Royal HaskoningDHV
Enhancing Society Together

Climate adaptation and Flood resilience through digital tooling

Global Flood Risk Tool – Flood risk assessment tool

March 2021

Matthijs Bos

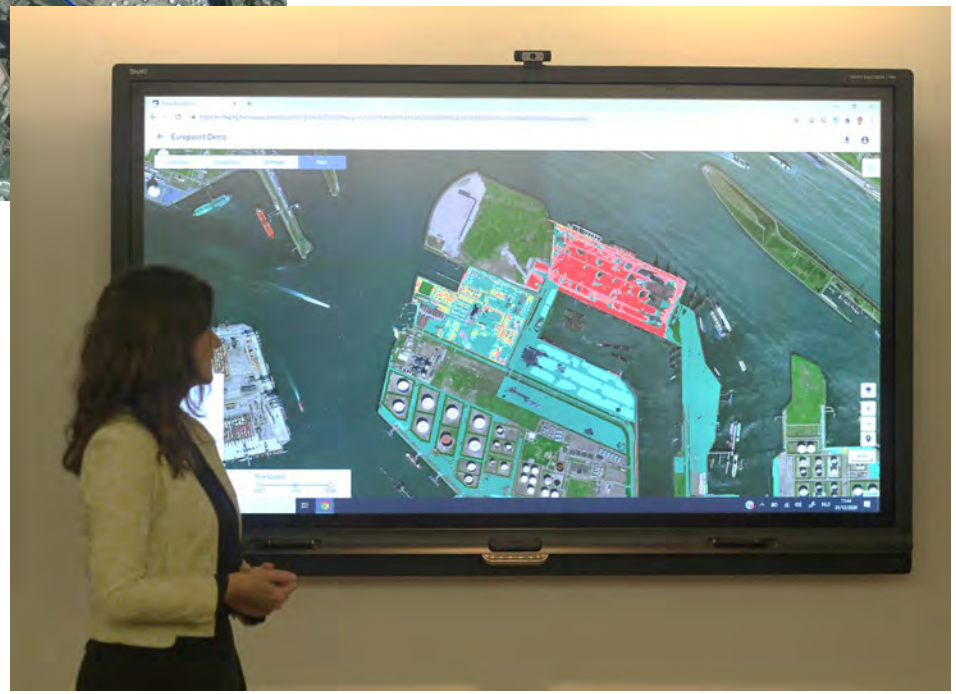
Floods have tremendous impact on society

Royal HaskoningDHV


Land use
Inundation
Damage
Risk
Damage, € per m²
0
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
> 250
Scenario
Default Scenario
Time horizon
2023
2050
2100
Return period
10
100
300
1000
3000
10000

Global Flood Risk Tool - Digital ‘Resilience’ tooling

- **Online service:** Flood Risk calculations through cloud-based computing platform based on 5-steps approach
- **Fast calculations:** inundation and damage calculations within a minute instead of hours
- **Visually attractive:** User interface is interactive, visually attractive and understandable for non-experts to stimulate stakeholder dialogue during real-life sessions.
- **Enables decision-making:** GFRT to be used for scenario modelling to support decision-making on business cases for different climate scenarios



