# Accessing the RICCAR Regional Knowledge Hub and Data Portal

Mashreq Waters Knowledge Series: Workshop on Economic Implications of Climate Change and Water Scarcity in the Mashreq Region

1-3 December 2020





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### RICCAR Regional Knowledge Hub

- Central aim of the RKH is to provide access to information that can facilitate cooperation, coordination, dialogue
  and exchange among Arab States, organizations, and stakeholders and to support awareness raising as well as
  regional networking and exchange on issues related to climate change and water resources in the region
- Access to RICCAR assessment findings and associated datasets, which is comprised of two open-access components: a website and a data portal
- Website provides access to all RICCAR reports and technical materials, prepared by the implementing partners; informs on training tools, activities and events; and offers assistance tools for submitting inquires and requests for support. All information related to RICCAR, including meetings, workshops and related materials can be consulted on the website.
- Data portal allows interactive visualization of RICCAR maps and provides access to RICCAR data repository.
  Moreover, it presents search functionality and research tools for generating maps, downloading datasets, and exporting outputs in different formats. It also includes links to other databases of relevance through the platform.





REGIONAL INITIATIVE FOR THE ASSESSMENT OF CLIMATE CHANGE IMPACTS ON WATER RESOURCES AND SOCIO-ECONOMIC VULNERABILITY IN THE ARAB REGION









Partners

Overview

Meetings & Events

Data Portal



### **Knowledge Resources: RICCAR Publication Series**

### Main Report and Executive Summary









#### Technical Annex



#### **Booklets**



**Technical Reports** 













#### **Technical Notes**









### **Training Tools**







### **Knowledge Nodes: Adaptation**

### Assessing the Impacts of Changing Water Availability on Agricultural Production



### Water-Energy Nexus Regional Policy Toolkit





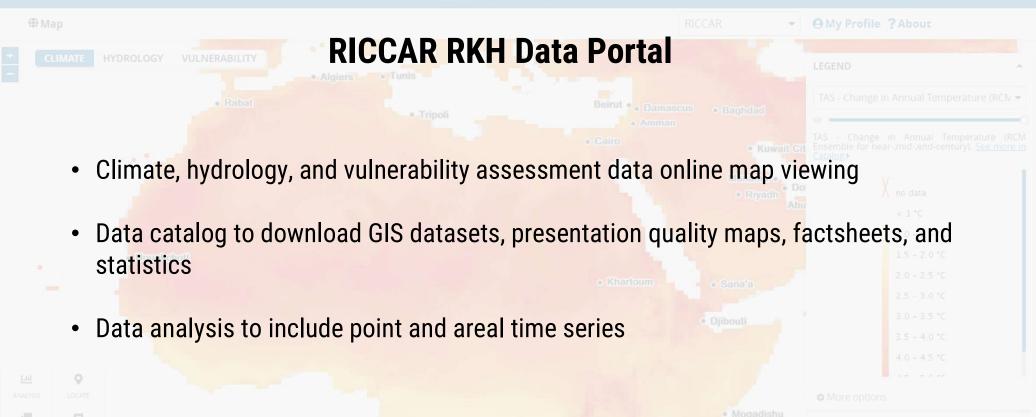


### Climate Change Adaptation using Integrated Water Resources Management Tools











### **RICCAR Climate Modelling Outputs**

Spatial **Driving GCMs** Climate Scenarios Climate data Resolution RCP8.5 **EC-EARTH** Precipitation RCP8.5 and **GFDL-ESM2M** Temperature RCP2.6 data (ave, max, min) **RCP4.5 NetCDF Format EC-EARTH RCP8.5** Daily 0.44 grid resolution **RCP4.5** CNRM-CM5 **Bias-corrected** (~50 km) 1951-2100 **RCP8.5 RCP4.5** GFDL-ESM2M **RCP8.5** 



