

## Adaptation to Climate Change in the Water Sector in the MENA Region

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) programme entitled "Adaptation to Climate Change in the Water Sector in the MENA Region (ACCWaM)" is implemented in partnership with the League of Arab States, ACSAD and ESCWA with funding provided by the Federal Ministry for Economic Cooperation and Development of Germany (BMZ). Under this programme, GIZ is supporting RICCAR in the development of the:

- Regional knowledge hub
- Vulnerability assessment component of the integrated assessment
- Integrated assessment mapping tool for identifying and illustrating vulnerability hotspots

Two working groups were established at the fourth RICCAR Expert Group Meeting held in July 2012 to support the implementation of these activities. The working groups are financially and technically supported by GIZ through an implementation agreement with ESCWA and a contract with adelphi consult GmbH.

### Regional Knowledge Hub Working Group

The RKN-WG is tasked with preparing the terms of reference of the regional knowledge hub and defining the selection criteria for identifying a host institution. The working group is comprised of 10 experts representing:

- Arab Governments: Lebanon, Palestine, Yemen
- UN organizations: ESCWA (Secretary), UNISDR, United Nations University Institute for Water, Environment and Health (UNU-INWEH)
- LAS organizations and Arab research centres: ACSAD, Centre for Environment and Development for the Arab Region and Europe (CEDARE), League of Arab States
- Global expert institution: GIZ

### Vulnerability Assessment Working Group

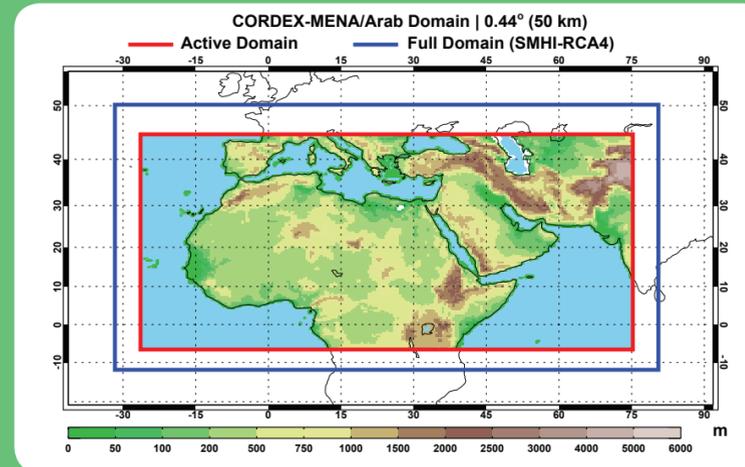
The VA-WG is tasked to support the development and preparation of the vulnerability assessment component of the RICCAR integrated assessment. The working group is comprised of 15 experts representing:

- Arab Governments: Egypt (Vice-Chair), Libya, Palestine, Tunisia
- UN organizations: ESCWA (Secretary), UNEP/ROWA (Chair), UNESCO/Cairo Office, World Health Organization
- LAS organizations and Arab research centres: ACSAD, the American University of Beirut (AUB)/AWARENET, Arabian Gulf University (AGU), and the League of Arab States
- Global and regional expert institutions: GIZ, International Center for Biosaline Agriculture (ICBA), University of Alexandria

Adelphi consult serves as an *ex officio* advisor to the working group.

## \* Establishing an Arab Domain under CORDEX

The Coordinated Regional Climate Downscaling Experiment (CORDEX) is a World Climate Research Program (WCRP) initiative that supports research and exchange on regional climate modelling based on a common and unified set of protocols. The establishment of a MENA/Arab Domain under CORDEX alongside other regional domains allows researchers to pursue regional climate modelling based on a uniform set of limiting boundary conditions and a common set of assumptions that allows for inter-comparison and exchange on climate change projections conducted at the Arab regional level. This effort was led by SMHI in consultation with other RICCAR partners.



