

Economic and Social Commission for Western Asia

Understanding vulnerability to climate change in the Arab region

Arab Regional Parliamentary Forum on the 2030 Agenda:
Strengthening Parliamentary Engagement in Climate Action in the Arab Region



UNITED NATIONS

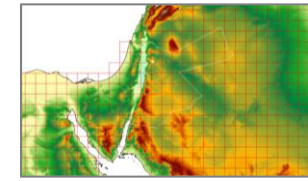
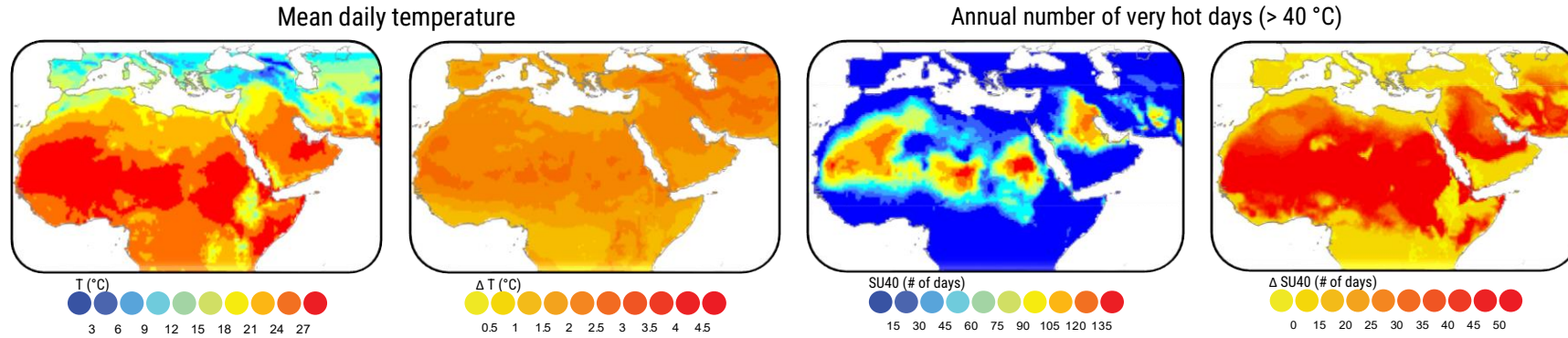
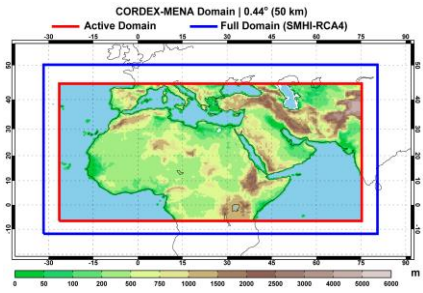
الاسواق
ESCWA

Shared Prosperity **Dignified Life**



Beirut, 29 - 30 November 2022

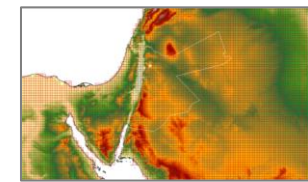
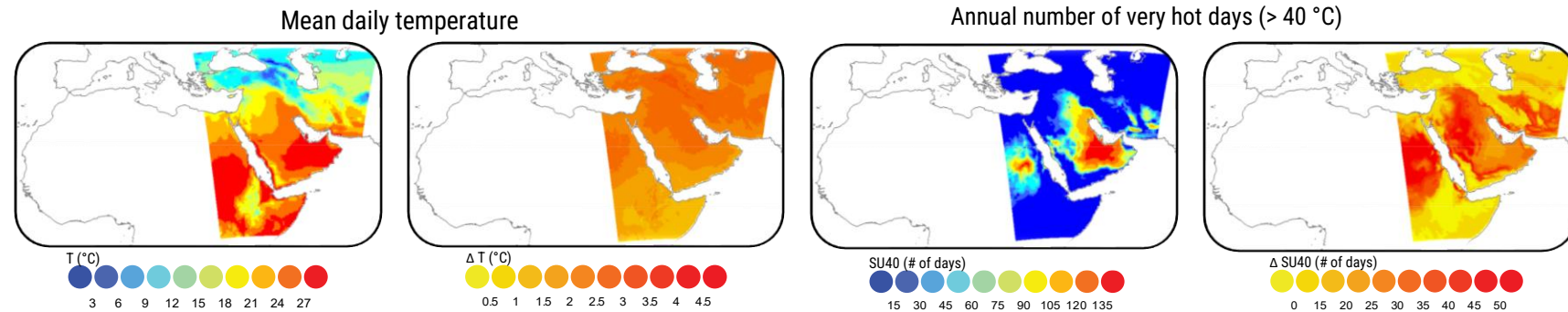
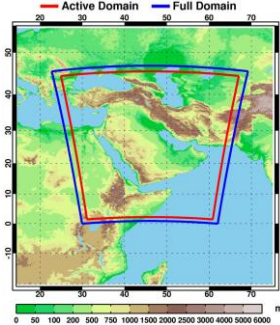
From CMIP5 across the CORDEX-MENA/Arab Domain to support regional cooperation . . .