### From GCMs to RCMs

### CNRM-CM5

CNRM (Météo-France/CNRS) and CERFACs

### EC-EARTH

Europe-wide consortium

Regional Climate Models and Empirical Statistical Downscaling

RCA4

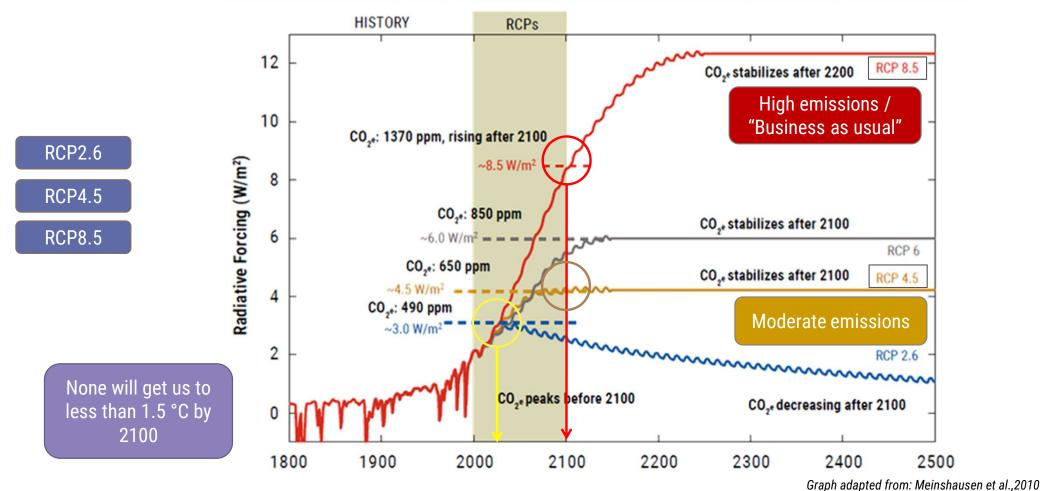
SMHI Rossby Centre Atmospheric Model

GFDL-ESM2M

**NOAA Geophysical Fluid Dynamics Laboratory** 



# Climate Scenarios: Representative Concentration Pathways (RCPs) [IPCC AR5 (2014)]

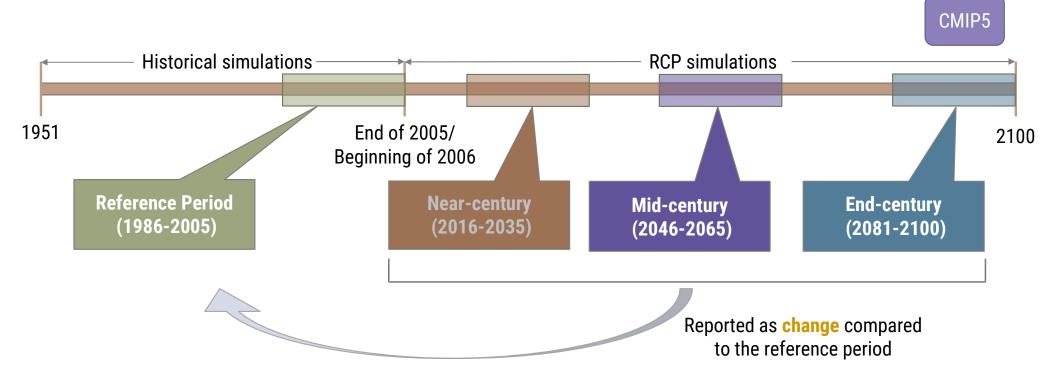




### **Daily RCM Outputs to Ensembles**

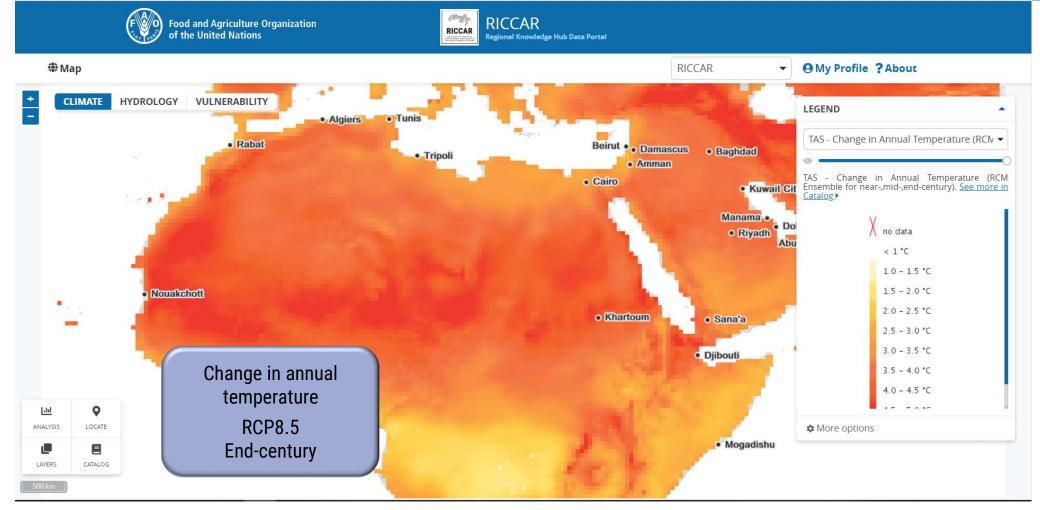
Use multiple model outputs (3 or more) to assess for a long-range period (20 years)