For more information, see:  
<http://wcrp-cordex.ipsl.jussieu.fr/index.php/community/domain-mena-cordex>



The Arab Integrated Water Resources Management Network (AWARENET) Working Group on Climate Change is comprised of climate and water experts. AWARENET members are providing technical expertise to support the impact assessment and vulnerability assessment components of the regional initiative.



## RICCAR Partners



## Contributing Research Institutes

- Climate Service Center (CSC) – Germany
- King Abdulaziz University Center of Excellence for Climate Change Research (CECCR) – Saudi Arabia
- King Abdullah University of Science and Technology (KAUST) – Saudi Arabia

## Donors



The Regional Initiative is coordinated by ESCWA.

For more information, visit the RICCAR website: [www.escwa.un.org/RICCAR](http://www.escwa.un.org/RICCAR)



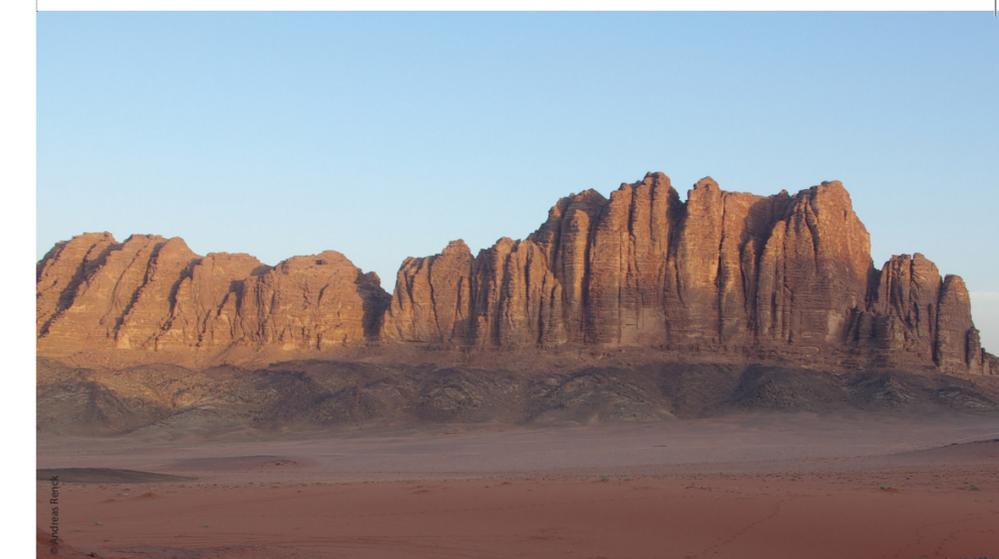
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# Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR)



ESCWA

United Nations Economic and Social Commission for Western Asia

## Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR)



**RICCAR** is a collaborative regional initiative that assesses the impact of climate change on freshwater resources in the Arab Region through a consultative and integrated assessment to identify the socio-economic and environmental vulnerability caused by climate change impacts on water resources in the Arab Region.

### Mandate

Arab Governments called for the preparation of the assessment through various declarations and resolutions upon which United Nations-League of Arab States (UN-LAS) coordination is based.