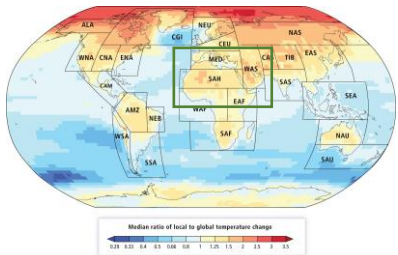
50 km² scale

. . . To CMIP6 within the Mashreq Domain to facilitate more detailed analyses to inform regional action

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



10 km² scale



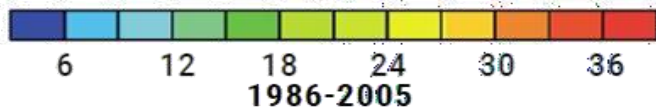
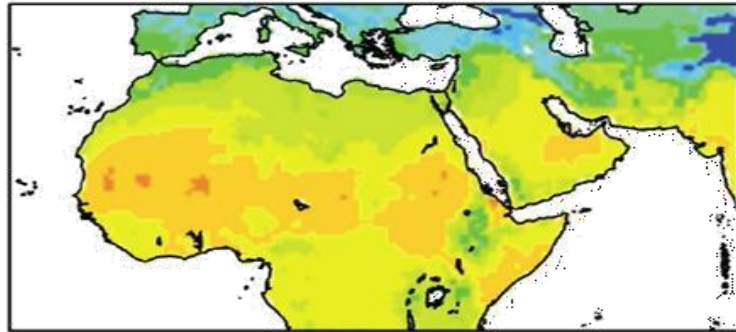
Mean changes in annual temperature and number of very hot days (> 40 °C) are for 2041–2060 (RCP8.5/SSP5-8.5) compared to 1981–2000.

Increasing temperature will give rise to extreme events, including heat waves, and impact water availability, agricultural productivity, biodiversity and vulnerable populations.

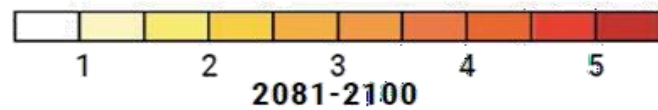
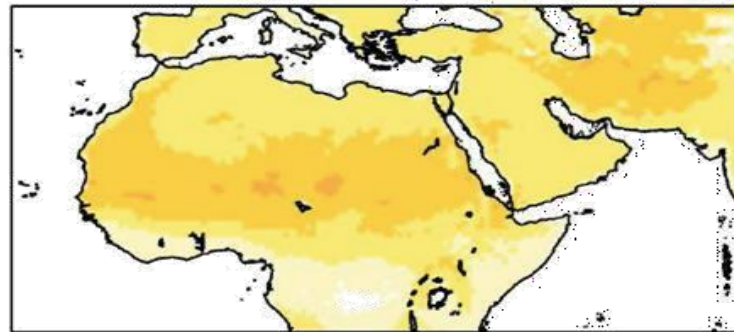
The RICCAR Regional Knowledge Hub provides climate analysis that informs regional cooperation & policymaking in Arab States.

