Overview of the sectors covered by the vulnerability assessment in the Arab Region

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Integrated Vulnerability Assessment Methodology

Under Pillar 2 of RICCAR, a methodology for conducting an integrated assessment of vulnerability to climate change in the Arab region was developed, supported by the (GIZ) through its regional project, “Adaptation to climate change in the water sector in the MENA region” (ACCWaM).

Involving:
ESCWA, ACSAD, GIZ, EURAC, Adelphi,
Vulnerability is the Key?

Vulnerability is the function of:

1. The character, magnitude, rate of climate change variation to which system is exposed
2. Its sensitivity and
3. Its adaptation capacity
The VA three keys:

- **Exposure**: What is the risk from Climate change

- **Sensitivity**: The degree to which a system is affected
  - **Directly**: For instance: reduction of crop yields
  - **Indirectly**: For instance: damages made by floods caused by sea level for example

- **Adaptive Capacity**: The ability of a system to moderate potential damage
The methodology focuses particularly on assessing vulnerability towards water-related climate change impacts in the Arab region, such as decreasing water availability and precipitation, flooding due to shifting rainfall patterns and extreme weather events.

In this way, the vulnerability assessment methodology links climate change impact assessment to socio-economic vulnerability assessment.

It integrates the outputs of Regional Climate Models (RCMs), Regional Hydrological Models (RHMs) and other available spatial and statistical data from regional and international organisations and combines them in an integrated map.
Shadow on the Methodology Development Process

VA -WG: 15 members: 3 meetings
VA Task Force: some 10 members and 4 meetigs

Meetings and discussions for:

• Vulnerability concept,
• Identification of objectives and key sectors/topics
• climate change impacts the vulnerability assessment focuses on
• Validation of selected climate change impacts, identification and
• Discussion of key indicators for assessing vulnerability in the
different sectors, discussion of possible data sources
• Finalisation of the list of indicators, approval of the aggregation
• methodology and exercise on indicator evaluation
Sectors and potential climate change impacts

Five main sectors covered by the VA

Vulnerability is assessed within the framework of a specific climate change impact affecting a clearly determined geographic and/or sectoral reference point.
### Overview of the sectors covered by the vulnerability assessment in the Arab Region

**What is of concern? Sector/Impacts**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td>Change in water availability</td>
</tr>
<tr>
<td><strong>Biodiversity &amp; Ecosystems</strong></td>
<td>Change in area covered by forests&lt;br&gt;Change in area covered by wetlands</td>
</tr>
<tr>
<td><strong>Agriculture</strong></td>
<td>Change in water available for agricultural production (crops)&lt;br&gt;Change of rangeland area for livestock</td>
</tr>
<tr>
<td><strong>Infrastructure &amp; Settlements</strong></td>
<td>Damage from inland flooding&lt;br&gt;Damage from coastal flooding</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td>Change of water available for drinking&lt;br&gt;Change in health due to heat stress&lt;br&gt;Change of employment rate in the agricultural sector</td>
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</tbody>
</table>
Water availability:

It plays a central role in the vulnerability assessment.

It is understood as a cross-cutting issue as it directly affects the sector’s agriculture, biodiversity and ecosystems, infrastructure and human settlements, and human beings.

The VA-WG decided to integrate the water sector into the vulnerability assessment of the Arab region, focusing on the potential impact of:

*Change in water availability*
The agricultural sector

The agricultural sector in the arid to semi-arid Arab countries is highly dependent on surface and groundwater resources for the production of crops, whether rain-fed or irrigated.

In the livestock sector, water plays a major role in the provision of pasture and rangeland for cattle and small ruminants.

It focuses on the potential impacts of:
- Change in water availability for crops
- Change in rangeland/pasture area
Ecosystems and biodiversity

Water is crucial in sustaining ecosystem functions.

In the VA, wetlands and forests are key focus, as they are particularly sensitive to climate-induced changes in water availability.

Particular focus is laid on climate change induced:
• Change in forest cover
• Change in wetland area
Infrastructure and Human Settlements:

As climate change may also increase the risk of extreme events such as flooding, infrastructures and human settlements are another sector the vulnerability assessment takes into consideration. Aside from inland flooding, the risk of coastal flooding is included in the assessment.

Two key climate change impacts into the integrated VA:

- Coastal flooding due to sea level rise
- Inland flooding due to extreme events
Human Beings:
Climate change impacts on water affect human beings directly - in terms of the availability of drinking water - as well as indirectly, e.g. as production losses in the agricultural sector lead to higher unemployment in rural populations.

Three key climate change impacts on human beings by the VA-WG:

- Change in availability of drinking water
- Change in employment rate in the agricultural sector
- Change in the state of health due to heat stress
How the VA can help decision makers and research institutes, etc..

The integrated vulnerability assessment of the Arab region is designed to:

1. Support the identification of climate change vulnerability hotspots;
2. Foster the mainstreaming of climate change issues into sectoral planning as well as regional and national policy integration;
3. Improve policy-making and provide a planning tool;
4. Contribute to global climate change adaptation and advocacy in the Arab Region;
5. Provide capacity-building to responsible institutions; and
6. Raise awareness of intermediate groups.
Aim and Structure of the Training Manual

Based on the work of the VA-WG, the manual:

1. Provides practical step-by-step guidance to assess the vulnerability of the Arab region to climate change.

2. Helps to identify areas which are most susceptible to climate change.

3. Provides practical guidance on how to implement the integrated vulnerability assessment methodology under RICCAR using GIS software.
The manual is structured into four main parts:

**Part I** outlines the vulnerability assessment approach including the underlying understanding of vulnerability as well as the thematic, spatial and temporal scope of the assessment.

**Part II** provides practical guidance on how to implement the assessment methodology using **GIS** including examples from the test application of the integrated vulnerability assessment methodology for the Arab region.

**Part III** provides - as a supplement - a brief introduction to remote sensing image classification.
Annex Integrated Vulnerability Assessment

Annex I - List of Indicators

Annex II - Indicators by Sector and Impact

Annex III - Indicator Factsheets

Annex IV - Test Application of the Integrated Vulnerability Assessment Methodology
Testing and refining the IVAM
Annex IV – Test Application of the Integrated Vulnerability Assessment Methodology

The IVAM was applied to a section of the Arab region comprising Tunisia.

The country was chosen for the test application since it represents very well different landscapes and habitats (plains, mountainous areas, coastal areas, forests, wetlands) and relevant sectors (in particular agriculture) existing throughout the Arab region.

For the test application, the vulnerability assessment focused on the climate change impact “change in water availability for agriculture/crops”.

Main reasons to selecting this sector:
1. Strong relation between water availability and agricultural production throughout the Arab region.
2. The agricultural sector has a high economic importance in almost all of the Arab countries.
A call for Decision makers to think with us!

1. Engaging stakeholders of different sectors
2. Enhancing scientific understanding
3. Designing CC adaptation strategy of formulating related projects and assure policy support

Resources?

- Human resource: staff and expertise
- Financial resources: Money!

How much time we still have before it is too late?
Thank you for your attention