InsuResilience Solutions Fund

ETH zürich

AXA

Empowering Climate Resilient Development and Transformation in Vietnam

CLIMADA Climate Risk Analysis

Implemented by ISF, AXA Climate and ETH Zurich

October 2020

funded by

KFW

on behalf of

Federal Ministry for Economic Cooperation and Development

managed by

Frankfurt School of Finance & Management

German Excellence. Global Relevance.

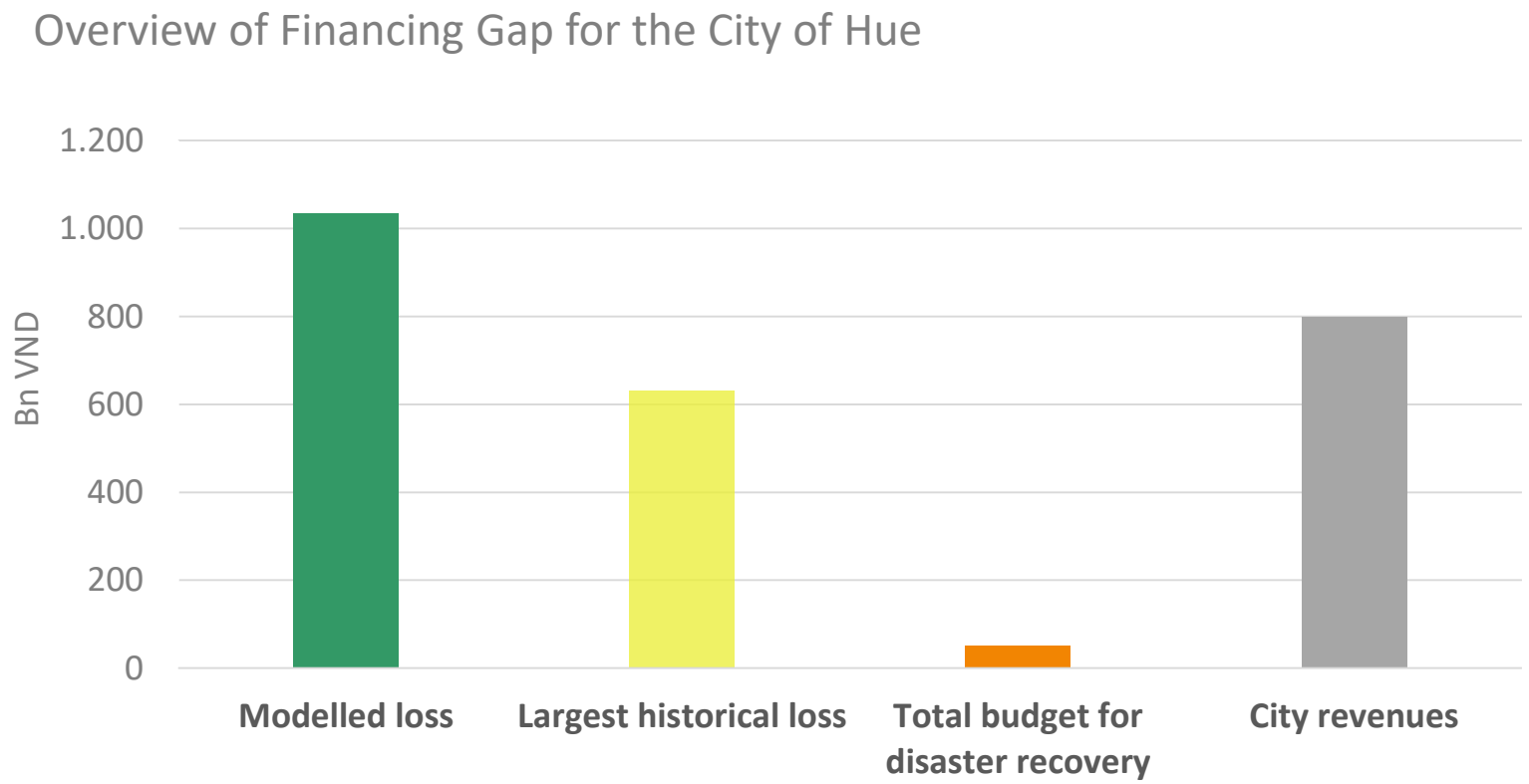
part of

InsuResilience GlobalPartnership

InsuResilience Solutions Fund

Increasing Financing Gap due to Climate Change

Why should we care about future climate risk?