Changes in temperature for end of century (compared to reference period)

1986-2005



2081-2100



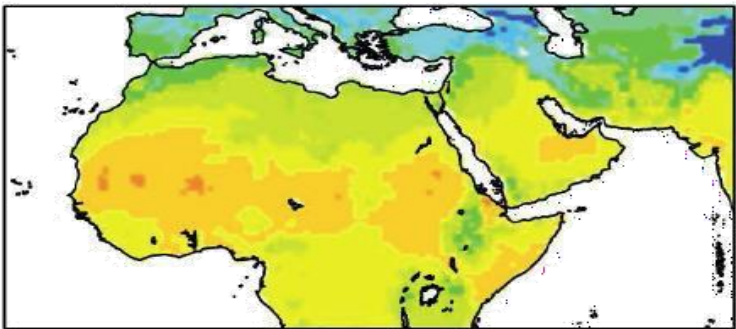
RCP 4.5

Temperature (°C)

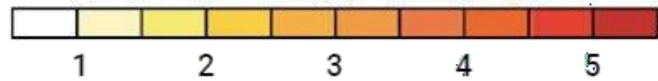
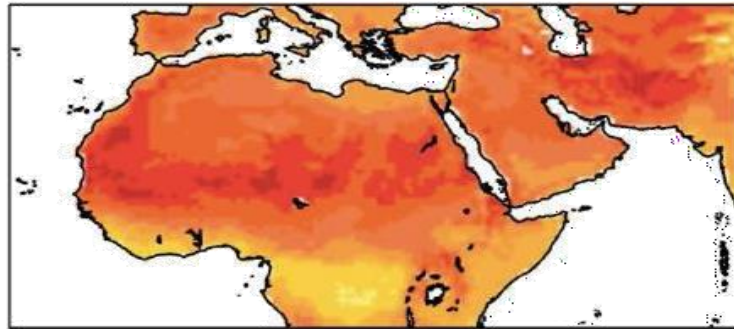
- The general change of temperature towards end of the century shows an increase between 1 to 3°C in RCP 4.5 and from 2 to 5°C with RCP 8.5.

- The areas showing higher increase are in the Sahara area in North Africa and East Africa, including Morocco and Mauritania.