- Individual modelling outputs exhibit biases
- Climate variability



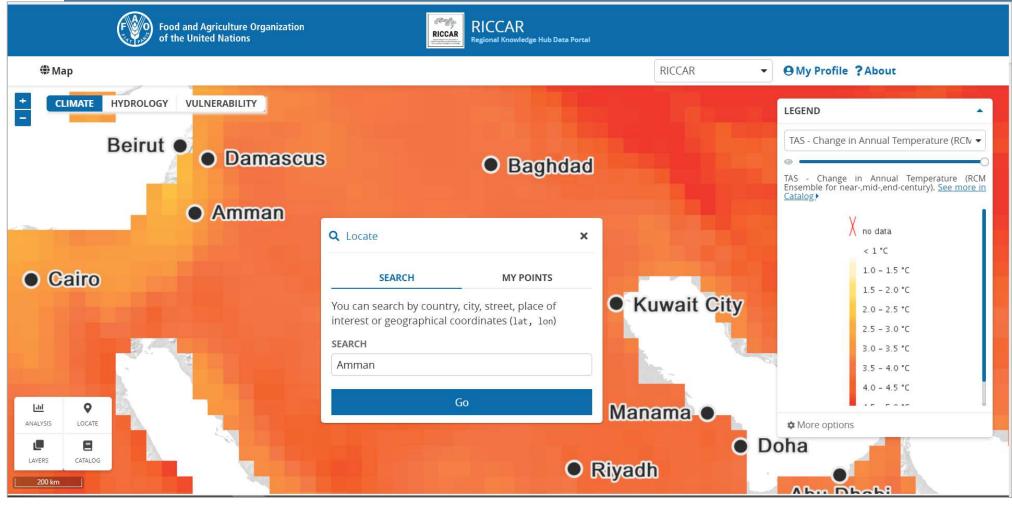


### **RKH Map Viewing**



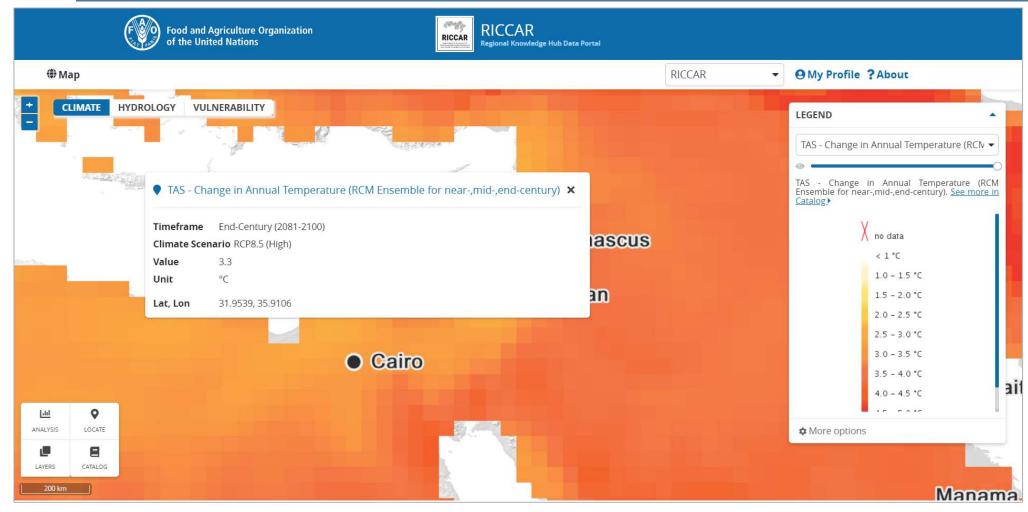


### Locate and obtain results for current dataset



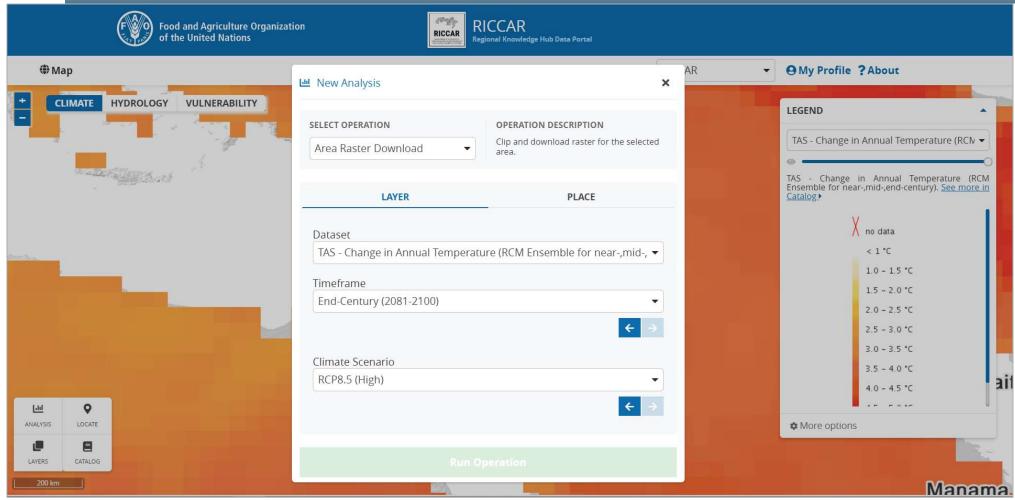


### Locate and obtain results for current dataset



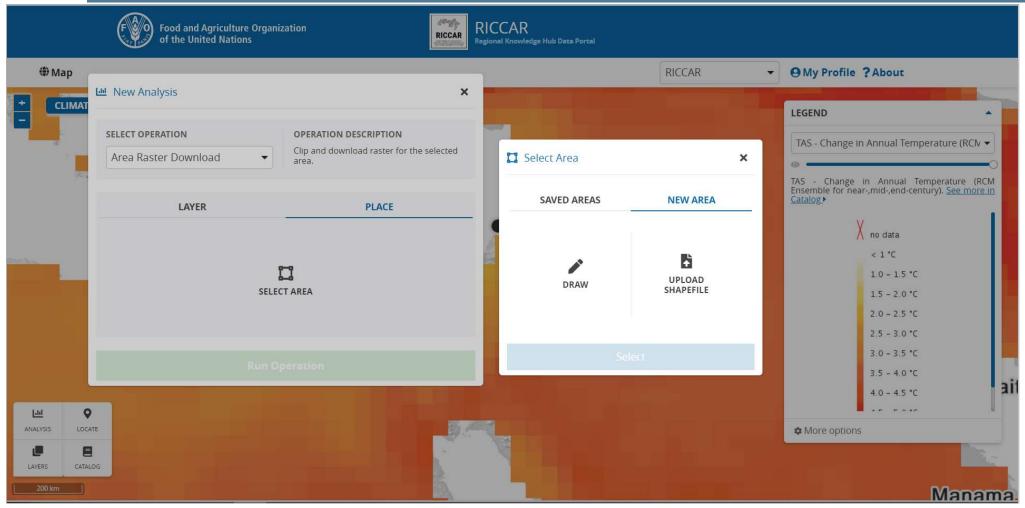


### **Area raster download**



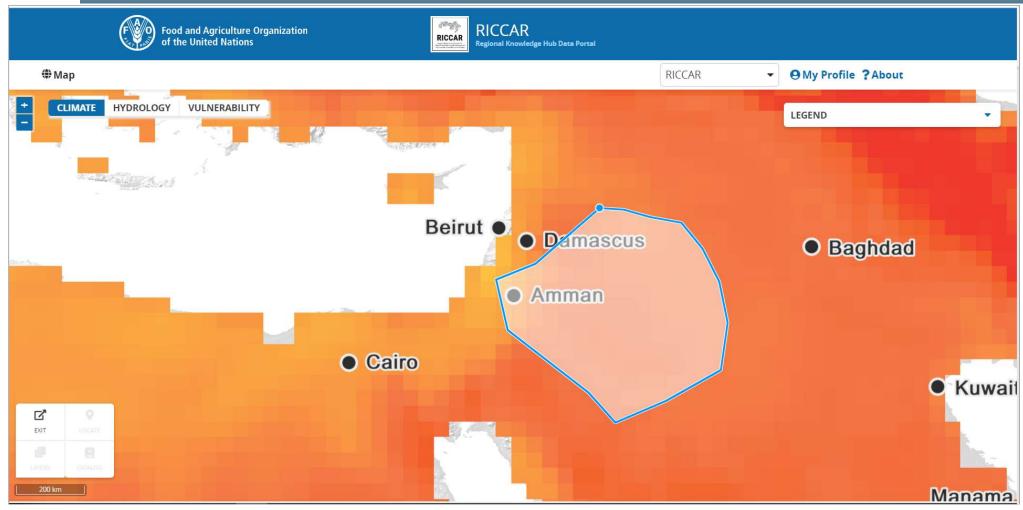


### Area raster download





### Area raster download





### **Available Climate Ensembles for Map Viewing**

### Climate parameters

- Precipitation
- Temperature
