

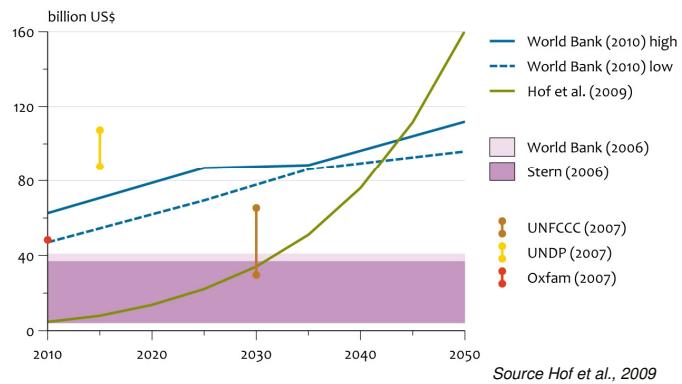
Introduction

- The opportunity for preventing *any* warming has now passed; respond by
 - Minimizing further warming (mitigate)
 - Finding ways to adapt to the impacts warming will bring
- Adaptation cuts across a myriad of sectors, thereby complicating attempts to assess the costs of global adaptation to climate change



Adaptation costs in developing countries

Adaptation costs in developing countries



Source Hof et al., 2009

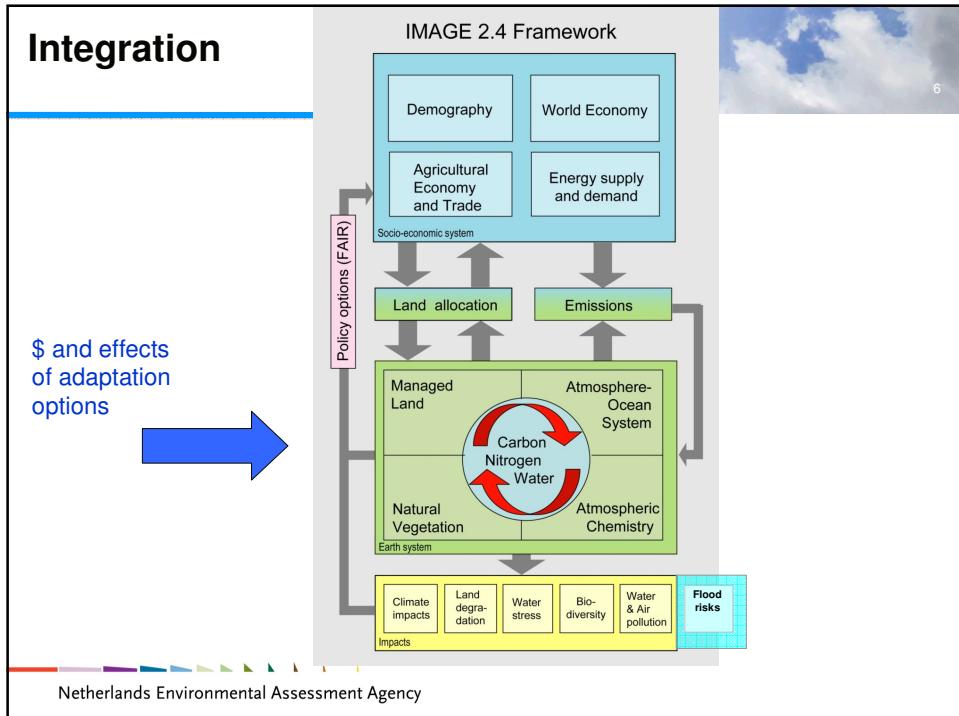
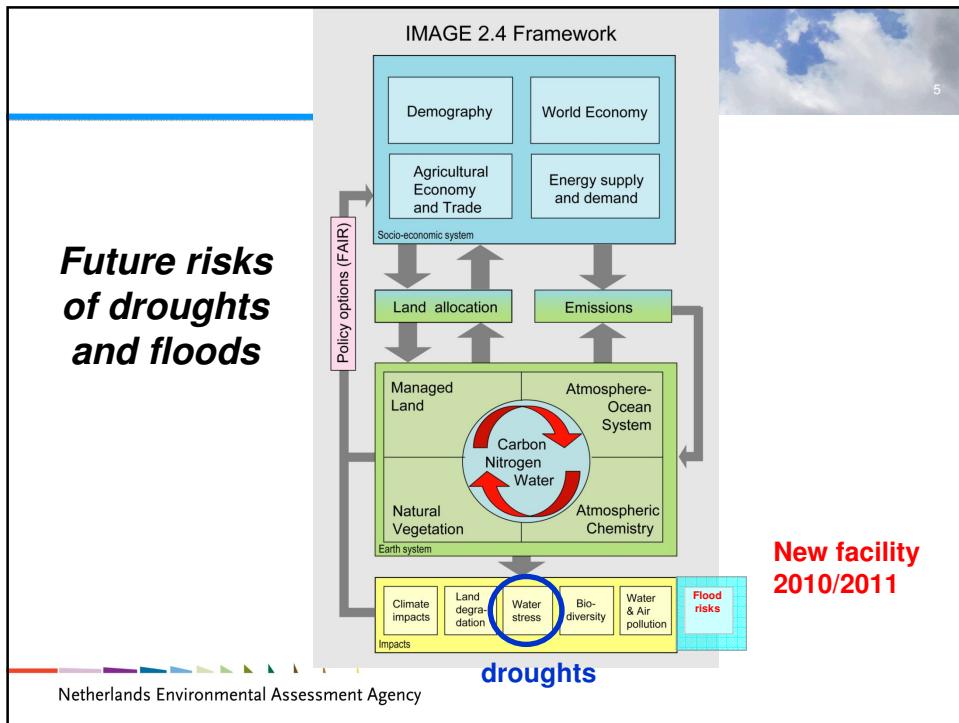
All top-down estimates

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Research Objective

To provide building blocks of knowledge on cost efficiency of adaptation options in developing countries and requirements for effective adaptation strategies within the context of sustainable development.