Source: based on Asian Development Bank (2017)

InsuResilience Solutions Fund

Climate based Risk Assessment and Adaptation

Guiding questions

- What is the expected climate-related damage to the assets/commodities and to societies due to the identified climate risks until 2050?
- What are the potential options - behavioral, physical and financial measures - which can be taken to reduce the expected damage for specific assets?
- What is the cost-benefit of implementing such measures to the given region?
  - Which measures should be prioritized (which are most cost-effective)?
  - Where should these measures be primarily implemented?
  - How do they need to be designed to ensure required risk reduction?

Climate risk analysis as a tool to facilitate political decision-making

InsuResilience Solutions Fund

Climate based Risk Assessment and Adaptation

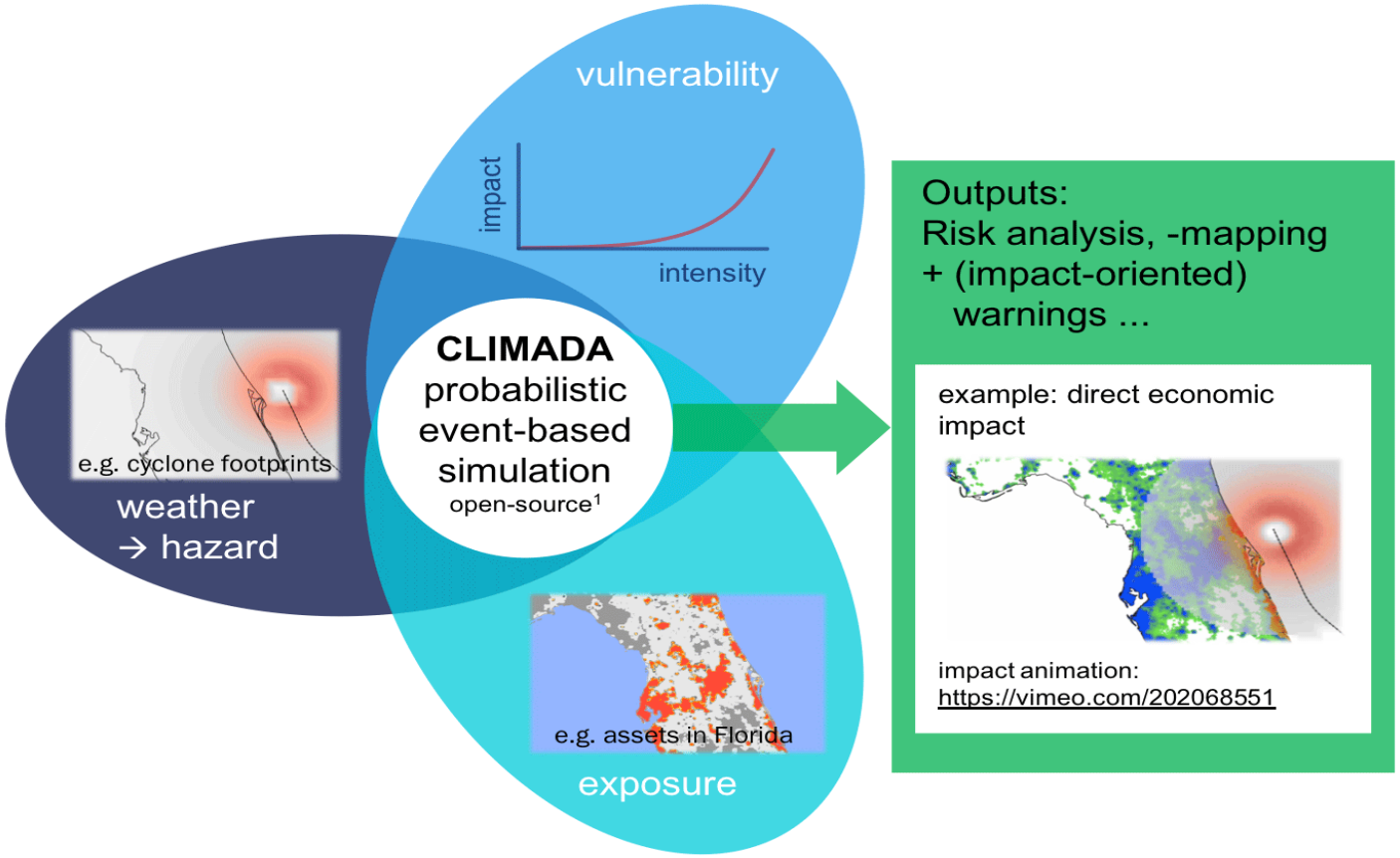
Study approach

- The study quantifies current and future climate risks using tools developed by the insurance industry (CLIMADA platform - catastrophe models and probabilistic simulation methods).
- The study instigates, assesses, and presents various options of climate risk management for policy makers.
- Scope of the study
  - Hazards: Tropical cyclone and storm surge – incl. sea level rise
  - Exposure: Agricultural production, residential housing and people
  - Adaptation measures: Focus on measures for coastal protection