- Tmax
- Tmin

### Ensemble Mean from 3 models

- Reference period (1986-2005)
- Near-century (2016-2035)
- Mid-century (2046-2065)
- End-century (2081-2100)

# Extreme events indices (Temperature)

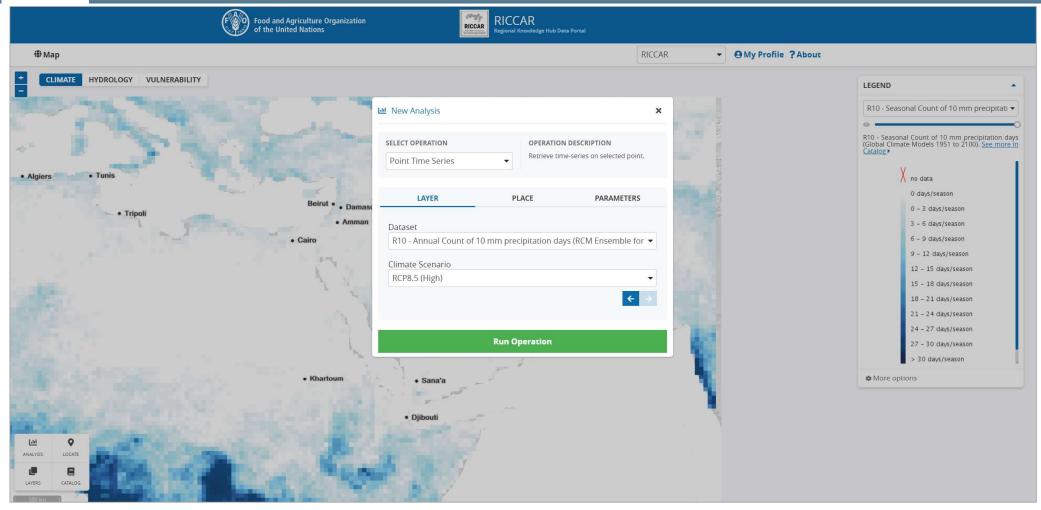
- Number of summer days (SU)
- Number of hot days (SU35)
- Number of very hot days (SU40)
- Number of tropical nights (TR)

# Extreme events indices (Precipitation)

- Maximum length of dry spell (CDD)
- Maximum length of wet spell (CWD)
- Annual count of 10 mm precipitation days (R10)
- Annual count of 20 mm precipitation days (R20)
- Simple precipitation intensity index)

