The impact of methodological choices on the outcome of national-level climate change vulnerability assessments: an example from the global fisheries sector

Which *regions, countries* or *groups of countries* are most vulnerable to climate change?

Literature suggests **Least Developed Countries** (LDCs) and **Small Island Developing States** (SIDS) are considered most vulnerable to climate change.

**Inclusion** of these country groups in Vulnerability Assessments is strikingly different.

![Bar chart showing vulnerability indices for LDCs and SIDS](chart.png)

Red = LDCs, Blue = SIDS

---

Which **national fisheries sectors** are the most vulnerable to climate change?

**Allison et al. 2009 framework based on IPCC 2001**

- **EXPOSURE**: Nature and degree to which countries are exposed to predicted climate change.
- **SENSITIVITY**: Degree to which economies & people are likely to be affected by fishery-related changes.
- **POTENTIAL IMPACTS**: All impacts that may occur without taking into account planned adaptation.
- **ADAPTIVE CAPACITY**: Abilities and resources to cope with climate-related changes.
- **VULNERABILITY**: Education, Health, Governance, GDP.
Conclusion of Allison et al. 2009:
The fisheries sector of *Least Developed Countries* (particularly in Africa) are *most vulnerable*

Not ONE SIDS was included in final list of 33 most vulnerable countries

How about the vulnerability of the fisheries sector in SIDS?

Looking more closely at the Allison et al. 2009 assessment we found that:

- an inconsistent representation of countries belonging to each group (11 SIDS out of 51/24 out of 48 LDCs);
- use of socio-economic indicators that are not scaled based on population size (3/10);
- use of a small number of indicators (10); and
- lack of accounting for potential redundancy among indicators.

Our research:

1) Assessment of the impact of methodological choices in climate change vulnerability assessments: an example from the global fisheries sector

2) Assessment of the key drivers of climate change vulnerability in the fisheries sector in Small Island Developing States and Least Developed Countries

3) Key drivers of fisheries sector vulnerability to climate change in Small-Island Developing States

4) Examine the diversity in vulnerability of the fisheries sector in Caribbean SIDS
Assessment 1
FIRST ASSESSMENT
Allison et al. 2009 data
107 coastal and island countries (excluding landlocked)
10 original indicators
Equal weighing of all indicators (within components E, S and AC)

Assessment 2
Use of 9 modified indicators

Assessment 3
Use of most recent data

Assessment 4
Inclusion of 66 additional countries (#173 total)

Assessment 5
Use of 35 indicators
(incl. 8 from previous assessments)

Assessment 6
FINAL ASSESSMENT
Weighing of indicators per PCA subcomponent
(Use of most recent data
173 coastal or island countries
35 indicators)

ESSENTIAL
Degree to which economies & people are likely to be affected by climate change

POTENTIAL IMPACTS
All impacts that may occur without taking into account planned adaptation

ADAPTIVE CAPACITY
Abilities and resources to cope with climate-related changes

VULNERABILITY
Effects of low lying coastal areas
Population largest city (%)
Biodiversity health*
Habitat health*
Conservation status marine species*
Exploitation status of fished stock*
Fisheries employment
Fisheries exports
Fish catch
Fish nutrition
Healthy life expectancy*
Health: access to sanitation*
Health: infant mortality*
Education*
Worldwide Governance*
Fisheries management capacity
Marine Protected Areas*
EEZ by coastline
Resilience Marine livelihood*
Resilience Wildfish caught*
GDP per capita*
Night Light development index (NLDI)*
Terms of trade*
Concentration of exports
Diversification of exports
Change between Assessment 1 and 2
*Use of modified indicators*

- **Exposure**
- **Sensitivity**
- **Adaptive Cap**
- **Vulnerability**

Pink is A1, blue A2

Change between Assessment 2 and 3:
*Use of most recent data*

- **Exposure**
- **Sensitivity**
- **Adaptive Cap**
- **Vulnerability**

Pink is A2, blue A3
Change between Assessment 3 and 4: *Inclusion of 66 additional countries*

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Sensitivity</th>
<th>Adaptive Cap</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDS</td>
<td>LDC</td>
<td>OCC</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>A4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Change between Assessment 4 and 5: *Use of 35 indicators (incl. 8 from previous assessment)*

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Sensitivity</th>
<th>Adaptive Cap</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIDS</td>
<td>LDC</td>
<td>OCC</td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>A5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pink is A3, blue A4

Pink is A4, blue A5
Change between Assessment 5 and 6:  
*Weighing of indicators per PCA component*

<table>
<thead>
<tr>
<th></th>
<th>SIDS</th>
<th>LDC</th>
<th>OCC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exposure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adaptive Cap</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vulnerability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Change between Assessment 1 and 6

SIDs were *least* vulnerable in Assessment 1 and *most* vulnerable in Assessment 6 (only 107 countries)

<table>
<thead>
<tr>
<th></th>
<th>SIDS</th>
<th>LDC</th>
<th>OCC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exposure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adaptive Cap</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vulnerability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The outcome of the six vulnerability assessments of national fisheries sector to climate change per country

Results of Assessment 1 - 6 for the Wider Caribbean
Conclusions

- Methodological choices in Vulnerability Assessments have a large impact but are often not made explicit;
- Results of VAs are often used strategically so making these choices and their implications transparent is important;
- SIDS were least vulnerable in first analysis yet most vulnerable in final analysis;
- The overall vulnerability ranking for the final assessment suggests SIDS and LDCs are more vulnerable than other countries;
- While fisheries sector of SIDS is considered most vulnerable, LDCs follow close behind and as both have similar high levels of vulnerability looking at final vulnerability is not sufficient but one needs to look at underlying vulnerability;
- In line with other studies we found that the vulnerability of the fisheries sector in SIDS is associated with high exposure and sensitivity whereas, in contrast, the vulnerability of LDCs is associated with low adaptive capacity; an understanding of these differences can guide decision making;
- A more regional, national and local perspective is necessary for designing and implementing adequate adaptation measures.