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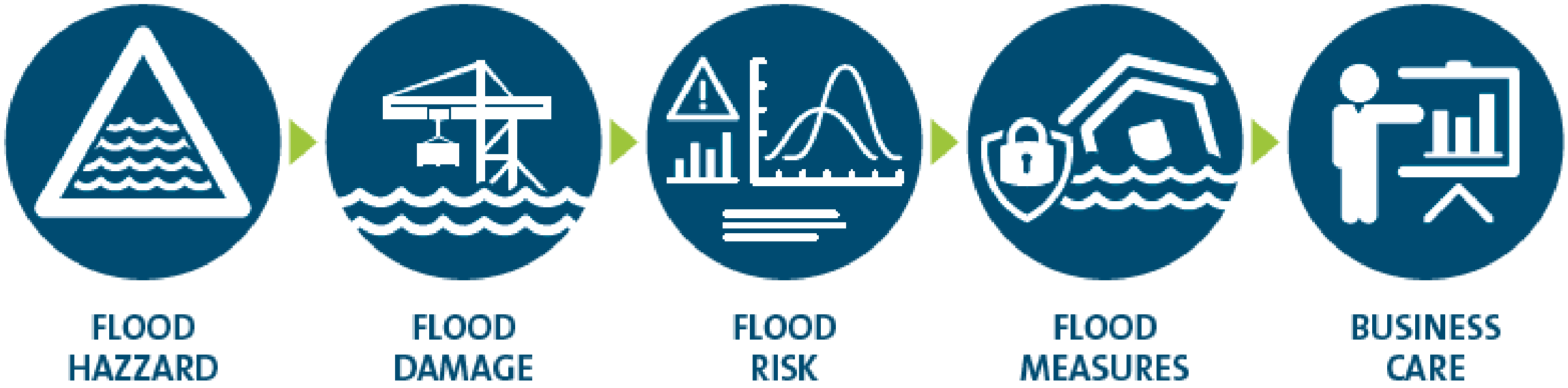
5-steps approach