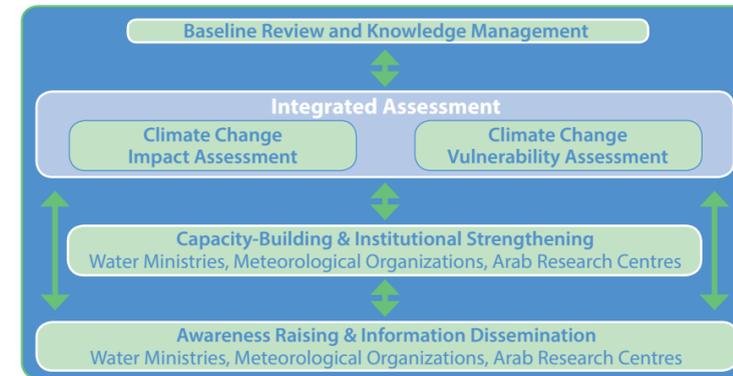
<b>Council of Arab Ministers Responsible for the Environment (CAMRE)</b>	Issued the Arab Declaration on Climate Change calling for the development and dissemination of climate change assessment methodologies and increased understanding of climate change impacts (Cairo, December 2007)
<b>ESCWA 25th Ministerial Session Resolution on Climate Change</b>	Called for the preparation of an assessment of socio-economic vulnerability caused by climate change impacts on water resources (Sana'a, May 2008)
<b>Arab Summit for Economic and Social Development</b>	Accepted the preparation of a project to assess climate change impacts on the region (Kuwait, January 2009)
<b>UN-LAS 9<sup>th</sup> Sectoral Meeting on Climate Change</b>	Called for UN-LAS joint action on the preparation of vulnerability studies that should include the socio-economic climate change impacts related to water, land, drought, desertification, biodiversity, health and agriculture (Cairo, June 2009)
<b>Arab Ministerial Water Council (AMWC)</b>	Approved the project brief submitted by ACSAD based on the Regional Initiative as an IWRM project in support of the Arab Water Security Strategy (Cairo, July 2010)
<b>Regional Coordination Mechanism (RCM)</b>	RICCAR established as a joint interagency initiative by the RCM Thematic Working Group on Climate Change as chaired by UNEP/ROWA (Beirut, November 2010)
<b>RICCAR Experts Group Meetings</b>	Annual Expert Group Meetings convened at the intergovernmental and interagency levels to coordinate implementation and discuss outcomes (EGM 1: October 2009; EGM 2: November 2010; EGM 3: July 2011; EGM 4: July 2012; EGM 5: December 2013)

### Objectives

- To assess the impact of climate change on freshwater resources through an integrated regional initiative that seeks to identify socio-economic and environmental vulnerability caused by the impact of climate change on water resources based on regional specificities.

The outcomes of the assessment aim to provide a common platform for addressing and responding to climate change impacts on freshwater resources in the Arab Region by serving as the basis for dialogue, priority setting and policy formulation on climate change adaptation at the regional and national levels.

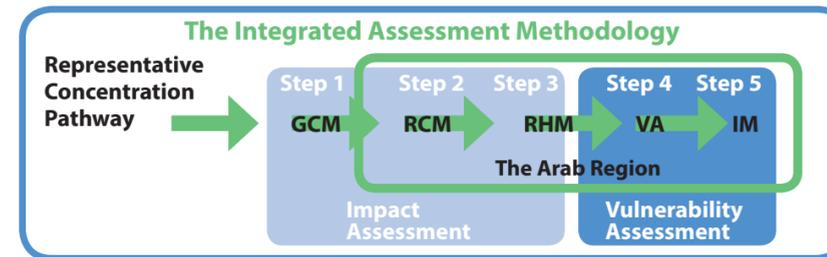
#### RICCAR Implementation Pillars



### Integrated Assessment Methodology

The methodology combines climate change impact assessment and vulnerability assessment tools. The five stages of analysis include:

- Selecting Representative Concentration Pathways (RCPs) and reviewing available Global Climate Models (GCMs) and climate data.
- Implementing an ensemble of Regional Climate Models (RCMs) over an Arab Domain for the dynamic downscaling climate projections.
- Interfacing Regional Hydrological Models (RHM) with RCM outputs to analyse climate change impacts on water resources.
- Conducting a socio-economic and environmental Vulnerability Assessment (VA) based on impact assessment findings.
- Presenting an Integrated Mapping (IM) display of the findings to facilitate regional policy analysis and dialogue.



### Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region

Within the framework of RICCAR, the Swedish International Development Cooperation Agency (SIDA) funds a project of the same name. Launched in December 2010, the project implements the following activities:

- Delineation of the Arab Domain for regional climate modelling based on regional sensitivity analysis.
- Generation of an ensemble of regional climate projections by the RICCAR partners and contributing research institutes based on a common domain, the same representative concentration pathways (RCPs) and uniform modelling protocols.
- Generation of 9 regional climate projections at the 50 km x 50 km and 25 km x 25 km scales.
- Analysis of climate change impacts on water resources and generation of hydrological impact scenarios based on the regional climate modelling projections.
- Regional capacity-building workshops for Arab water ministries, meteorological offices and interested stakeholders.
- National workshops and country-level technical assistance.
- Regional expert group meetings.
- High-level meetings and reporting to Arab ministerial and advisory councils.
- Support for the establishment of a regional knowledge hub.
- Dissemination of information on RICCAR methodology, findings and implementation modalities.