Climate risk analysis as a flexible first tool to develop adaptation policies

InsuResilience Solutions Fund

CLIMADA Modelling Platform



Source: G. Aznar-Siguan, D.N. Bresch, 2019

InsuResilience Solutions Fund

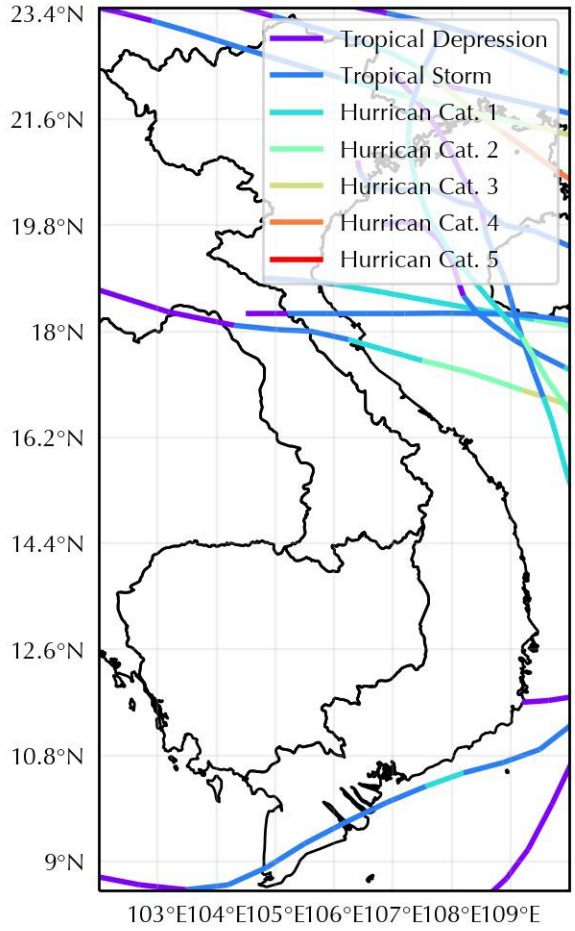
Tropical Cyclone – Wind

Today´s risk

- Assessment of historical events indicates more intense storms in northern regions
- Data and methods for simulation:
  - Storm tracks (IBTrACS)
  - Time period – 1980-2019
  - Number of Events – 269
  - Knutson et al., 2015

Future Risk

- Climate scenarios imply changes in intensity and frequency based on IPCC climate scenarios RCP4.5* and RCP8.5**
- Scenario considered: Increased intensity and same frequency



* Global temperature increase is more likely not to exceed 2°C
** Global temperature increase likely to exceed 2°C

