Water-related ex-ante disaster loss evaluation in Dutch policy design for climate adaptation

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Ex-Ante Economic Analysis in The Netherlands
CBA for Flood Protection Standards
Case studies (H2020 Green-Win Project)
Ex-Ante Economic Analysis in The Netherlands is well embedded and integral part of the policy formulation and implementation process since 1945.

The CPB Netherlands Bureau for Economic Policy Analysis conducts ex-ante economic analysis of:

• Government annual budget (and opposition) and new policies
• Election programs of political parties
• Provides guidelines for CBA
• External review/second opinions of CBA conducted by third parties
Examples of ex-ante evaluation

Policy formulation: Understanding economic consequences

→ example: flood protection standards in The Netherlands

Investment planning and implementation: Selection between alternatives, identifying possibilities for (co)financing

→ examples: flood risk reduction projects Nijmegen and Texel
Ex-Ante Economic Analysis (CBA) for Flood Protection Standards in The Netherlands
Flood Risk in the Netherlands

55% of the Netherlands is flood prone:

- 26% below sea level
- 29% above sea level
Flood protection: legal standards for dike ring areas

Legal standards

Coastal areas:

1/4000 – 1/10,000 per year

Rivers:

1/1250 – 1/2000 per year

In 2008, these legal protection standards were regarded not up to date, because they
1. did not have a common basis
2. were determined geographically
The National Delta Program

Multi-governance

Long term (2050 / 2100)
- Flood protection
- Fresh water supply
- Spatial adaptation

Well embedded
- Delta Law
- Delta Fund (€ 1 billion p.a.)
- Delta Commissioner
- Delta Program (annual)
- Delta Decisions
Cost-Benefit Analysis

Static CBA:
- How much to invest?
- Minimize total of investments and expected damages

Dynamic CBA:
- How much, when and when again to invest?
- Minimize total of investments and expected damages

(Kind et al, 2011)
Flood damage

Economic exposure

Exposure maps → Maximum damages

Hazard map → Vulnerability Functions → Damage map

€/#

Deltapex
Flood damage

- > 700 inundation scenario’s
- For each scenario assessment of economic damages and number of casualties

€ 10 billion damages
100 – 1,000 victims
Results: New flood protection standards
Conclusions

• Existing FRR standards were not efficient (too high, too low)
• Higher standards are needed esp. along Rhine and Meuse
• Earlier advice of 2\textsuperscript{nd} Delta Commission, 2008: ten-fold increase in standards everywhere $\gg$ at considerable cost!

<table>
<thead>
<tr>
<th>In billion euro</th>
<th>Add. Invest. costs</th>
<th>Residual flood risk</th>
<th>Total costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>2nd Delta Committee</td>
<td>11.5</td>
<td>1.5</td>
<td>13</td>
</tr>
<tr>
<td>CBA</td>
<td>3.7</td>
<td>5</td>
<td>8.7</td>
</tr>
</tbody>
</table>

• Hence, CBA leads to savings in additional investment cost of € 7.8 billion (and € 4.3 billion in total costs) in NPV.
Delta Scenarios:

- plausible views of future climate and socio-economic trends, looking approximately 50 and 100 years ahead.
- work with a range of perspectives that could all actually become a reality
- Working with a bandwidth for climate change that fits with the IPCC insights
- consists of narratives and maps that describe the backgrounds and demonstrate interconnectivity
Delta scenarios

- **Socio-economic growth**
  - Busy
  - Steam

- **Socio-economic shrinkage**
  - Rest
  - Warm

- **Climate change**
  - Moderate
  - Rapid
Lessons learned

New flood protection standards

- Sensitive issue, equity and efficiency considerations
- Long process (over 10 years between start of CBA and political decision in Parliament)
- Delta scenarios to increase robustness
- Dependent on political support through openness and credibility
- International scientific recognition through Franz Edelman Award 2013
Green-Win Project

(http://www.green-win-project.eu/)
Challenges underlying Green-Win*:

• Lack of sufficient funding for climate adaptation and mitigation
• Challenge to apply “best practises” in global FRR policies
• Identifying win-win strategies, sustainable business models and enabling environments for implementation of FRR measures through case study analysis (WP5)

* Green-Win receives funding under EU H2020 R&I programme (Project No 15.0216)
Case studies

‘Room for the River’ Nijmegen Lent

Soft dike in the island of Texel (Wadden sea)
Case study 1: Nijmegen Lent

http://www.ruimtevoordewaal.nl
Case study 1: Nijmegen Lent

‘Room for the River’ project, creating additional channel with city island including real estate, catering industry and recreation facilities (swimming, boating, walking, etc.)

Funding of € 350 million through national budget

Co-benefits through*

• Land reclamation and real estate development
• Hotel and catering industry
• Recreation
• Ecological values

Creating economic activity and jobs in the region.

* From De Bel, Apon (2010)
Case study 2: Texel

https://www.hhnk.nl/waddenzeedijk/prins-hendrikzanddijk_41688/
Case study 2: Texel

Funding of € 45 million, € 33 million through public funding and € 12 million from the *Waddenfonds*

Co-benefits through*

- Land reclamation
- Recreation
- Ecological values

Project succeeded to attract external funding from environmental NGO for creation of additional ecological values

* From De Bel, Nieuwenhuijzen (2012)
First lessons learned from case studies

- Difficult to attract non-public funds for FRR
- Co-benefits create opportunities for co-funding or “return flows” to public budget
- Easier to attract non-public funding when (financial) benefits flow to a specific stakeholder
- Land reclamation effective in generating substantial (co)benefits (especially high-value real estate development)
- Leveraging of public funds up to 20 – 30 %
Further activities under Green-Win

- Workshop in Vienna on 7 & 8 February 2017 (business models and financing options for climate adaptation and mitigation)

- Workshop on financing of coastal flood risk reduction and climate adaptation (second half 2017)

- Case studies for other locations: Baltic sea (Germany), Shanghai (China), Jakarta (Indonesia), Maldives

People interested to participate please contact Mark.deBel@deltares.nl