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Scope of research on adaptation

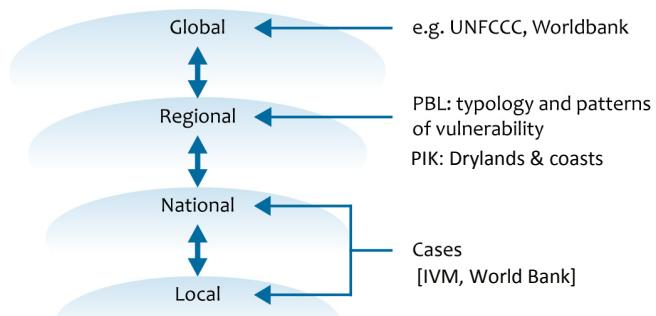
- Focus: developing countries
- Droughts / drylands
 - Floods
 - *Inland*
 - *coastal*
 - Salinisation of deltas
- Typology
 - Drylands
 - Riversystems
 - Coastal zones



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Bridging scales

Challenge: bridging scales

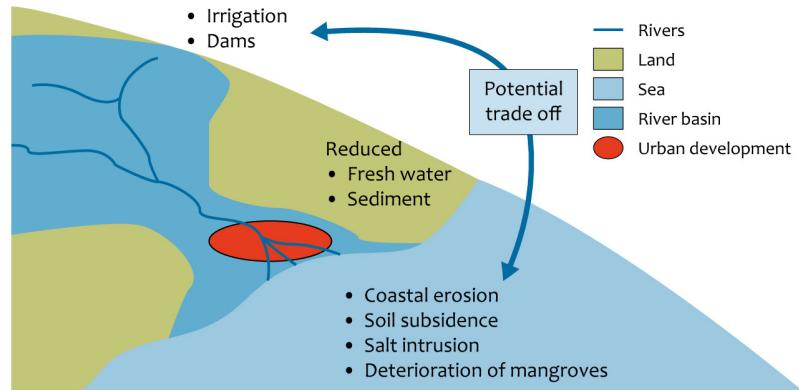


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Interactions trade-offs within river basins

9

Interactions within river basins



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WATER STRESS

AQUIFERS

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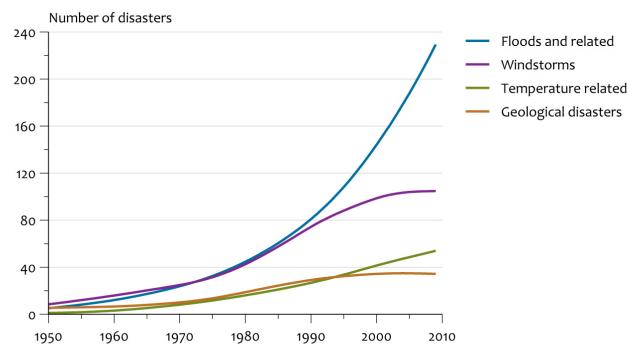
Projected Water Stress in Africa: 2025

0-500	10,001 - 20,000
501 - 1,000	20,001 - 50,000
1,001 - 2,000	50,001 - 100,000
2,001 - 5,000	100,001 - 200,000
5,001 - 10,000	200,001 - 500,000

Discharge per basin based on Gedde, Wassenaar and Gräfe (1999). Global, composite runoff fields based on observed river discharge and simulated water balance, precipitation, and evapotranspiration. Population data from UN Population Division. Water scarcity is defined as the ratio of available water to water use. Non-renewable change and population growth. Source: 2012-2025. © Netherlands Environmental Assessment Agency

Vulnerability to floods

Trends in major types of natural disasters: 1950 – 2009 [as reported by CRED]



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In sum

12

- Risks of drought \Leftrightarrow potential use of deep aquifers
- Risks of floods
- Risk of salinisation of deltas
- Future developments
 - * *climate change*
 - * *population growth*
 - * *land use changes*
 - *
- Types of measures
 - * *Adjustment of behaviour/management*
 - * *Technical measures*
 - * *Land use development*
 - * *Migration (tipping points?)*



Changes in
vulnerability
patterns?

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Methodology (*work in progress*)

	Reduces # casualties	Reduces \$ damage	Indication of costs	Indication of effect
Soft measures				
Technical measures				
Land use measures				
Adaptive capacity measures				

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Overall goal

14

Addressing:

- Drought
- Floods
- Salinisation in deltas

Types

- Adjustment of behaviour/management
- Technical measures
- Land use development
- Migration (tipping points?)

Analysis of main actors

Building blocks
for effective
adaptation strategies

- Adaptive capacity
- Institutional
- Education
- Finances

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The road ahead

- Groundwater report: ready by mid 2011
- Trends in disasters report: ready by mid 2011
- Typologies report: ready by mid 2011
- Final report: ready by end 2012
- Continued cooperation with IGRAC/Deltares, Institute for Environmental Studies
- Future cooperation OECD and WWDR
 - *Water chapters in OECD Environmental Outlook*
 - *Costs and Effects in WWDR 4*

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Thank you!

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