Design of assessment frameworks for delta adaptations – experiences from the Netherlands and the USA

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Why assessment framework?

• Building resilience requires a long-term vision how to adapt to future in terms of climate change and socio-economic development.

• Proposed strategies and measures need to be assessed and evaluated, providing essential information for decision making.
However:

- **little knowledge exists** how to design assessment frameworks that can handle the inherent **uncertainty** which comes with the long term character of adaptation strategies;

- most existing evaluation frameworks such as CBA are designed for investment plans and projects with a time horizon which is usually **too short to encompass effects of climate change**;

- adaptation strategies are of **a very diverse nature**, including but not limited to infrastructural investments, urban redesign, fiscal incentives, eco-engineering and green infrastructural designs.

How to design assessment frameworks that can grasp:

- **diversity**, **uncertainty** and **long-term horizons**

Source: rijkswaterstaat
Case studies

Delta Programme, NL  Hurricane Sandy, USA

Designing assessment framework for the Delta Program, NL

• For the Netherlands an assessment framework was prepared upon request of the Dutch Delta Program.

• The Framework was developed during 2011 and 2012 in close interaction with analysts and members of the Delta Program and was tested in a number of regional trial sessions.

• The outcomes of these sessions were used to refine and improve the Framework.
### Criteria matrix

#### Boundary conditions
- Safety
- Freshwater Supply
- Impacts and opportunities
- Implementation
- Financial feasibility

#### Main criteria
- Sustainability
- Solidarity
- Flexibility
- Cost-Benefit ratio

#### Evaluation Perspectives

#### Time horizons
- Delta scenarios
  - 2021
  - 2050
  - 2100

### Criteria list

<table>
<thead>
<tr>
<th>Main criteria</th>
<th>Sub-Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety against flooding</td>
<td>Casualties, damages and risks</td>
</tr>
<tr>
<td>Freshwater supply</td>
<td>Freshwater availability for urban areas, infrastructure, nature, drinking water, energy production, agriculture, industry, inland fishery, shipping and navigation</td>
</tr>
<tr>
<td>Impacts on and opportunities for other functions</td>
<td>Impacts and opportunities related to: (inter)national competitiveness, regional and local businesses, welfare, landscape amenity, agriculture, nature, fisheries, industry, shipping, harbours, recreation and tourism, energy and natural resources</td>
</tr>
<tr>
<td>Implementation</td>
<td>Risks related to technical, legal and societal implementation, opportunities for win-win, adaptation capacity, flexibility</td>
</tr>
<tr>
<td>Financial feasibility</td>
<td>Investment costs, operation &amp; maintenance, risks related to private and public financing.</td>
</tr>
</tbody>
</table>
Hurricane Sandy in the USA

Rebuild by Design: to create a resilient region

- Initiative of the President’s Hurricane Sandy Rebuilding Task Force and the U.S. Department of Housing and Urban Development
- Addresses structural and environmental vulnerabilities that Hurricane Sandy exposed in New York and New Jersey
- Develops fundable solutions to better protect residents from future climate events
- Multi-stage design competition to develop innovative, implementable proposals to promote resilience
- 10 interdisciplinary teams participate in the competition

Designing assessment framework for RbD, USA

- **Dutch experiences** used to prepare an Assessment Framework for application in the Rebuild by Design contest aiming at providing a more resilient and adaptive coastal development

- An initial framework was tested during a workshop with the designers (NYC, 18th February 2014).

- The framework was applied in reviewing the project designs (March 2014).

Why Assessment Framework for RbD?

- Objective: to stimulate and support the Teams to think about the beneficial aspects of their project, project evaluation and implementation.

- To help the Design Teams in transforming their design opportunities to implementable design solutions.

- Focus on costs and benefits of the proposed solutions, using an economic, social and environmental long-term perspective.

- Start thinking about financial feasibility of the solutions.

- To facilitate a comparison of all the projects that are being developed within RbD.
Methodology – Assessment Framework

Phase 3

Step 1 Problem Analysis

Step 2 Project Definition

Step 3 Reference situation

Step 4 Identify Stakeholders

Step 5 Project Scoring

Step 6 Robustness and flexibility

Step 7 Implementation challenges and opportunities

Phase 4

Step 8 Develop Business Cases

Step 9 Identify Relationships between projects

Example of the Criteria List

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Sub criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life cycle costs</td>
<td>Investment costs (including preparation and project management)</td>
</tr>
<tr>
<td></td>
<td>Operation and maintenance cost</td>
</tr>
<tr>
<td></td>
<td>Re-investment after ... years</td>
</tr>
<tr>
<td>Flood protection</td>
<td>Reduction of expected property damages due to flooding</td>
</tr>
<tr>
<td></td>
<td>Reduction of expected casualties due to flooding</td>
</tr>
<tr>
<td>Environmental value</td>
<td>Ecosystem and biodiversity effects</td>
</tr>
<tr>
<td></td>
<td>Energy efficiency</td>
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<tr>
<td></td>
<td>Ambient (urban) environment / spatial quality</td>
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<tr>
<td></td>
<td>Noise levels</td>
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<tr>
<td></td>
<td>Greenhouse gas emissions</td>
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<tr>
<td></td>
<td>Air quality</td>
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<tr>
<td>Social value</td>
<td>Identity &amp; Social cohesion</td>
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<tr>
<td></td>
<td>Crime and vandalism</td>
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<td></td>
<td>Affordable housing</td>
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<td></td>
<td>Recreational value for inhabitants</td>
</tr>
<tr>
<td></td>
<td>Cultural, historic, archaeological sites and landscapes</td>
</tr>
<tr>
<td>Economic value</td>
<td>Directly effects local or regional economy (e.g. tourism, agriculture/</td>
</tr>
<tr>
<td></td>
<td>fishery, logistics, energy)</td>
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<tr>
<td></td>
<td>Synergies or spin-off effects to other sectors’ revenues (e.g. transportation)</td>
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<tr>
<td></td>
<td>Economic competitiveness</td>
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<td></td>
<td>Substitution effects / damages</td>
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<tr>
<td></td>
<td>Local / regional employment</td>
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<tr>
<td></td>
<td>Local / regional employment in construction</td>
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<tr>
<td></td>
<td>Spin-off effects to other sectors</td>
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<tr>
<td></td>
<td>Value of property</td>
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<tr>
<td></td>
<td>Mobility / Transportation</td>
</tr>
</tbody>
</table>
Lessons learned (USA)

AF was helpful in a number of aspects:

• It forces the teams to think about (project-) alternatives. This can only be achieved if realistic alternatives or realistic reference situations are described in sufficient detail.

• It should be used in an early stage to focus on most promising and feasible solutions. This reduces time wasted on less promising alternatives.

• The framework is flexible in the sense that different stakeholder perspectives can be presented (e.g. CBA perspective and a regional perspective). This enhances the acceptance of the method for a variety of stakeholders.

Lessons learned (NL)

• Flexible
• Use it as checklist, not scoring list
• Define spatial scale levels (local, regional, national)
• Define reference situation (current, future without project, etc.)
• Too many criteria for use in selection! Too complex.
• At the end choices have been made on a limited set of criteria; For water safety mainly:
  • Costs
  • Potential flood damage
  • Shipping/navigation
  • Agriculture
  • Nature

• People have difficulty in thinking in alternatives (both NL and USA)
Thank you for your attention!