1986-2005



2081-2100

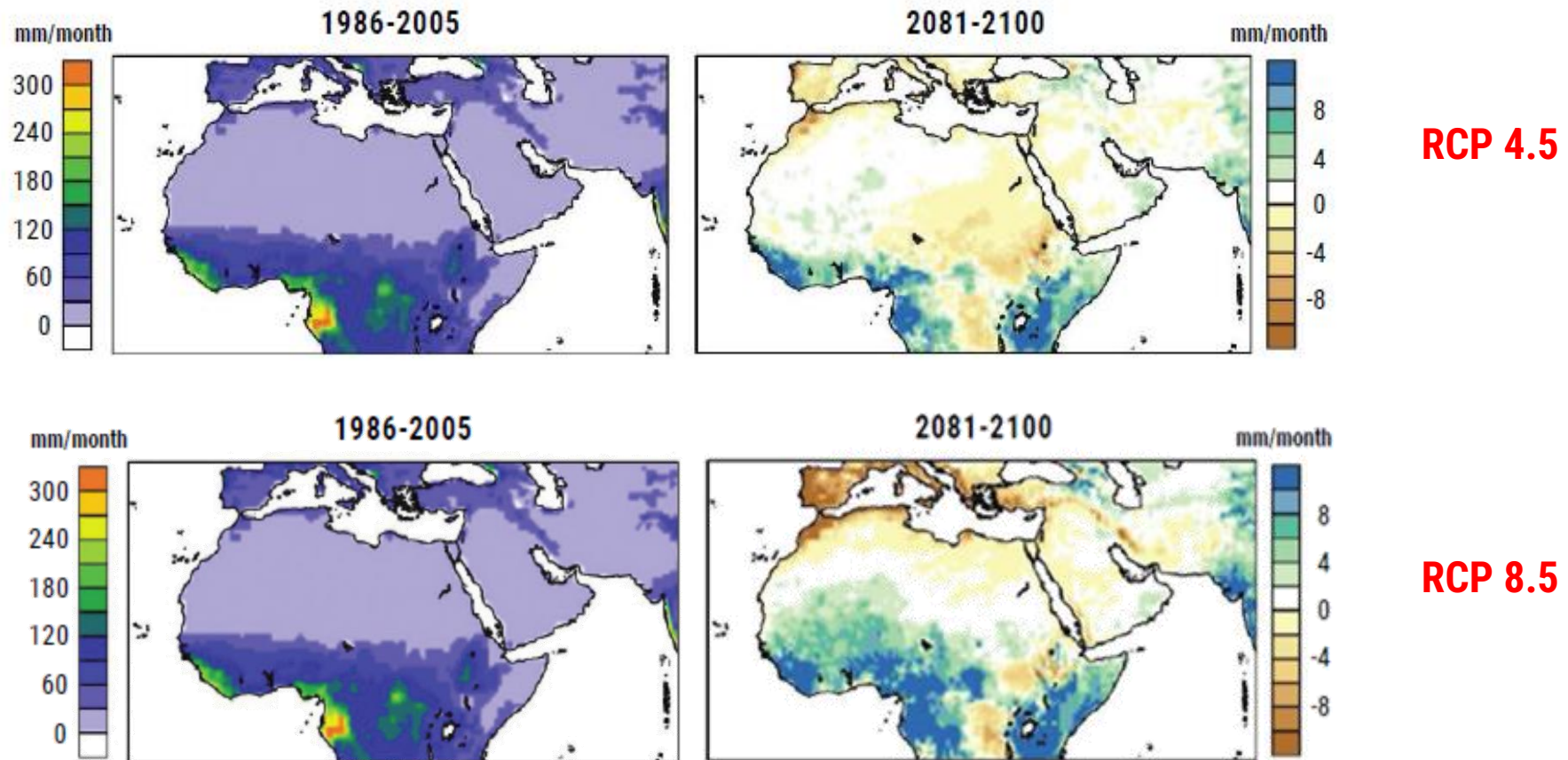


RCP 8.5

Temperature (°C)

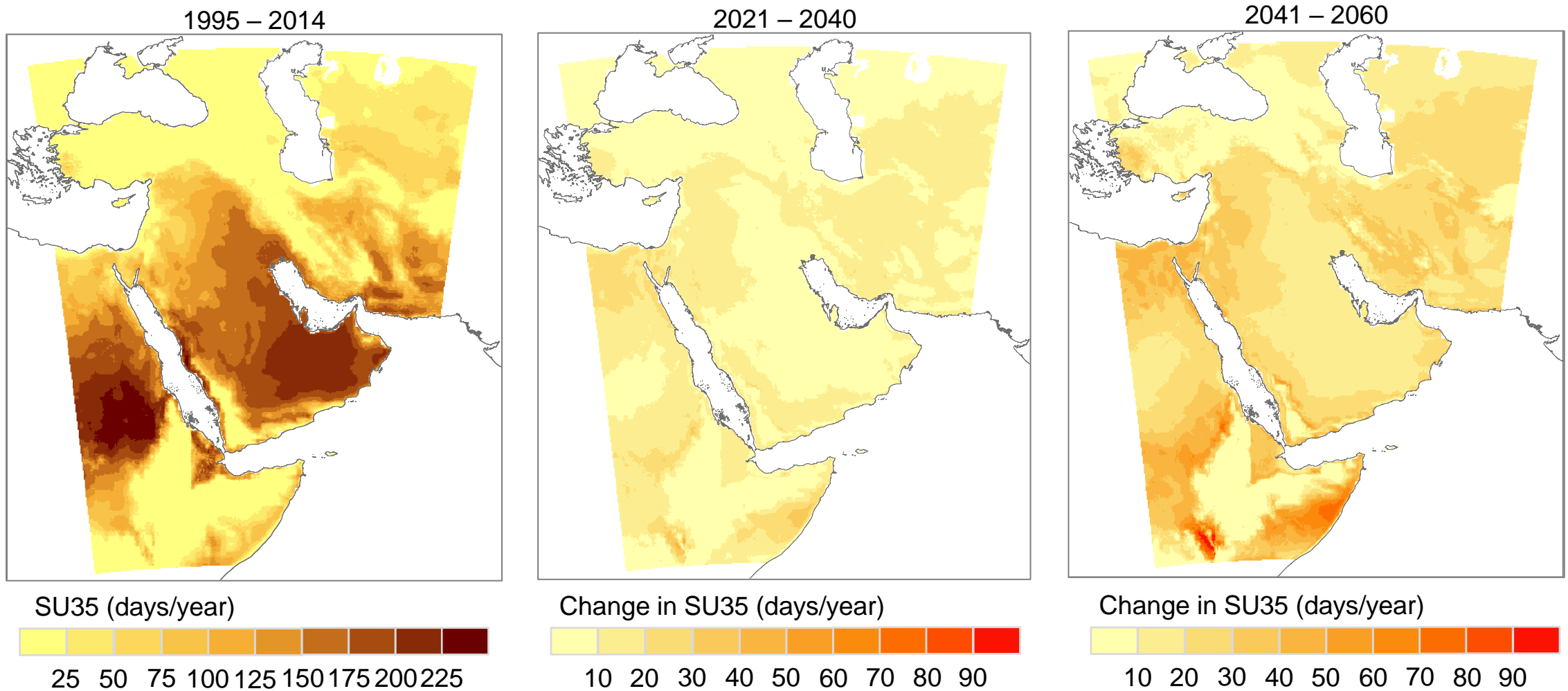
- The increasing temperature signals along the western shores of Yemen and Saudi Arabia under RCP 8.5 are also stronger than under RCP 4.5 in comparison with the rest of the Arabian peninsula.