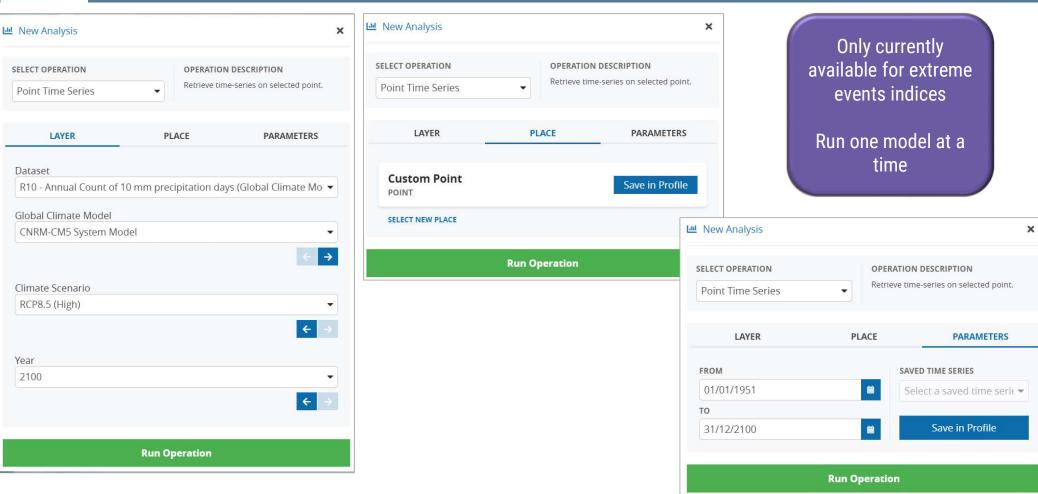


# Time series analysis



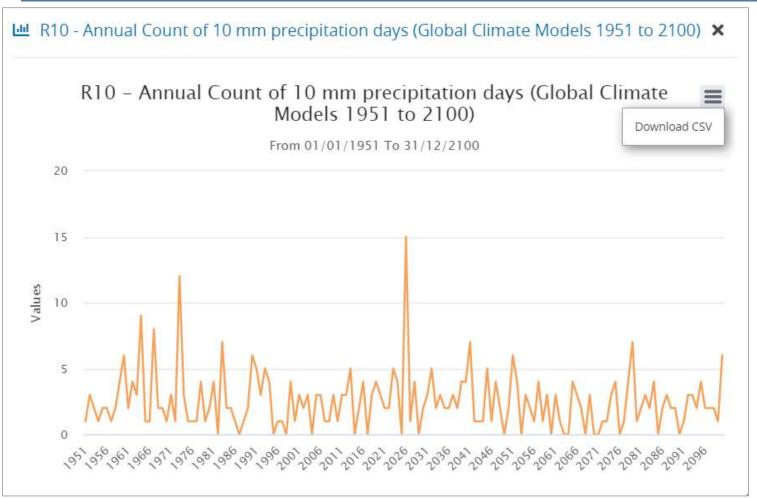


# Time series analysis (point)





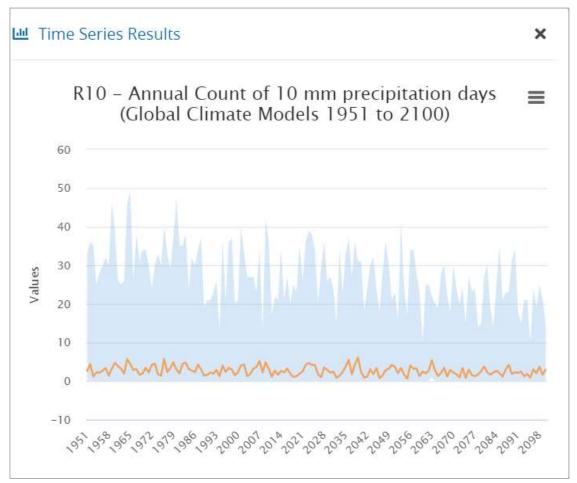
### Time series analysis (point)



Helpful for using as input into other models (hydrology, impact studies)



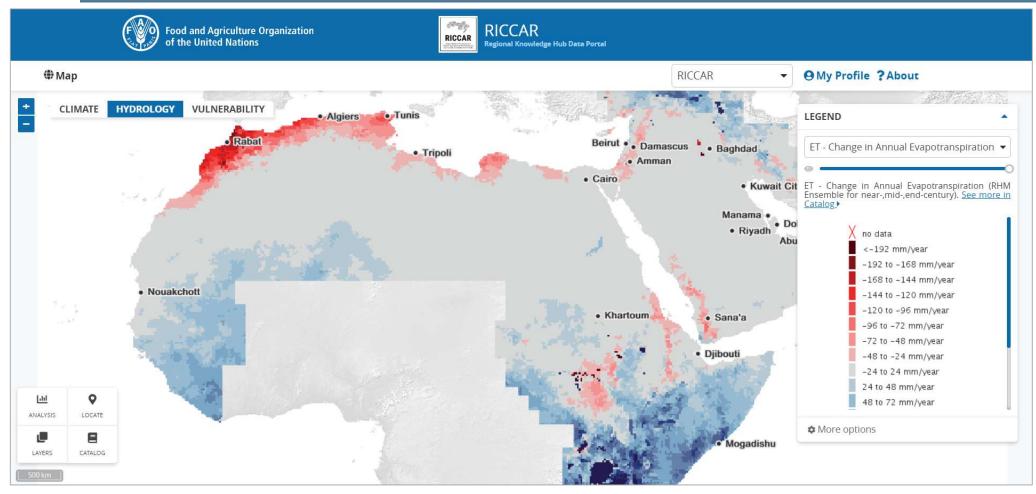
# Time series analysis (area)