### Understanding Extreme Events

The SIDA-supported project includes the analysis of extreme weather events as a core component of the integrated assessment and associated capacity-building activities. This includes training on climate change prediction, projection and extreme events indicators. The establishment and updating of national disaster losses databases is also being pursued as well as basin-level case studies to support extreme events analysis.

### Project Partners

The project is an integral part of RICCAR and is implemented by the following partner organizations:

- League of Arab States (LAS)
- Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD)
- Swedish Meteorological and Hydrological Institute (SMHI)
- United Nations Economic and Social Commission for Western Asia (ESCWA) – project coordinator
- United Nations Office for Disaster Risk Reduction (UNISDR)
- World Meteorological Organization (WMO)

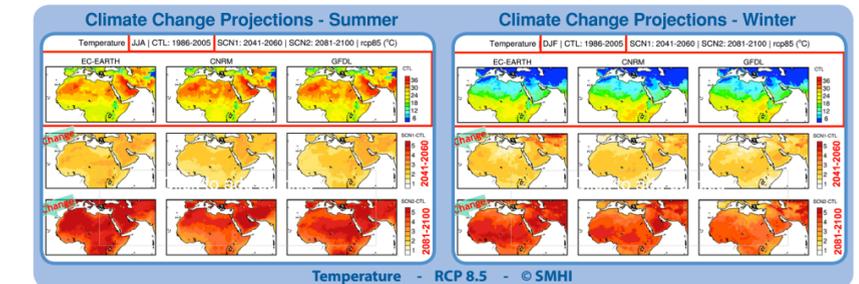
Funding for this four-year project is provided by SIDA and through in-kind contributions by the project partners.

### RICCAR Outputs

RICCAR will achieve the following:

- Establish** an Arab Regional Knowledge Hub on climate and water.
- Delineate** an Arab Domain for regional climate modelling in accordance with CORDEX protocols.\*
- Complete** an ensemble of regional climate projections for the Arab Region based on a common regional domain and the same representative concentration pathways (RCP 4.5 and RCP 8.5).
- Conduct** detailed analysis of climate change impacts on water resources based on regional climate and hydrological modelling tools.
- Incorporate** extreme weather events analysis in the climate change impact assessment and vulnerability assessment.
- Identify** vulnerability hotspots.
- Increase** the capacity of Arab water ministries and meteorological institutions to engage in climate prediction and climate change projection.
- Provide** a common and comparable scientific understanding of climate change impacts and associated vulnerabilities across the Arab Region.
- Inform** policy dialogue, negotiations and exchange among Arab decision-makers.

These outputs are achieved through projects and activities implemented by the RICCAR partners.



### Linking Assessment to Adaptation and Mitigation

RICCAR is informing other efforts aimed at improving regional capacity for climate change adaptation and mitigation. These include the following:

- Arab Strategy for Water Security in the Arab Region to Meet the Challenges and Future Needs for Sustainable Development 2010-2030 adopted by the Arab Ministerial Water Council;
- United Nations Development Account project "Developing the Capacities of the Arab Countries for Climate Change Adaptation by Applying Integrated Water Resources Management Tools" that is preparing a climate change adaptation manual drawing upon the RICCAR findings (Partners: ACSAD, ACWUA, GIZ, ESCWA, UNEP/ROWA, WHO);
- FAO Water Scarcity Initiative that focuses on examining water use and availability in the agricultural sector in light of different pressures, including climate change.

RICCAR is also informing regional analysis and dialogue on the water-energy-food nexus and the sustainable development goals, which reveal the importance of pursuing integrated natural resources management when developing appropriate adaptation and mitigation strategies in the Arab Region.