Changes in precipitation for end of century (compared to reference period)



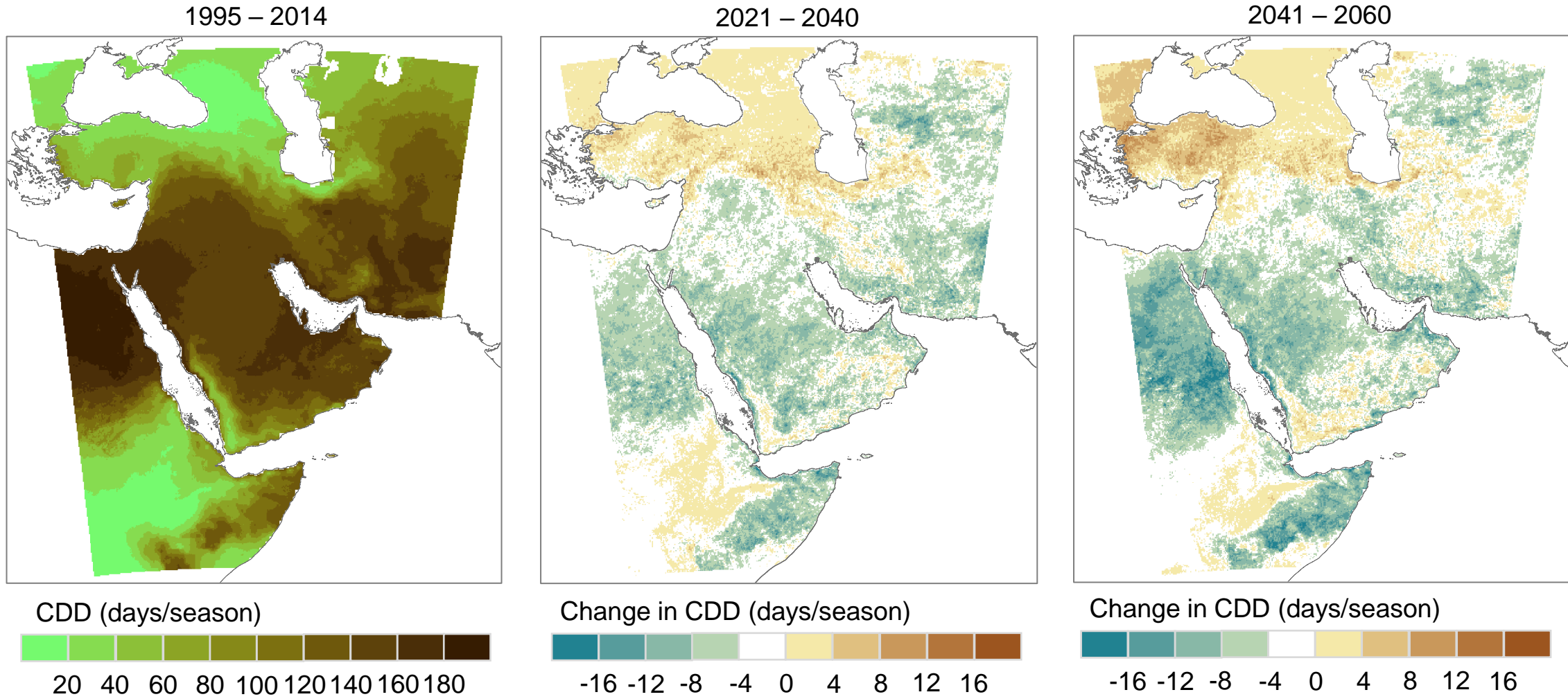
Both scenarios show a reduction of the average monthly precipitation reaching 8-10 mm in the coastal areas of the domain, mainly around the Atlas Mountains in the West and upper Euphrates and Tigris river basins in the East.

