Review of the vulnerability assessment indicators related to adaptive capacity

Carol Chouchani Cherfane
Chief, Water Resources Section
Sustainable Development Policies Division
United Nations Economic and Social Commission for Western Asia
Beirut, Lebanon
Adaptive Capacity: Definition

- Exposure and Sensitivity (population, natural, man-made) determine the Potential Impacts of climate change without considering ability of people to act.

Adaptive capacity is “the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behavior and in resources and technologies” - IPCC (2007)

- Adaptive capacity considers the socio-economic, cultural, institutional & technological determinants that characterize the ability to adapt, including ability:
  - To moderate potential damages,
  - To take advantage of opportunities, and/or
  - To cope with the consequences

- Adaptation is a response strategy to climate change, involving the measures taken to reduce the vulnerability of communities, regions, or sectors to climate change.
  - Adaptation refers to the processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with the changing climate (Smit, Pilifosova 2001).
Adaptive Capacity in RICCAR VA

Adaptive capacity consists of 4 dimensions, with 6 sub-determinants:

1. **Awareness**
   - Knowledge and awareness demonstrates ability of community to access and understand information to enable the identification of adaptation measures

2. **Ability**
   - Technology and infrastructure characterizes access to built environment that can support ability of a given society to act.

3. **Action**
   - Economic resources and institutions characterize the enabling environment that allows a society to carry out adaptation measures

4. **Equity**
   - Considers vulnerable groups, including gender, socio-economic status and marginalized groups and transversal dimension
Adaptive Capacity: Dimensions and Determinants

- Awareness
  - Knowledge and Awareness
- Ability
- Infrastructure
- Institutions
- Action
- Economic Resources
- Equity
- Vulnerable Groups
Objective is to develop an **adaptive capacity index** based on a selection of available indicators.

- **Generic indicators** characterize socio-economic determinants (e.g., income, education, health) because they *enable adaptation across localities* and countries irrespective of their location and climate impacts.

- **Specific indicators** are those that characterize the ability to *respond to a particular climate change impact*, such as floods or droughts (see: IPCC (2007)).

Selection of indicators based on the **principle of parsimony**, i.e., that ‘less is more’ to not make the index unwieldy.

- **Balance** thus sought between the dimensions and 6 determinants, to ensure AC Index is representative of all the necessary aspects to consider.

- **Data quality** assessed based on extensive review of available data sources and data sets, with due consideration to ensuring maximum country coverage (Arab States); overcoming data gaps; using national data, and open source data.

- **Composite indicators** sometimes used to combine proxies with different data gaps to effectively represent a dimension without adding too many indicators.

- **National level data** dominates most datasets, which affects their geospatial representation for the VA. Per capita geospatial distribution possible.
1. Knowledge and Awareness

Main Proposed Indicators

- Public spending on education, total (% of government expenditure)
- Expenditure per student, primary/secondary/tertiary (% of GDP/per capita)
- Graduates from Tertiary Education
- E-Governance Readiness Index
- Knowledge Society Index
- Youth literacy rate, population 15-24 years, both sexes
- Adult literacy rate, population 15+ years, both sexes
- Public awareness about Water Scarcity/Climate change
- Farmers served by extension services

Proposed Indicators

- Adult literacy rate, population 15+ years, both sexes (UNESCO Institute of Statistics)
- Graduates from Tertiary Education (UNESCO Institute of Statistics)
- E-Government Readiness Index (UN Public Administration Country Studies)
# 2. Technology

<table>
<thead>
<tr>
<th>Main Discussed Indicators</th>
<th>Proposed Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and development expenditure (% of GDP/ per capita)</td>
<td>✓ Scientific and technical journal articles (in Thomson Reuters, Social Science Citation Index; and other sources)</td>
</tr>
<tr>
<td>Knowledge Economy Index</td>
<td>✓ Telecommunication Infrastructure Composite based on International Communication Union:</td>
</tr>
<tr>
<td>- Innovation sub-index</td>
<td>- Fixed-mobile telephone subscriptions per 100 inhabitants (ITU)</td>
</tr>
<tr>
<td>- Information and Communication Technology sub-index</td>
<td>- Households with a Computer (ITU)</td>
</tr>
<tr>
<td>Scientific and technical journal articles</td>
<td>- Individuals using the internet (ITU)</td>
</tr>
<tr>
<td>Fixed-mobile telephone subscriptions per 100 inhabitants</td>
<td>- Mobile-cellular subscriptions per 100 inhabitants (ITU)</td>
</tr>
<tr>
<td>Households with a Computer</td>
<td></td>
</tr>
<tr>
<td>Individuals using the internet</td>
<td></td>
</tr>
<tr>
<td>Mobile-cellular subscriptions per 100 inhabitants</td>
<td></td>
</tr>
<tr>
<td>Patents Granted by USPTO / Mil. People, avg 2005-2009</td>
<td></td>
</tr>
<tr>
<td>Telecommunication Infrastructure Index (E-Governance Index)</td>
<td></td>
</tr>
</tbody>
</table>
3. Infrastructure