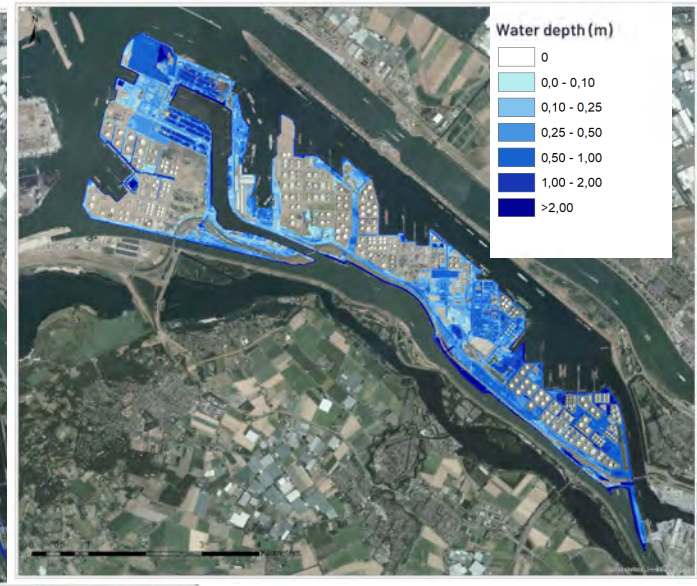


Hazard & Damage maps: in 2050 +35cm SLR

Return period: 10 years

100 years

1,000 years

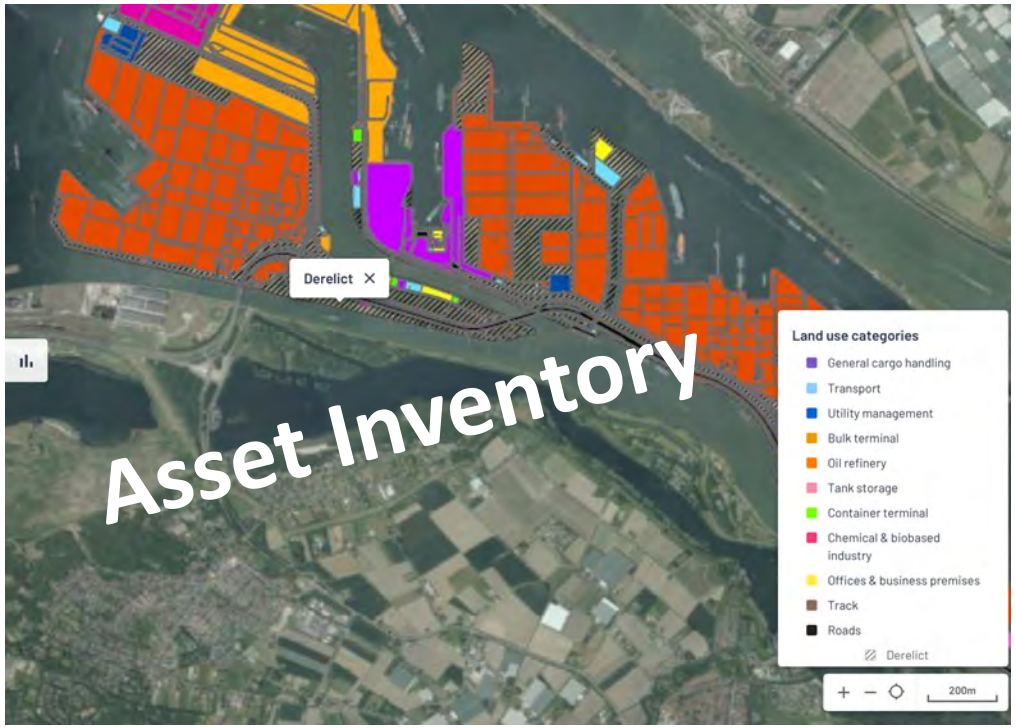


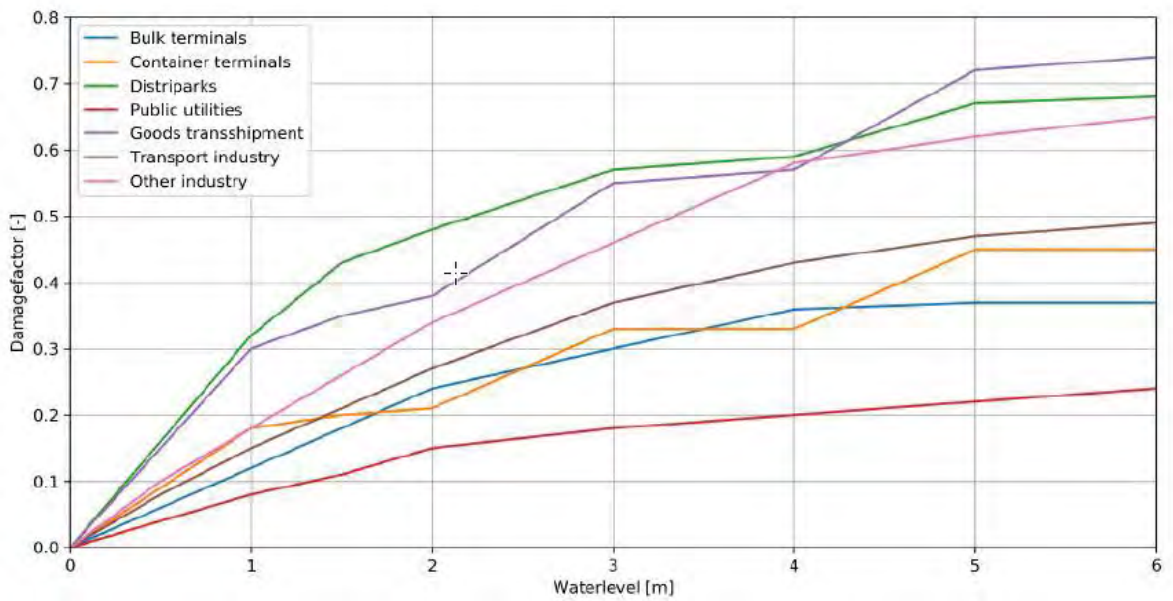
10,000 years

Economic input parameters

- **Land use map, Land values and damage curves (obtained from literature and stakeholder consultations)**

Sector	Value
Bulk terminals	€ 443
Container terminals	€ 696
Distriparks	€ 886
Public utilities	€ 1583
Goods transshipment	€ 886
Transport industry	€ 633
Other industry	€ 633