Change in number of hot days for near term (2021-2040) and mid-term (2041-2060) compared to the reference period (1995-2014), SSP5-8.5 scenario, Days which Tmax > 35 °C



By mid-term, 55% of the Mashreq Domain will experience at least 3 months of temperatures > 35 °C (the threshold which the human body can no longer cool itself) and 23% of the domain will experience at least 6 months which exceed 35 °C – before factoring in humidity effects

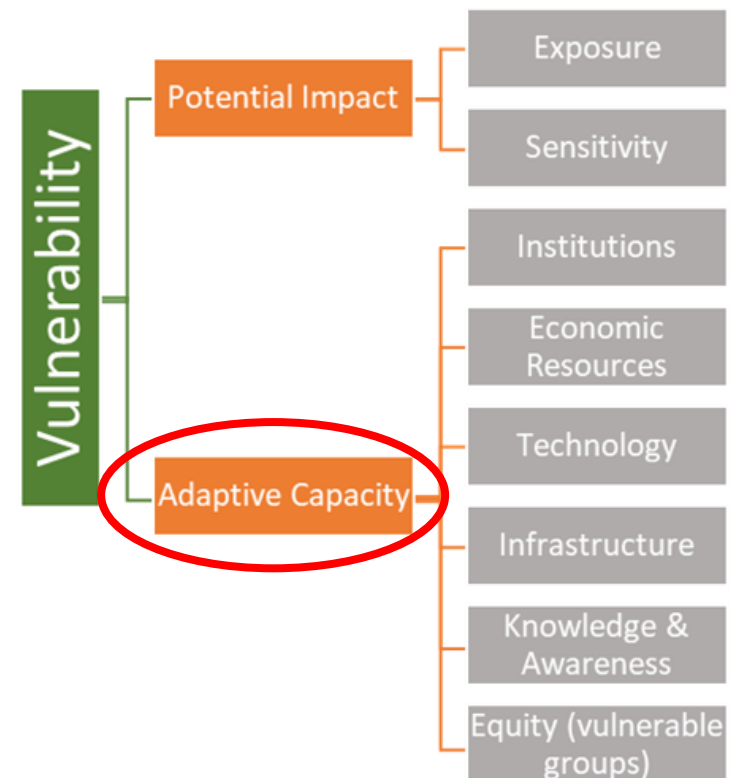
Change in seasonal (Apr-Sep) maximum length of dry spell for near-term (2021-2040) and mid-term (2041-2060) compared to the reference period (1995-2014), SSP5-8.5 scenario



Although CDD is decreasing over much the Arabian Peninsula, nearly half of the domain (to include Mashreq and GCC countries) will have at least 4 (out of 6) months of consecutive dry days by mid-term

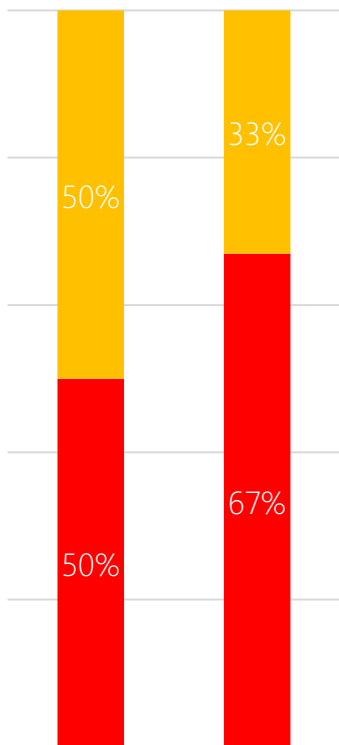
Assessing Vulnerability & Adaptive Capacity on Regional Sectoral Level

- ❖ According to the IPCC, **vulnerability** is central to **assessing adaptation needs**.
- ❖ RICCAR's framework applies IPCC's- AR4 methodology for Integrated Vulnerability Assessment.
- ❖ Adaptive capacity is more likely to influence vulnerability.
- ❖ The adaptive capacity composite indicator comprises 27 indicators categorized into the six dimensions.
- ❖ RICCAR shows, to some extent, the feasibility to assess adaptation-related indicators to extrapolate the adaptive capacity of the Arab region on the sector level.