InsuResilience Solutions Fund

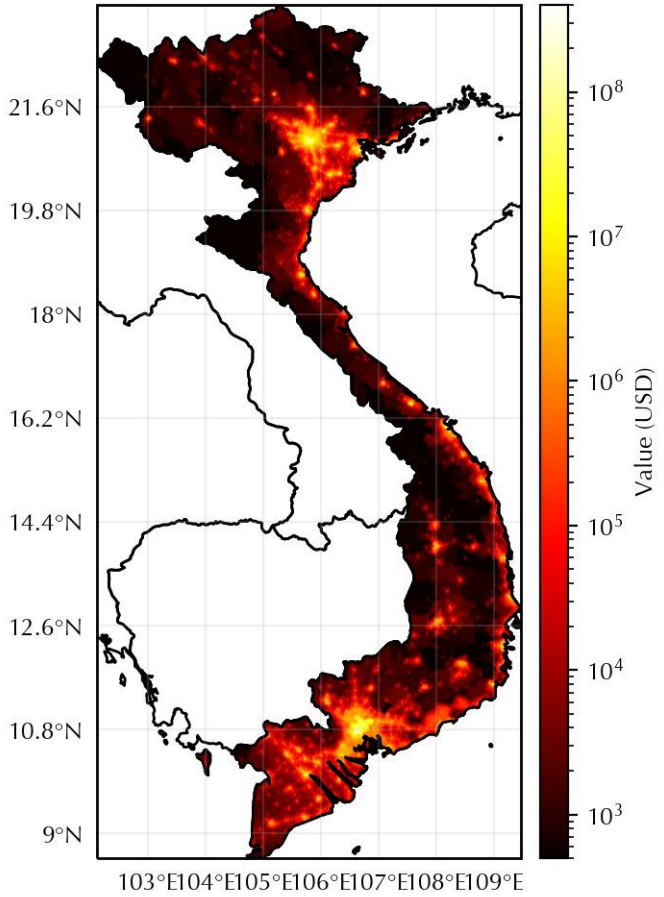
Exposure – Residential Houses

Total Value of Residential Houses

- Data from UN Global Assessment Report on Disaster Risk Reduction (GAR)
- 2020: 125.9 Bn USD

Data

- Estimating geographical distribution based on night light intensity
- Resolution: 1 km x 1km
- Validation by comparison with national statistics:
  ➡ Urban population: 37%



InsuResilience Solutions Fund

Impact of Surge given Climate Change

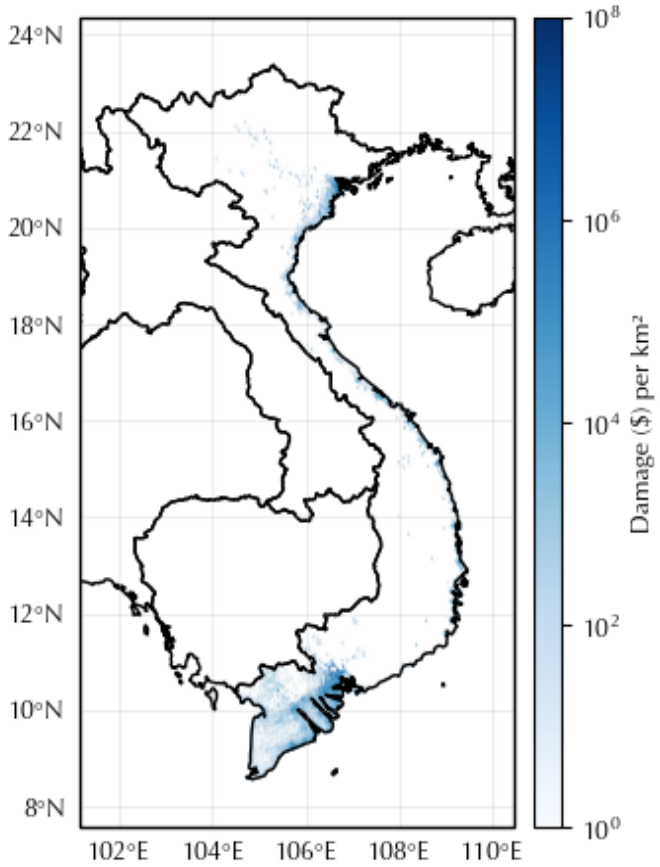
Damage on Residential Houses due to Surge

Expected Damage due to Surge:

- Expected annual impact (EAI) –
  - Current climate: 2.65 Bn USD
  - RCP4.5: 2.93 Bn USD (+11%)
  - RCP8.5: 3.08 Bn USD (+16%)

What does this tell us?

- ~ 11%-16% increase in damage due to expected climate change
- Coastal and high population areas are most vulnerable to effects of climate change