More than 30 Discussed Indicators; 11 Proposed Indicators

 bł Energy
  ▪ Access to electricity (IEA)
  ▪ Energy consumption (IEA)

 bł Transport
  ▪ Road density (International Road Federation)

 bł Health Composite based on:
  ▪ Total expenditures on health (WHO)
  ▪ Number of hospital beds per 1000 inhabitants (WHO)

 bł Water Supply & Sanitation
  ▪ Access to improved water (WHO/UNICEF JMP)
  ▪ Access to improved sanitation (WHO/UNICEF JMP)
  ▪ Desalination capacity per capita (DesalData)
  ▪ Water storage capacity (ACSAD)

 bł Environment
  ▪ Change in Forest cover
  ▪ Change in Wetlands
  ○ Environmental Performance Index (Yale University)
4. Institutions

Main Discussed Indicators
- Governance
- Spending on Disaster Risk Reduction (DRR)/ DRR Inventory Data Updates
- Indicator of the size of the informal sectors
- Number of NGOs per million persons
- Insurance (% of GDP/ % of service imports)
- ISO 14001 Certifications
- Area under nature protection
- Cultural Heritage Sites
- Number of agricultural cooperatives
- Products that are subject to agricultural grading schemes

Proposed Indicators
- **Governance Composite** (from selected World Bank indicators):
  - Government Effectiveness
  - Regulatory Quality
  - Voice and accountability
  - Rule of law
  - Political Stability

- **Area under nature protection** (UNEP-WCMC)

- **Cultural Heritage Sites** (UNESCO)

- **Existence of DRR Strategy** (UNISDR)
5. Economic Resources

Main Discussed Indicators

- GDP per capita (UNSTAT)
- Central government debt (% of GDP)
- Government surplus/deficit (% of GDP)
- Age dependency ratio (Total/Youth/Elderly)
- Cereal Imports Dependency
- Food imports % of merchandise exports
- Overseas Development Assistance (ODA) (Per capita % of Gross National Income (GNI); Net ODA and official aid)
- Foreign Aid for Climate Change Mitigation/Adaptation/Desertification

Proposed Indicators

- **GDP per capita** (SEDAC/CIESEN)
- **Age Dependency ratio** (Proportion of dependents, youth and elderly, per 100 in the working-age population, UN Population Division)
- **Food imports** as a % of merchandise exports (FAO)
- **Overseas Development Assistance Composite**
  - Net Overseas Development Assistance (ODA)
  - Official Aid/ODA per capita (OECD)
6. Equity

Main Discussed Indicators

- Gender Inequality Index
- Unemployment Rate (national level)
- Male/ Female Unemployment rate
- Youth/ Male/ Female literacy rate
- Rural poverty headcount ratio at national poverty lines (% of rural population)/ Rural poverty gap at national poverty lines (%)
- Income share held by lowest 20%
- Disability prevalence
- Slum population in urban areas
- International migrants
- Refugees/ IDP
- Male/ Female Employment in Agriculture, Hunting and Forestry

Proposed Indicators

- Gender Inequality
  - Female/ Male Literacy Ratio (UNESCO Institute of Statistics)
  - Female/ Male Unemployment Ratio (ILO)
- Slum population in urban areas (UN-Habitat)
- Migrants (UN Population Division)
- Refugee Composite:
  - Refugees & Internally Displaced Persons (IDP) (from UNCHR)
- Disability prevalence (ESCWA/National Statistical Offices) – also includes disability caused by military conflicts in region
Thank you!

The Vulnerability Assessment component of the RICCAR Integrated Assessment is led by ESCWA and ACSAD, with funding provided by the GIZ/ACCWaM Project, Sida project funding for RICCAR, and the in-house resources of the lead organizations.