The Arab Region is one of the most vulnerable to climate change

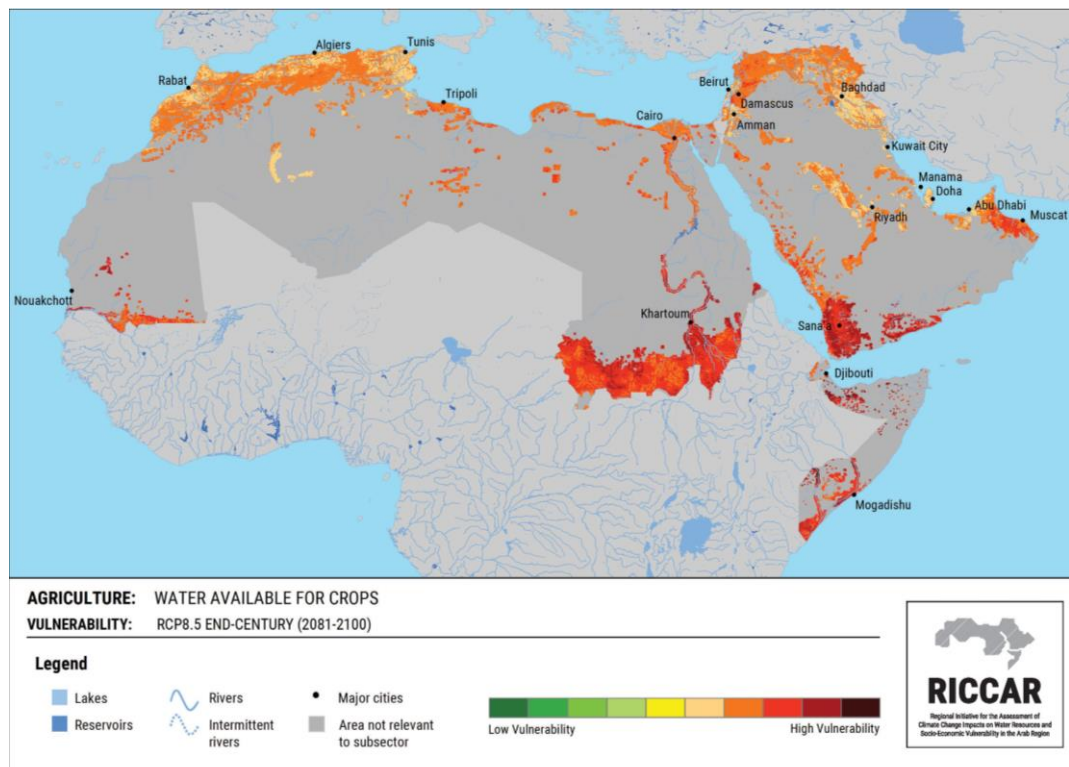
Mid Century
(% Study Area)



Moderate Scenario Extreme Scenario

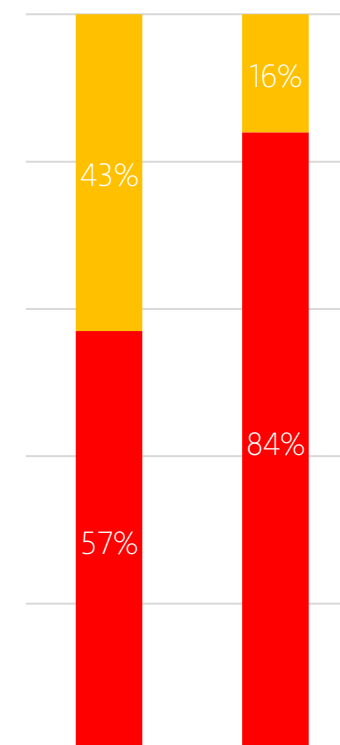
- Low Vulnerability
- Moderate Vulnerability
- High Vulnerability

Water Available for Crops: Vulnerability



Up to 84% of Agricultural Land in the Arab Region is Highly Vulnerable to Water Availability under Climate Change

End Century
(% Study Area)



