Costs of water related climate change versus the limitations in financing

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Historic losses from weather disasters 1950-2005

- Direct economic losses [mld. US$]
- Insured losses [mld. US$]
- Trend economic losses
- Trend insured losses

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Findings

• Global weather losses increased from 8.9 billion to 45.1 billion dollar per year between 1977-2006
• Losses increased 125% per decade
• Global average GDP increased 35-45% per decade

Bouwer et al. 2007, *Science*
Mega-cities with over 5 million inhabitants

1950

Analysis by Munich Re
Data:
U.N. Population Division
Mega-cities with over 5 million inhabitants

Analysis by Munich Re
Data:
U.N. Population Division
Findings

• Projections 2005-2015:
  – Losses increase up to 22% (Tokyo) and 88% (Shanghai, Jakarta)
  – Affected population increase up to 35% (Dhaka)

Bouwer et al. 2007, Science
Conclusions

• No climate signal in loss records yet
• Major driver: increased exposure
• Therefore role of climate seems negligible (still)
• Disproportionate increase in vulnerabilities
• Adaptation/vulnerability reduction:
  – Flood protection
  – Incentives for risk reduction, e.g. government programmes for flood proof building, insurance, etc.
Financing climate adaptation

1. Why adapting?
2. What are the costs?
3. Financierings constructions
4. Sources under the climate convention
5. Other sources
6. Conclusions
1. Why adapting?

CO\textsubscript{2} emissies 2000-21000

Bron: IPCC 2001
1. Why adapting?

Bron: Meinshausen 2004
Consolidating our knowledge: impacts by sector

**WATER**
- Increased water availability in moist tropics and high latitudes
- Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes
- Additional people with increased water stress
- 0.4 to 1.7 billion
- 1.0 to 2.0 billion
- 1.1 to 3.2 billion

**ECOSYSTEMS**
- Increasing amphibian extinction
- About 20 to 30% species at increasingly high risk of extinction
- Major extinctions around the globe
- Widespread coral mortality
- Terrestrial biosphere tends toward a net carbon source, as: ~15%
- ~40% of ecosystems affected
- Increased coral bleaching
- Most corals bleached
- Increasing species range shifts and wildfire risk

**FOOD**
- Crop productivity
- Low latitudes decreases for some cereals
- Increasing for some cereals
- Mid to high latitudes decreases in some regions

**COAST**
- Increased damage from floods and storms
- Additional people at risk of coastal flooding each year
- About 30% loss of coastal wetlands
- 0 to 3 million
- 2 to 15 million

**HEALTH**
- Increasing burden from malnutrition, diarrhoeal, cardio-respiratory and infectious diseases
- Increased morbidity and mortality from heatwaves, floods and droughts
- Changed distribution of some disease vectors
- Substantial burden on health services

**SINGULAR EVENTS**
- Local retreat of ice in Greenland and West Antarctic
- Long term commitment to several metres of sea-level rise due to ice sheet loss
- Leading to reconfiguration of coastlines world wide and inundation of low-lying areas
- Ecosystem changes due to weakening of the meridional overturning circulation

Global mean annual temperature change relative to 1980-1999 (°C)
1. Waarom adaptatie?

Zeespiegelstijging 2x CO₂

Bron: IPCC 2001
2. What are the costs?

- Damages: in the order of 2-10% of global GBP, depending on the temperature rise.
- Costs of adaptation: 7-10% of the costs of damages
- But: large uncertainty about vulnerability

Bron: IPCC 2001
3. Financiering constructions

1. Mutual interest
   → Adaptation in public investments

2. Solidarity
   → ODA

3. Liability
   → Adaptation funds under climate convention
4. Sources under the climate convention

- **Special Climate Change Fund**
  Part of 410 miljoen US$ for technology transfer

- **Least Developed Countries Fund**
  Part of 410 miljoen US$ for National Adaptation Programmes of Action

- **Adaptation Fund**
  Revenues from CDM (~2% of emission reductions) for implementation
5. Other sources

- Global Environment Facility
- ODA
- Public investments
- Private investments
- Insurances (re insurances)
5. Global Environment Facility

- Strategic Priority on Adaptation:
  50 miljoen US$

- Other multilateral environment conventions, including
  - Convention on Biodiversity
  - Convention on Wetlands
  - Convention on Desertification
• ~50 billion US$ per year, but decreasing
• Objective and targets: development and MDGs
• Chances for mainstreaming
5. Public investments

- Investments in infrastructure:
  - Coastal defence
  - Water management
  - Energy production
  - Transport (roads, rail, bridges)
- Disaster preparedness
- Early warning
- Education and awareness raising
5. Private investments

- Potentially 207.6 miljard US$ per year (1998-2002)
- Possibly to direct via spatial planning and sectoral policies towards land use and constructions
5. Insurances

- Coverage for damages due to extremes
- Measures to mitigate damages e.g. Building codes and regulations
6. Conclusions

• Climate change is unavoidable
• Financing under the Convention is available for studies
• Financing under the UNFCCC Convention is grossly insufficient for implementation measures
• Therefore: awareness raising about climate risks
• Mainstreaming in investments
• Additional financing mechanisms necessary: for example compensation via international law?