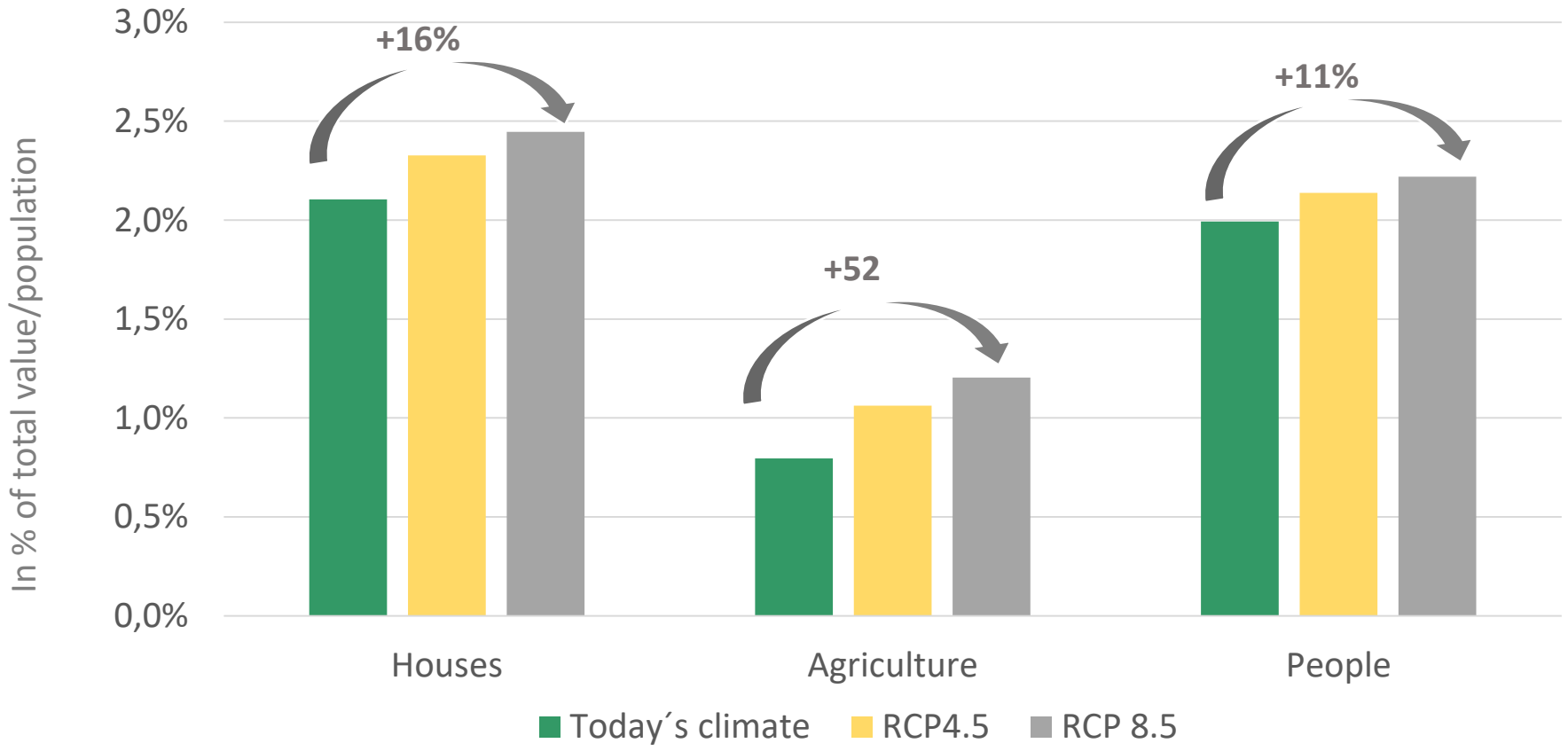


Expected increase in annual damage under RCP 8.5

InsuResilience Solutions Fund

Impact of Surge given Climate Change

Expected Increase of Future Damage due to Climate Change



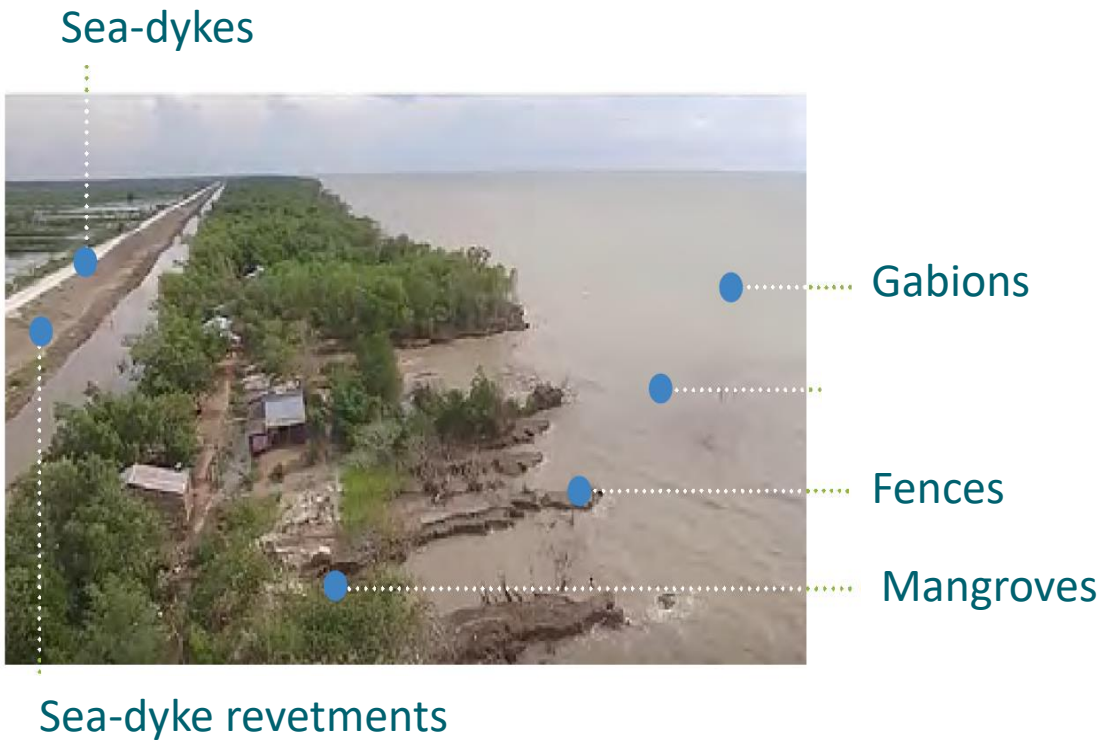
InsuResilience Solutions Fund

Adaptation Measures – Surge

Design

- Set of measures analysed:
  - Rehabilitation sea-dykes
  - Gabions
  - Plantation/rehabilitation mangroves

- Assumed protection against surge up to 3 m water depth