Sources:

* JCR, 2017. Global flood depth-damage functions: Methodology and the database with guidelines, Huizinga, De Moel and Wojciech: https://publications.jrc.ec.europa.eu/repository/handle/JRC105688
* Tebodin, 1998. Schade bij inundatie. By Rijkswaterstaat

Hazard & Damage maps: in 2050 +35cm SLR

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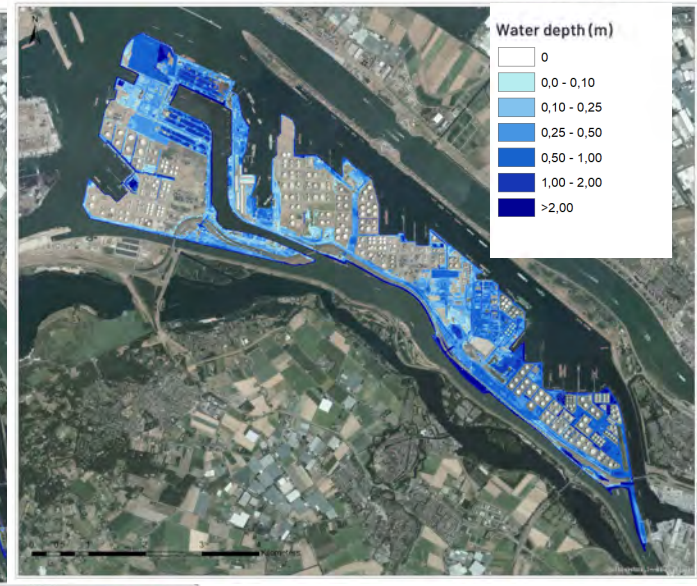
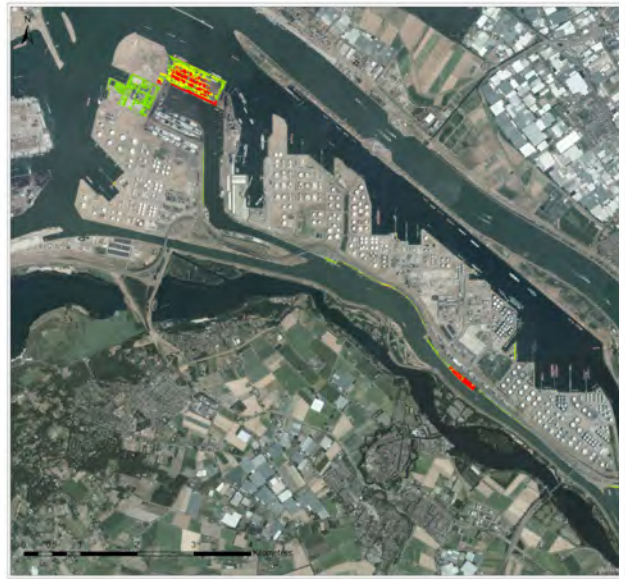
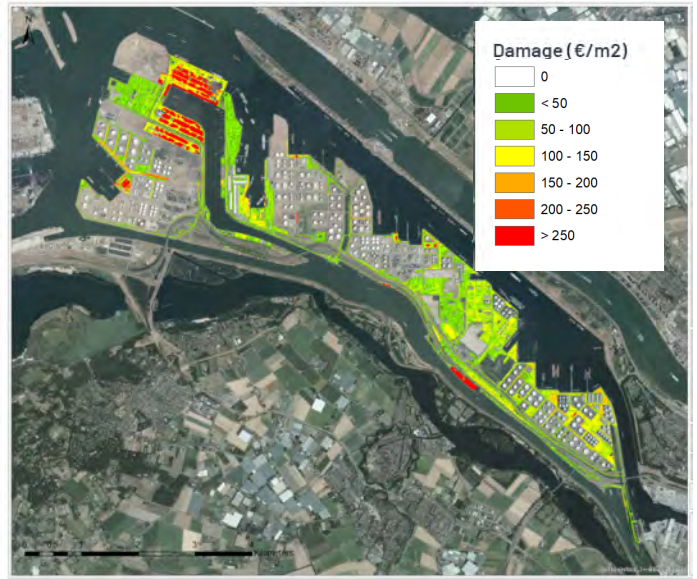