Moderate Scenario Extreme Scenario

- Low Vulnerability
- Moderate Vulnerability
- High Vulnerability

The Arab Region is one of the most vulnerable to climate change

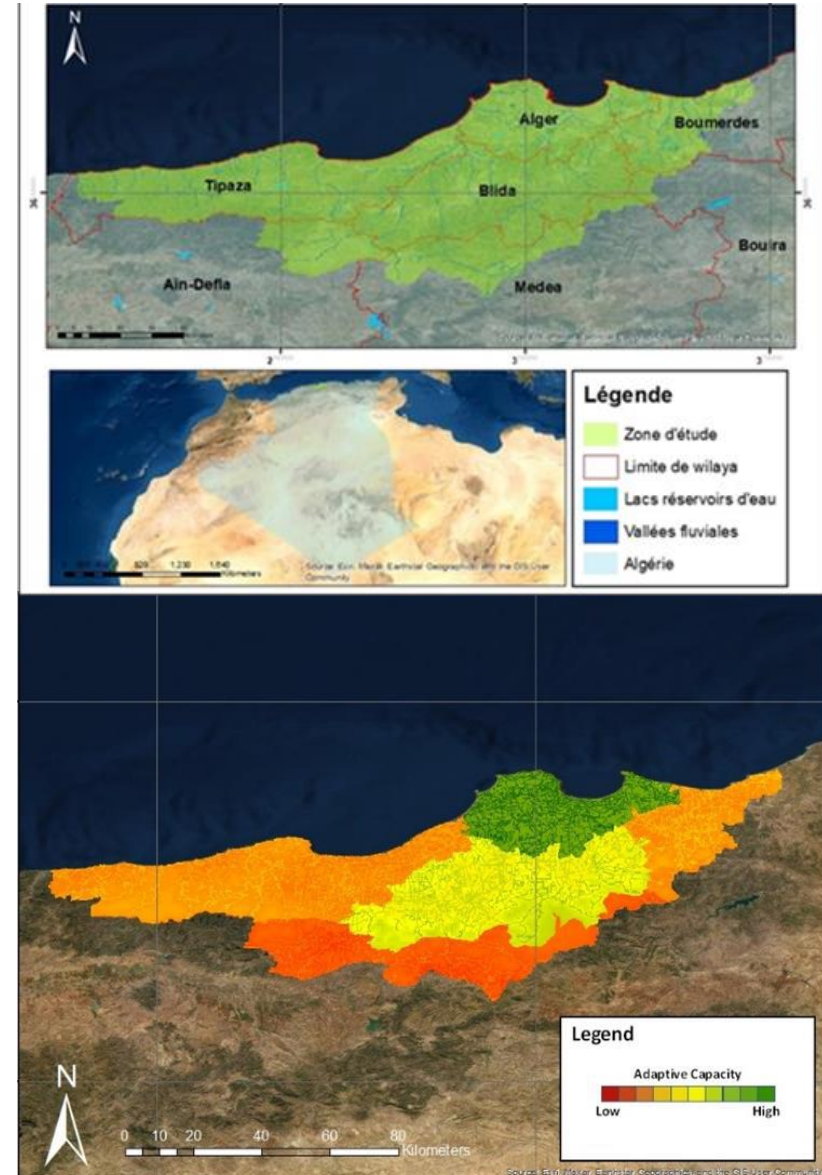
Case of the Agriculture Sector in Algerois Watershed

Adaptability is dependent on a variety of interrelated variables

Access to improved sanitation	Access to improved drinking water	Road network density	Access to healthcare	Access to electricity
Access to natural gas	Student-teacher ratio	Number of schools	Adult Literacy Rate	Number of farmers
Small & medium-sized enterprises (SMEs)	Distribution of registrations in the commercial register	Distribution of postal institutions	Rural and urban housing ensure the distribution	Access and use of agricultural machinery
Facebook users	Women to men Literacy ratio	Distribution of farmers (women's share)		

Approximately 58% of the study area indicated low adaptive capacity of which 26% indicated very low. Conversely, areas of high adaptive capacity represent 42% of the study area; mostly located in urban areas.

Areas with a high agricultural adaptive capacity are prepared to cope with future changes and are less likely to suffer from climate change impacts.



Key messages

- ❖ Areas with the highest vulnerability, which have been defined as hotspots, generally occur in the Horn of Africa, the Sahel and the south-western Arabian Peninsula, irrespective of sector, subsector or projected climate scenario.
- ❖ Of the three components of the VA, adaptive capacity is most likely to influence vulnerability, suggesting that the ability of mankind to influence the future is stronger than that of climate change and environmental stressors.
- ❖ Sector and national and sub-national case studies enhance understanding of climate change implications and vulnerabilities.



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Thank You

<https://riccar.org/>
www.unescwa.org/portal/riccar-data