Category	Average	Range (low)	Range (high)	
1951	2.623	0	33	
1952	4.397	0	36	
1953	1.185	0	35	
1954	2.252	0	25	
1955	2.219	0	28	
1956	2.682	0	30	
1957	3.351	0	32	
1958	1.437	0	30	
1959	3.212	0	46	
1960	4.715	0	39	
1961	3.861	0	26	
1962	3.238	0	25	
1963	1.934	0	26	
1964	5.682	0	46	
1965	4.47	0	49	
1966	2.808	0	26	
1967	3.139	0	38	
1968	1.629	0	31	
1969	2.02	0	34	
1970	3.411	0	34	
1971	2.291	0	30	
1972	4.219	0	24	
1973	4.45	0	30	
1974	1.788	0	33	
1975	1.397	0	30	
1976	5.702	0	40	
1977	2.344	0	33	
1978	3.318	0	29	
<b>)</b>	R10 - Ann	ual Count o	f 10 mm pre	

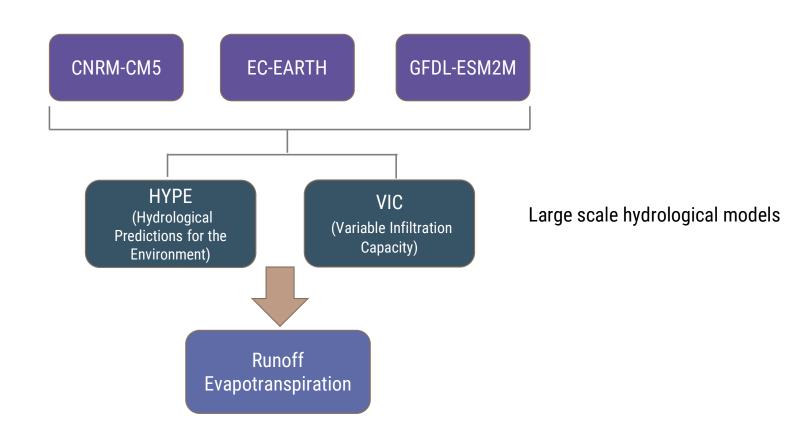


# **RKH: Regional Hydrological Modelling Outputs**



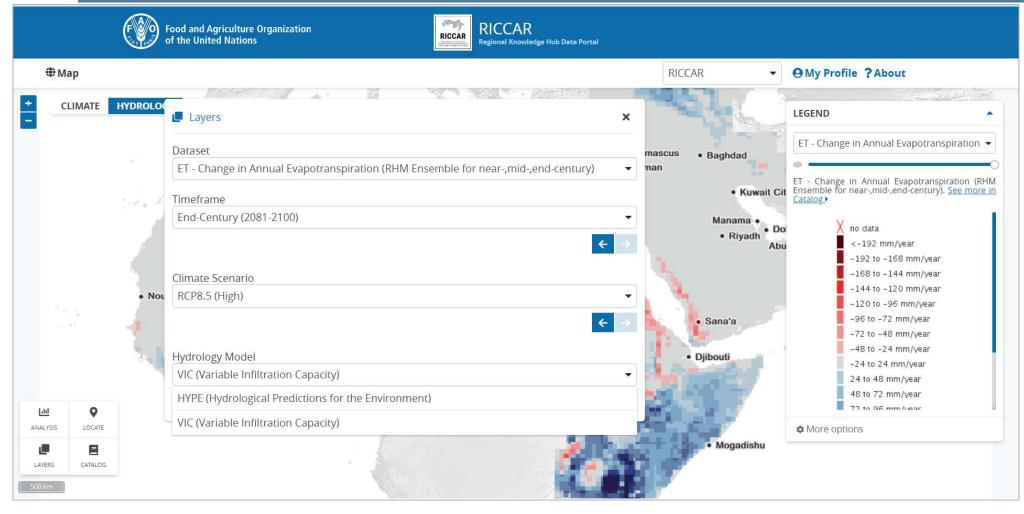


## **Regional Hydrological Modelling**



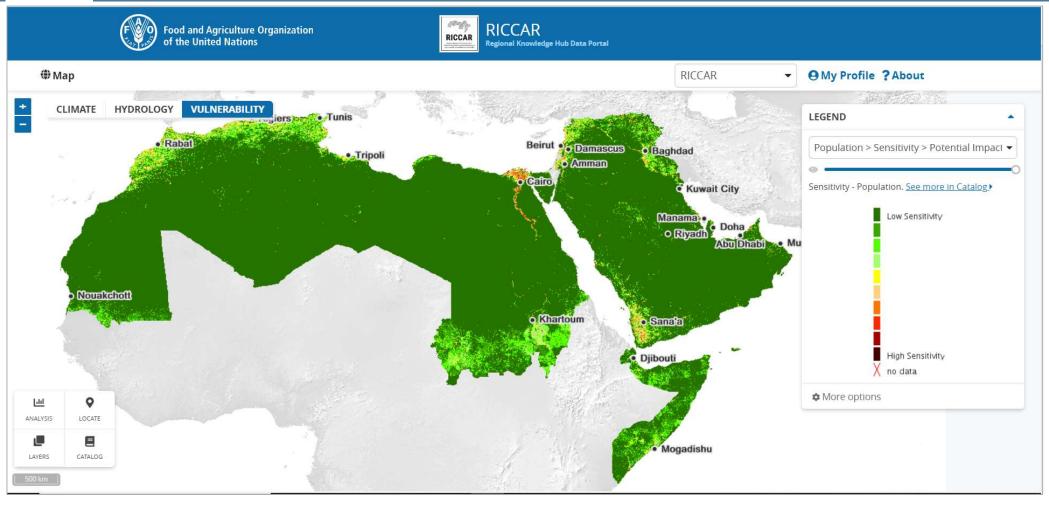


# **RKH: Hydrology**



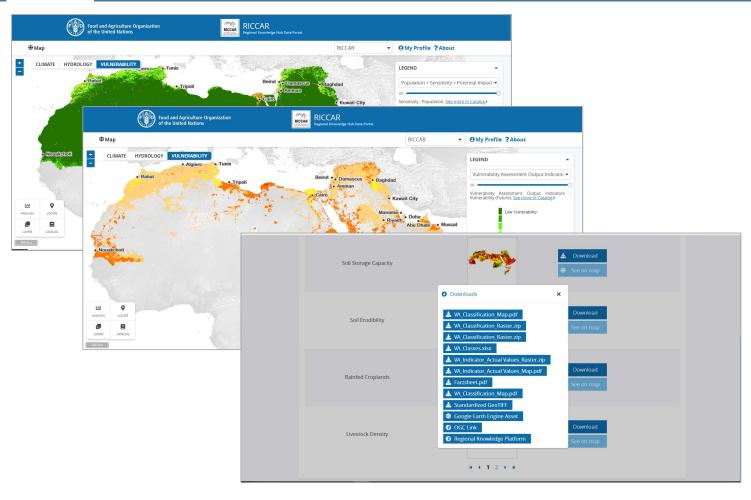


# **RKH: Vulnerability**





### **Available vulnerability data**

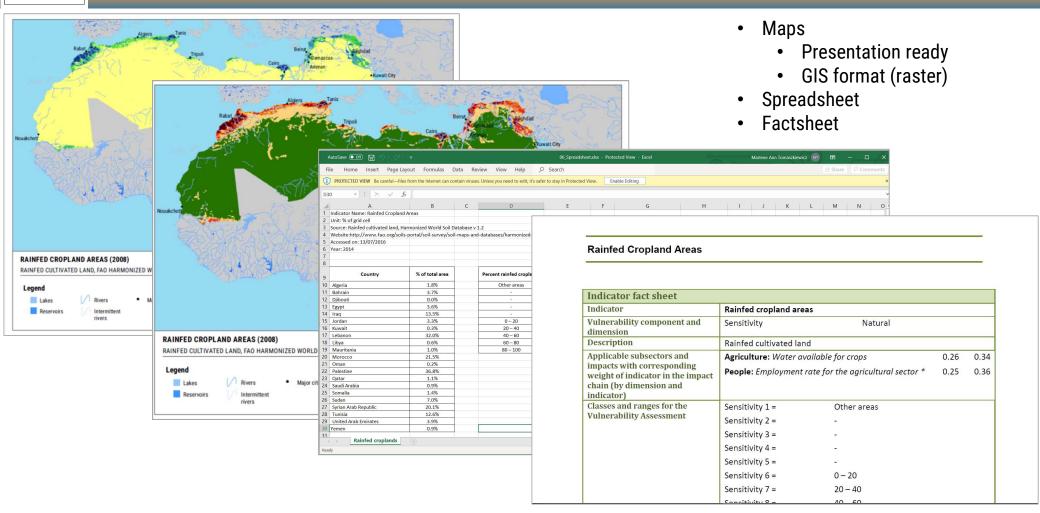


- Viewable map of Vulnerability
   Assessment indicators
- Viewable map of Vulnerability
   Assessment outputs

• Other data formats (from Data Catalog)