InsuResilience Solutions Fund

Adaptation Measures – Surge

Design

- Combination of all three measures
- Implementation only in Mekong Delta

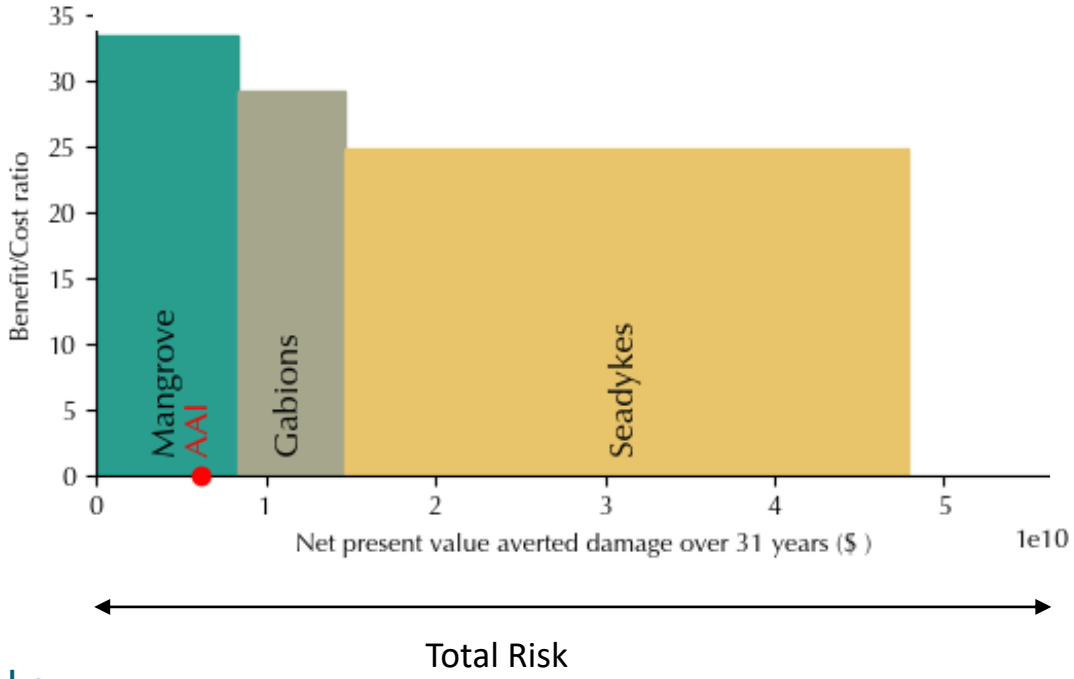
Effects

- Cost: 1.8 Bn USD
- Benefit: 48.8 Bn USD

Alternative options

Change of cost-benefit ratios in case of

- different focus on green vs. grey adaptation measures
- different mangrove width
- different height of sea-dykes



Potential for insurance for remaining risks