10,000 years



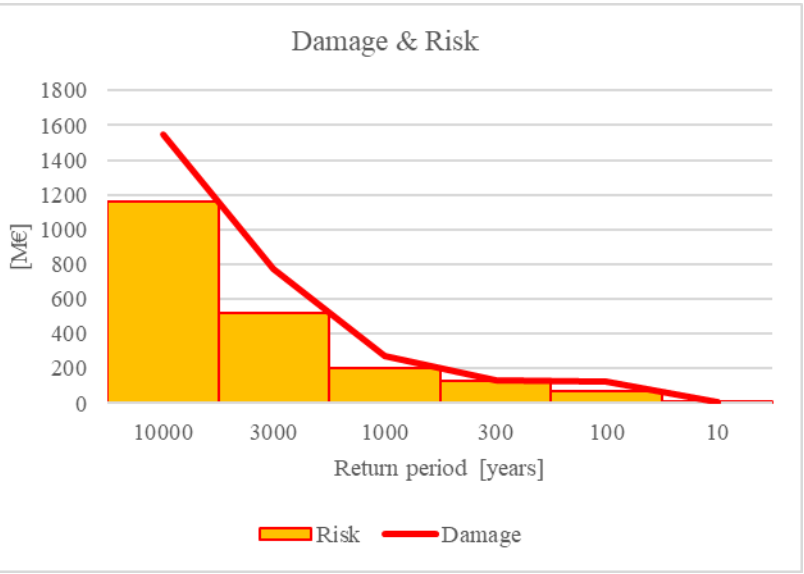


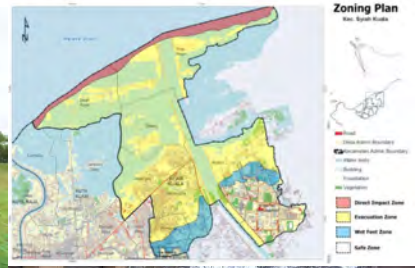
2023

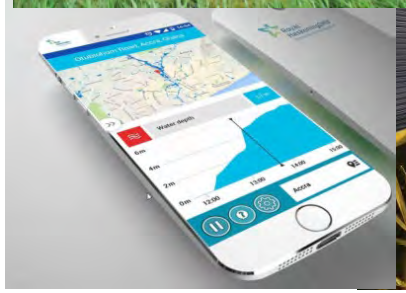
2050

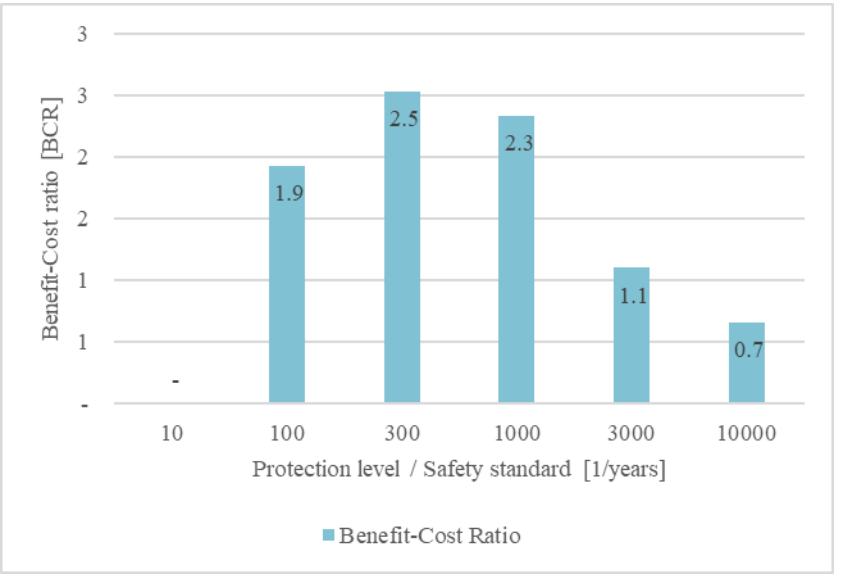
2100

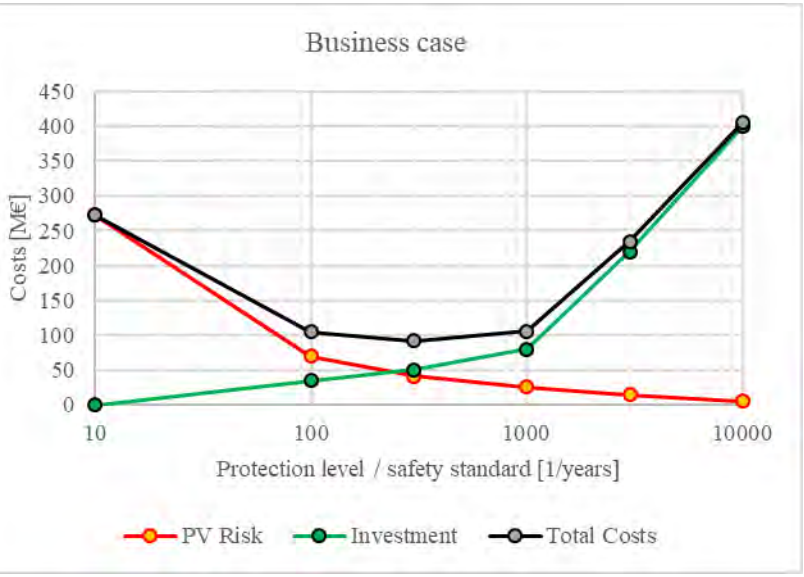
Benfits, measures & business case modelling

