Multi-Scale Risk Mapping to Environmental Hazards in Coastal Bangladesh
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Background

- Risk must be addressed at an appropriate scale as the components that contribute to risk and vulnerability, the data availability and type, and the utility of an index approach vary with scale (there is no "one size fits all" index).
- Vulnerability or risk indexing involves varying degrees of simplification and aggregation of information; with higher resolution usually being required at the local level as some important local variations in vulnerability are masked by simplifications at national or sub-national scale.
- At the local level, more detailed information is usually available; complexities are better captured, and certain methods to collect data (e.g. participatory approach) can be applied.

Methodology

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Exposure</th>
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</thead>
<tbody>
<tr>
<td>Regional (Coastal zone; 17 districts)</td>
<td>Storm surge, Salinity, Erosion</td>
</tr>
<tr>
<td>Storm surge, Salinity, Erosion</td>
<td>Population density, Cropped land, Number of household</td>
</tr>
<tr>
<td>Sub-regional (Upazila scale)</td>
<td>Storm surge, Salinity</td>
</tr>
<tr>
<td>Storm surge, Salinity</td>
<td>Population density, Cropped land, Number of household</td>
</tr>
<tr>
<td>Local (Union scale)</td>
<td>Storm surge, Salinity</td>
</tr>
<tr>
<td>Storm surge, Salinity</td>
<td>Population density, Cropped land, Number of household</td>
</tr>
</tbody>
</table>

Vulnerability

- Choice of indicators for different scales are guided by three considerations: (i) what is the most appropriate type of data to quantify vulnerability and risk? (ii) what data are available or obtainable at the spatial scale of interest? (iii) are the data spatially explicit or can be made spatially explicit?
- For regional and sub-regional scale, indicators are chosen from literature review and expert opinions. A combination of participatory research methods and tools are used in selecting indicators and also obtaining data for local scale risk assessment.
- Some of the parameters relevant for regional scale may not be relevant at local scale. For example, flood and erosion are important hazard at regional scale while these hazards are not significant at local scale. Some parameters relevant for regional scale may not be relevant at local scale as data are of insignificant resolution e.g. poverty rate.

Results and Discussion

- The delineation of study area is divided into three scales: Regional, Sub-regional, and Local. This allows for an assessment of risk and vulnerability at multiple spatial scales while also helping to inform practical response to coastal hazards or help devise a local scale development and management plan.
- Assessing of risk and vulnerability at multiple spatial scales will provide improved understanding of the appropriateness of assessment scale for effective policy formulation, prioritization of resources and implementation of risk reduction measures.

Conclusion and Future Work

- A nested approach is of great value where national/regional scale assessments are useful for formulation of policies and prioritization of resources, while local scale assessments help implement practical response to coastal hazards or help devise a local scale development and management plan.
- Assessing of risk and vulnerability at multiple spatial scales will provide improved understanding of the appropriateness of assessment scale for effective policy formulation, prioritization of resources and implementation of risk reduction measures.
- This is an ongoing work. Present study represents only preliminary findings. Future task will include refinement of indicators for different spatial scales, selection of appropriate weight for different indicators with stakeholder engagement for local scale.

Acknowledgement

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