Vulnerability of Water Available for Crops

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The water availability study area represents 22% of the Arab Region and is defined by:

- rainfed cropland Area, and
- irrigated cropland areas
Impact chain of Water Available for Crops

CHANGE IN THE WATER AVAILABLE FOR CROPS – IMPACT CHAIN

EXPOSURE (0.50)

- RCM
  - Change in temperature (0.17)
  - Change in precipitation (0.17)
- RHM
  - Change in runoff (0.17)
  - Change in evapotranspiration (0.17)
- EXTREME CLIMATE INDICES
  - Change in number of days > 35 °C (0.16)
  - Change in maximum length of dry spell (0.14)

SENSITIVITY (0.50)

- POPULATION (0.50)
  - Population density (0.12)
  - Share of agricultural labor force in total labor (0.12)
  - Total renewable water available per capita (0.13)
  - Share of water consumption in agriculture (0.50)
  - Share of agriculture in GDP (0.13)
- NATURAL (0.26)
  - Soil storage capacity (0.34)
  - Degradation of vegetation cover (0.32)
  - Rainfed areas (0.34)
- MAINMADE (0.14)
  - Flood prone areas (0.46)
  - Irrigated areas (0.54)

ADAPTIVE CAPACITY (0.50)

- POTENTIAL IMPACT (0.56)
- VULNERABILITY ASSESSMENT (0.56)
- KNOWLEDGE & AWARENESS (0.11)
  - E-Government development (0.34)
  - Tertiary enrollment (0.33)
  - Adult literacy rate (0.33)
- TECHNOLOGY (0.11)
  - Number of scientific and technical journal articles (0.45)
  - Information and communication technologies index (0.55)
- INSTITUTIONS (0.10)
  - Governance index (0.53)
  - Disaster risk reduction committees (0.47)
- INFRASTRUCTURE (0.56)
  - WATER & SANITATION (0.56)
    - Areas served by dams (0.17)
    - Installed desalination capacity per capita (0.17)
    - Fossil groundwater (0.17)
    - Access to improved water (0.17)
    - Access to improved sanitation (0.16)
    - Area equipped for irrigation (0.16)
  - ENVIRONMENT (0.17)
    - Environment performance index (1.0)
  - ENERGY (0.17)
    - Access to electricity (0.50)
    - Energy consumption (0.50)
  - TRANSPORT (0.16)
    - Density of road network (1.0)
- ECONOMIC RESOURCES (0.10)
  - GDP per capita (0.35)
  - ODA (0.28)
  - Food imports as % of merchandise exports (0.37)
- EQUITY (0.08)
  - Female-to-male literacy ratio (0.52)
  - Migrants/refugees index (0.48)

6 Exposure indicators

10 Sensitivity indicators

20 Adaptive Capacity indicators
### Exposure

The exposure analysis focuses on the percentage of the study area under different climate scenarios and RCPs.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Low EX</th>
<th>Moderate EX</th>
<th>High EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP 4.5 Mid-century</td>
<td>7%</td>
<td>86%</td>
<td>7%</td>
</tr>
<tr>
<td>RCP 8.5 Mid-century</td>
<td>1%</td>
<td>67%</td>
<td>32%</td>
</tr>
<tr>
<td>RCP 4.5 End-century</td>
<td>6%</td>
<td>68%</td>
<td>26%</td>
</tr>
<tr>
<td>RCP 8.5 End-century</td>
<td>1%</td>
<td>35%</td>
<td>64%</td>
</tr>
<tr>
<td>Scenario</td>
<td>Percentage of study area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>All climate scenarios</td>
<td>28% 66% 7%</td>
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</tbody>
</table>
### Potential Impacts

#### Areas with highest potential impact:
- The lower Nile River valley
- The eastern ME cost

#### Areas with lowest potential impact:
- Tigris-Euphrates Basin

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<th>Percentage of study area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low PI</td>
</tr>
<tr>
<td>RCP 4.5 Mid-century</td>
<td>3%</td>
</tr>
<tr>
<td>RCP 8.5 Mid-century</td>
<td>0%</td>
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<tr>
<td>RCP 4.5 End-century</td>
<td>2%</td>
</tr>
<tr>
<td>RCP 8.5 End-century</td>
<td>0%</td>
</tr>
</tbody>
</table>
### Areas with lowest adaptive capacity:

- the Horn of Africa
- The southern of Sudan,
- The southern of Mauretania and
- the southwestern Arabian Peninsula.

### Scenario vs. Percentage of study area

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Low AC</th>
<th>Moderate AC</th>
<th>High AC</th>
</tr>
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<tbody>
<tr>
<td>All climate scenarios</td>
<td>28%</td>
<td>66%</td>
<td>7%</td>
</tr>
</tbody>
</table>
Areas with highest vulnerability:
- the upper Nile Valley,
- the southwestern Arabian Peninsula, and

Areas with lowest vulnerability:
- the Mediterranean coast of the Maghreb,
- parts of the Levant, the Tigris-Euphrates Basin, and the central eastern Arabian Desert.
Vulnerability hotspots:

- sub-Saharan Africa,
- the Horn of Africa, and
- the southwestern Arabian Peninsula

Legend:
- Lakes
- Reservoirs
- Rivers
- Intermittent rivers
- Major cities
- Area not relevant to sector

AGRICULTURE: WATER AVAILABLE FOR CROPS
VULNERABILITY HOTSPOTS: RCP8.5 END-CENTURY (2081-2100)
Thank you