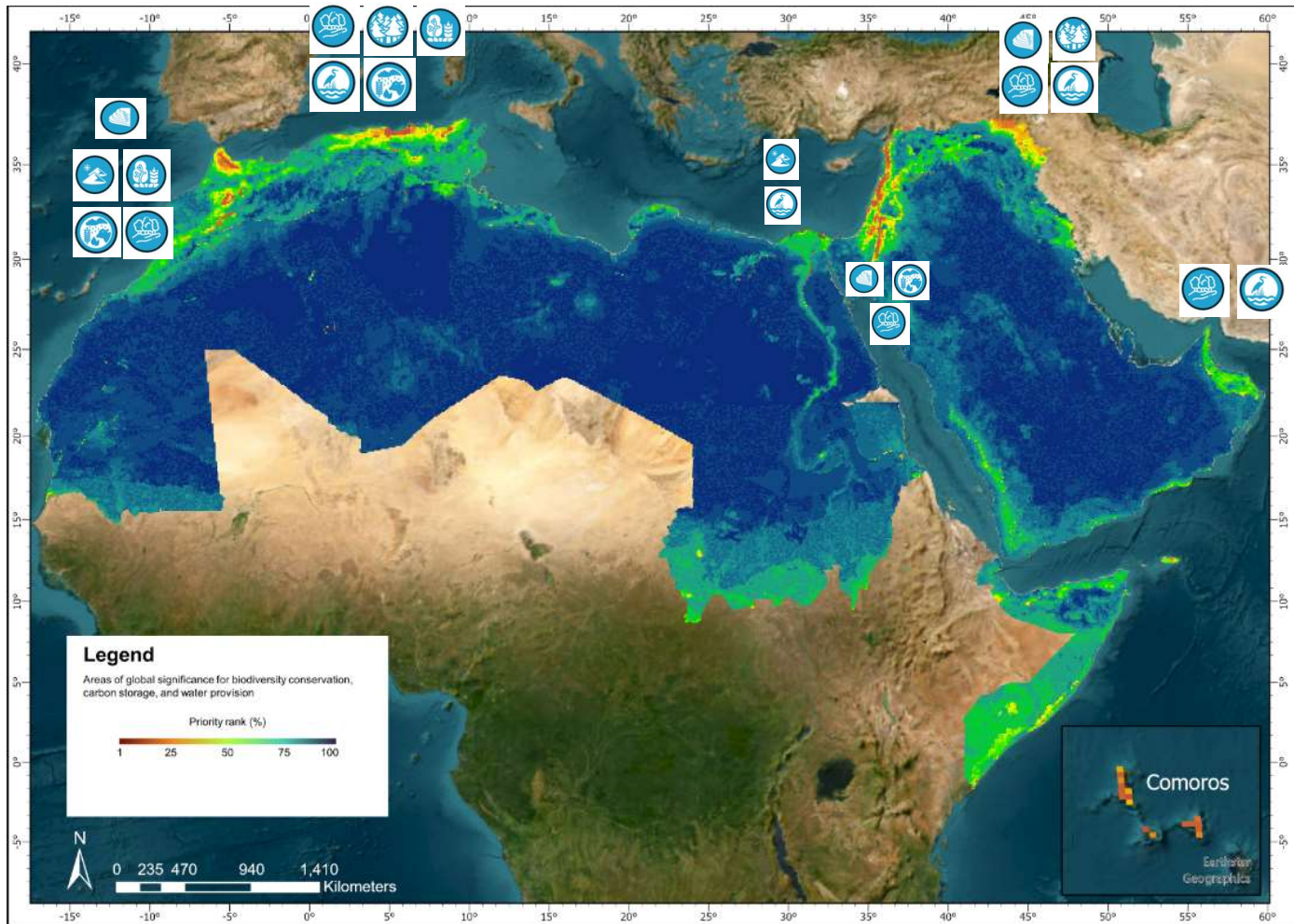
Source of Pressure

- Expanding urbanization
- Land conversion
- Agriculture intensification
- Climate change impacts

Main threats

- Forest degradation
- Loss in agricultural productivity
- Loss in habitat
- Desertification.





© Copyright ESCWA. All rights reserved. No part of this presentation in all its property may be used or reproduced in any form without written permission