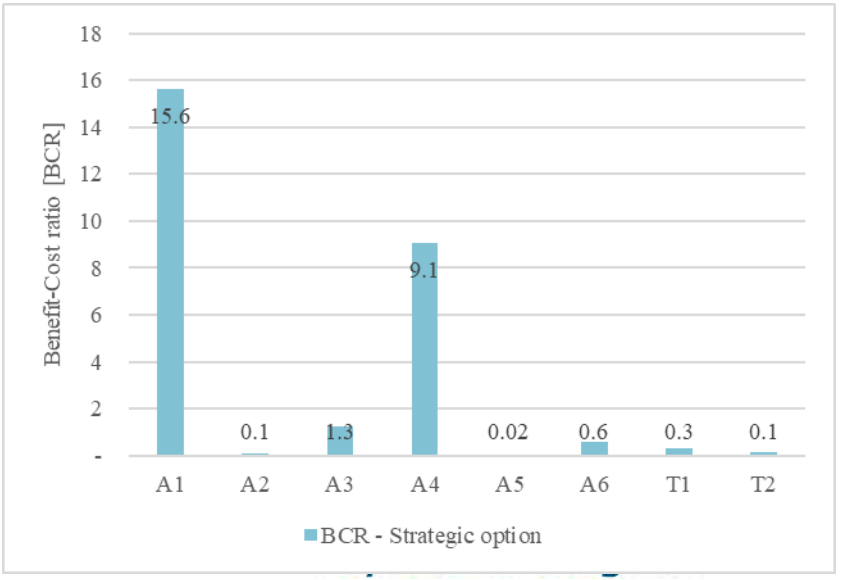








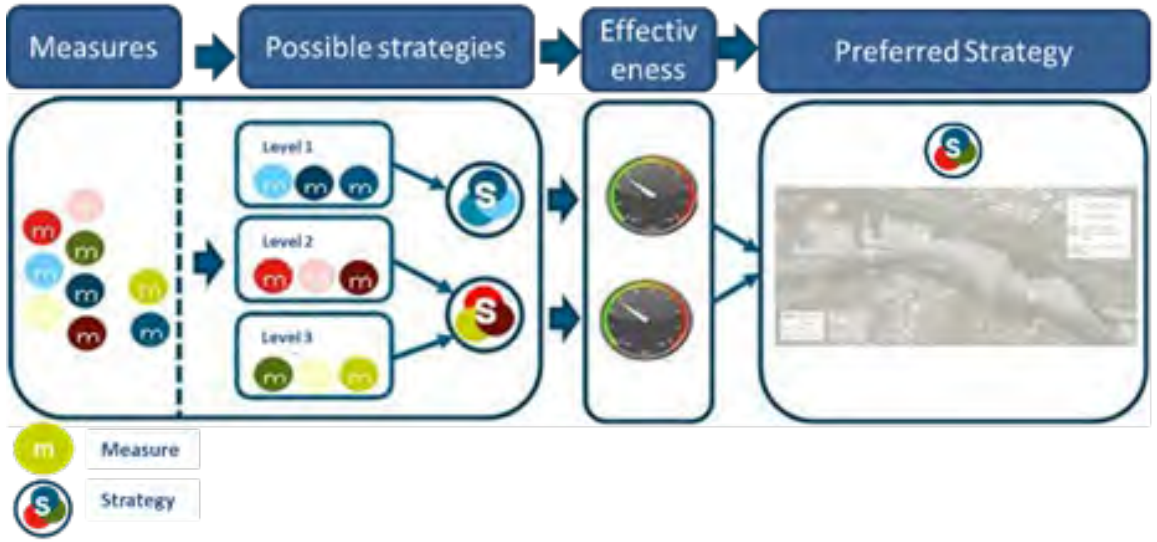




Preferred strategy through MCA and CBA approach

Multi-Criteria Analysis (qualitative) :

- technical (e.g. adaptive to climate change, effectiveness, does it require relocation, does it have stakeholder support, replicable and scalable);
- economic/planning aspects (e.g. urgency, consistent with policy and plans, does it stimulate the economy);
- socio-economic (e.g. protect people affected, reduce risk on losing lives, benefiting women or minority or vulnerable groups);
- environmental impacts (e.g. disturbance or destroys habitats).



Cost-Benefit Analysis (quantitative)

- Optimum Protection level (% avoided damage);
- Net present value (NPV) and Benefit-cost ratio (BCR) on strategic options.

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Reference projects: Adaptation strategies & investment proposals

- Port of Rotterdam

Port of Rotterdam

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Flood Risk Management

We are committed to ensuring that the port and its environs are safe, healthy and appealing. We aim to counter climate change while ensuring that the port area makes a significant contribution to Dutch prosperity and employment.

The risk of flooding will rise in the Port of Rotterdam and the surrounding areas over the decades ahead as a result of climate change, and in particular the rise in sea level. Current climate scenarios foresee a sea level rise by 2100 of between 35 and 85 cm compared to 1990. The great economic significance and the presence of essential and vulnerable functions in the port area mean that research into the consequences is desirable.

The area inside the dykes is protected by a network of dykes and barriers. This does not hold for the areas outside the flood defence system. Here, residents, businesses and the owners of assets are themselves responsible for taking measures to limit the consequences from flooding and for any damage that results from this.

- WB: Vietnam Coastal Districts

Open Knowledge Repository content related to COVID-19 / coronavirus can be found here.