### Vulnerability data (from data catalog)





# **RKH Data Portal Demographics – Total users by month**

Month/Year	Iraq	Iran	Jordan	Lebanon	Palestine	Syria	Turkey
Sep-19	-	-	1	3	-	-	-
Oct-19	-	-	1	13	-	-	-
Nov-19	-	-	7	4	2	-	-
Dec-19	-	-	3	7	-	-	-
Jan-20	4	-	2	16	-	-	-
Feb-20	-	-	2	3	-	-	-
Mar-20	2	-	1	5	-	-	-
Apr-20	1	-	-	6	-	-	2
May-20	-	-	-	1	-	-	1
Jun-20	4	-	3	11	2	8	-
Jul-20	4	1	8	11	2	4	-
Aug-20	1	-	3	8	-	4	1
Sep-20	-	-	-	6	1	1	1
Oct-20	1	-	1	13	4	-	-
Nov-20	-	-	-	15	3	1	-



### **Request for tailored datasets**



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

#### **Policy Guidelines for Data Dissemination**

#### 1. Background

The Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) is a joint initiative of the United Nations and the League of Arab States launched in 2010. RICCAR is implemented under the auspices of the Arab Ministerial Water Council and further derives is mandate from resolutions adopted by the Council of Arab Ministers Responsible for the Environment, the Arab Permanent Committee for Meteorology and the ESCWA Ministerial Session. Additional information on RICCAR and is contributing partners is available at <a href="https://www.riccar.org">www.riccar.org</a>.

The RICCAR outputs and constituent databases are based on an integrated assessment methodology that includes:

- <u>Regional climate modelling (RCM)</u> outputs for the CORDEX-MENA Domain (Arab Domain), which is among the domains included in the Coordinated Regional Climate Downscaling Experiment (CORDEX) of the World Climate Research Programme.
- Regional hydrological modelling (RHM) outputs for the surface water basins in Arab States, including the land and water areas of surface water basins that are shared or transboundary in nature that include areas external to the Arab region.
- Integrated vulnerability assessment (VA) outputs for various sectors across the Arab region covering the 21 Arab States included in the MENA Domain.

The RICCAR assessment outputs are available in the <u>Arab Climate Change Assessment</u> Report: Main Report and its <u>Technical Annex</u>.

#### 2. Principles of data acquisition and access

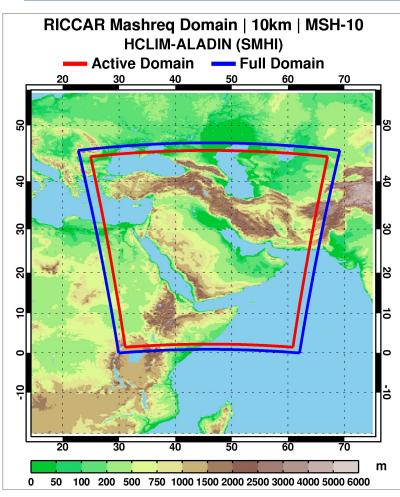
- 2.1. Users may request bias-corrected regional climate modeling (RCM) and regional hydrological modeling (RHM) outputs for the Arab Domain. Available RCM and RHM output variables are described in the RICCAR Technical Note <u>Regional Climate Modelling and Regional Hydrological Modelling Applications in the Arab Region prepared by SMHI.</u>
  - Temperature, precipitation, and hydrological outputs are available with daily frequency from 1950 to 2100 for RCP 4.5 and RCP 8.5 at the scale of 50x50 km. Extreme climate indices are available both annually and seasonally for the same period.
  - RCM and RHM ensembles for the reference period, near-century, mid-century, and end-century are available for RCP 4.5 and RCP 8.5 at the scale of 50x50 km.
- 2.2. Users may also request socio-economic geospatial data used for the integrated vulnerability assessment (VA), described in the RICCAR Technical Note <u>Integrated Vulnerability Assessment: Arab Regional Application</u> prepared by UN-ESCWA, ACSAD and GIZ

Data policy guidelines and request form available from <a href="https://www.riccar.org">www.riccar.org</a> – Knowledge Resources

- ✓ Other extreme events indices
- ✓ Extracted RCM outputs to specific area of study
- ✓ Ensembles for other data periods
- ✓ Daily or monthly hydrological modelling outputs



### **Coming soon: Mashreq Domain**



- Six GCMs (2 completed: CNRM-ESM2 and EC-EARTH)
- SSP5-8.5 Scenario (based on CMIP6)
  - Shared Socioeconomic Pathways (SSPs) with RCPs
  - SSP5 assumes an energy intensive, fossil-based economy

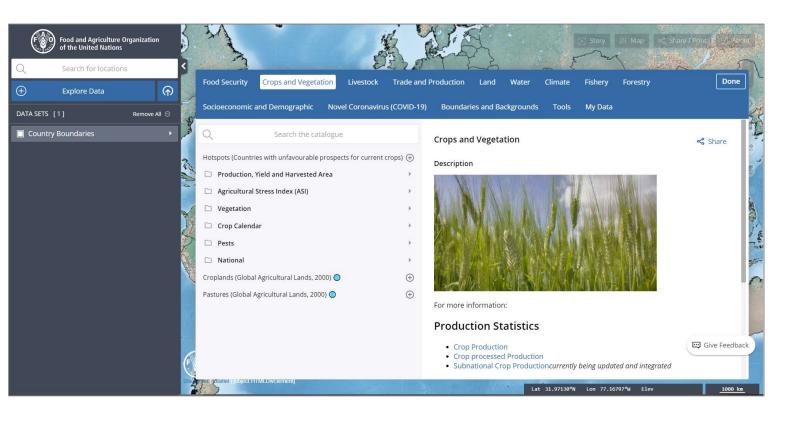
Historical period: 1961-2014

Scenarios: 2015-2070

Variable name	Variable long name	
tas	Near-surface air temperature	7
tasmax	Daily maximum near-surface air temperature	Diag corrects
tasmin	Daily minimum near-surface air temperature	→ Bias-correcte
pr	Precipitation	
ps	Surface air pressure	
hurs	Near-surface relative humidity	
sfcWind	Near-surface wind speed	
sfcWindmax	Daily maximum near-surface wind speed	
sund	Duration of sunshine	Note that uncorrected
rsds	Surface downwelling shortwave radiation	outputs (like the ones
evspsbl	Evaporation	listed for the Mashreg
snw	Surface snow amount	
uas	Eastward near-surface wind	domain) are available
vas	Northward near-surface wind	from the ESGF for the
wsgsmax	Daily maximum near-surface wind gust	entire Arab domain
snd	Snow depth	entire Arab domain



### **Coming soon: Migrate to Hand-in-Hand Platform**



- Latest generation geospatial platform
- Easier site navigation
- Compare RICCAR data to other geospatial datasets



# Thank you

www.riccar.org tomaszkiewiczm@un.org