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REPORT

Resilient Shores : Vietnam's Coastal Development Between Opportunity and Disaster Risk

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In a country that is among the most exposed to natural hazards, Vietnam's coastline often bears the brunt. Typhoons, storm surges, riverine flooding, coastal erosion, droughts, or saline intrusion are all-too-familiar threats to most people living along the coast. Yet despite these risks, coastal regions host thriving economic sectors, providing livelihoods for a growing and rapidly urbanizing population. The coastal regions could be a powerful engine for Vietnam's continued socioeconomic development, but rapid urbanization, economic growth, and climate change mean that disaster risks are bound to increase in the future. Although the government of Vietnam has made impressive progress in reducing and managing natural risks, current trends show that the work is far from complete. To guide effective action, this report provides an in-depth and multi-sectoral analysis of natural risks in coastal Vietnam and reviews current efforts in risk management, proposing a concrete action plan to balance the risks and opportunities of coastal development. These actions, if taken decisively, are an opportunity to strengthen the resilience of coastal communities and hence the prosperity of coming generations.

Citation
"Rentschler, Jun; de Vries Robbé, Sophie; Braese, Johannes; Nguyen, Dzung Huy; von Ledden, Mathijs; Pozueta Mayo, Beatriz. 2020. Resilient Shores : Vietnam's Coastal Development Between Opportunity and Disaster Risk. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/34639 License: CC BY 3.0 IGO."

URI
http://hdl.handle.net/10986/34639

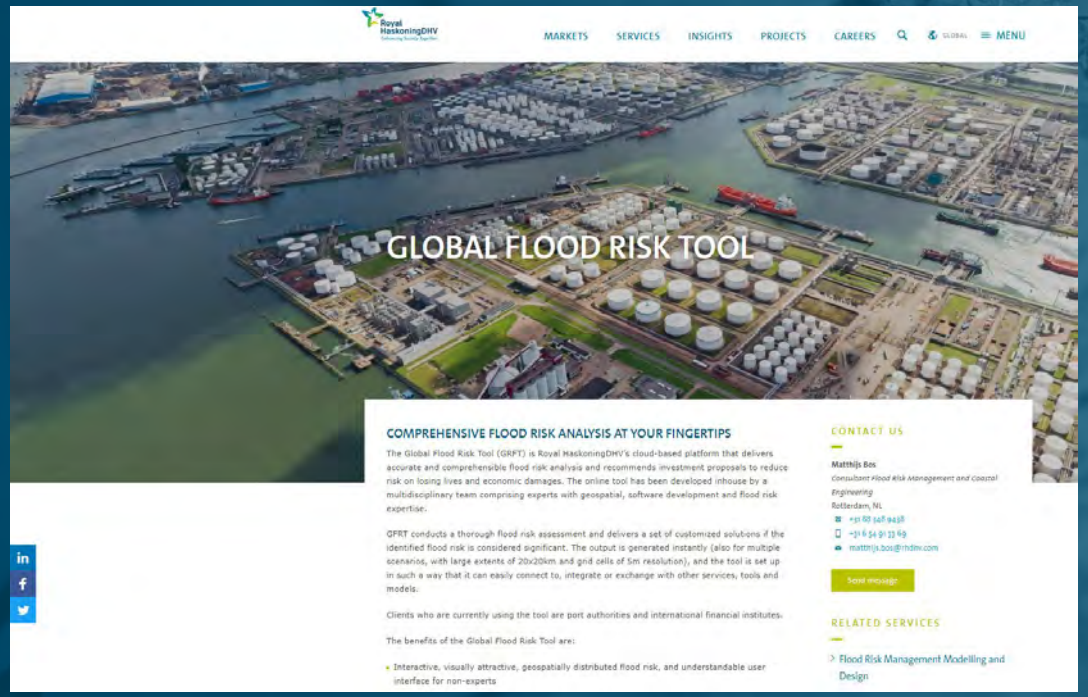
Collection(s)
Other Environmental Study

Associated content
An Assessment of the Coastal Protection System in Vietnam
A Multisectoral Risk Assessment for Vietnam

Thank you!

More information online: LINK

Blog: **Providing protection and security through our Global Flood Risk Tool**



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