

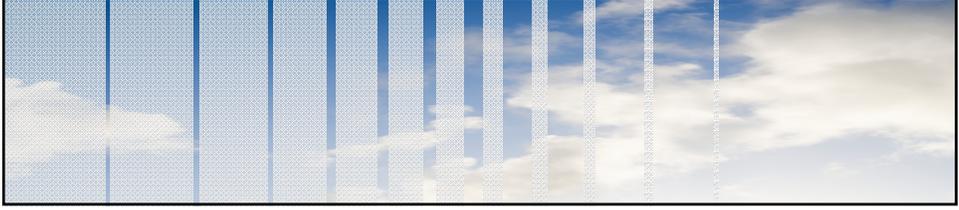


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Bridging the gap

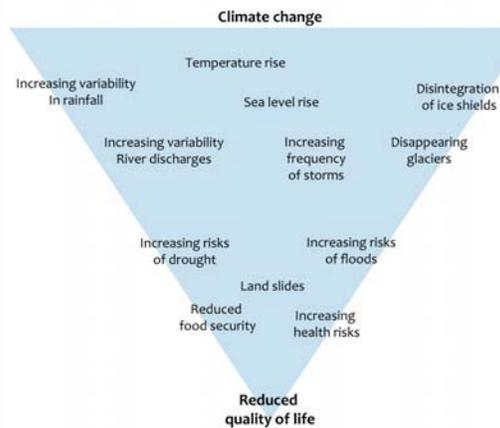
Costs & benefits of adaptation on different scales

Willem Ligtoet



Climate change influences quality of life

Climate change influences quality of life



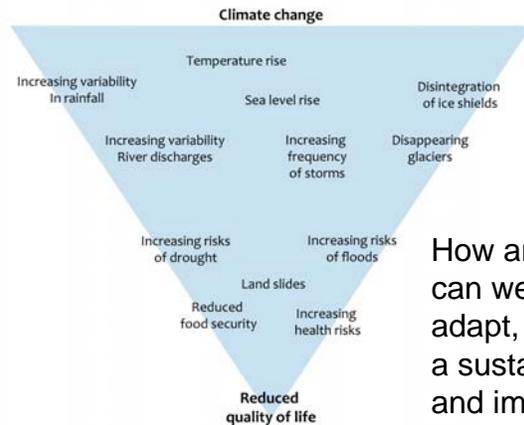
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Climate change influences quality of life

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Climate change influences quality of life



How and how far can we / should we adapt, in order to secure a sustainable development and improvement of the quality of life?

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Sustainable development and adaptation

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Guiding questions:

- How to come to an integrated strategy on sustainable development and adaptation?
- What are the costs and benefits of adaptation? How to bridge the gap between global, national and local scales?
- How do adaptation measures and strategies interact with other important policy fields: achieving MDGs, conserving biodiversity, biofuel production, (re) forestation.

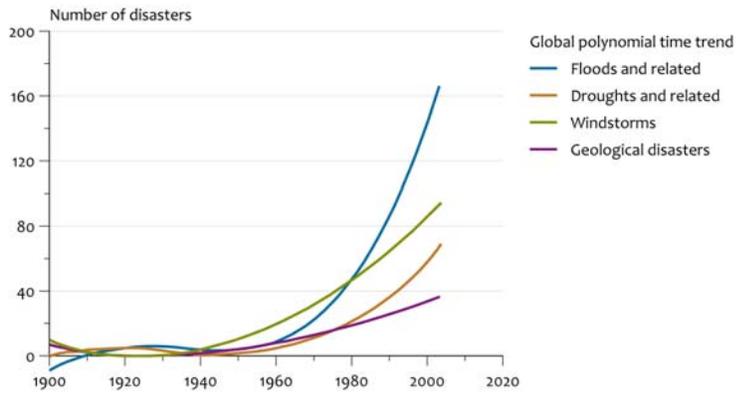
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Climate related natural disasters are increasing

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Four major types of natural disasters



Source: Centre for Research on the Epidemiology of Disasters (2004)

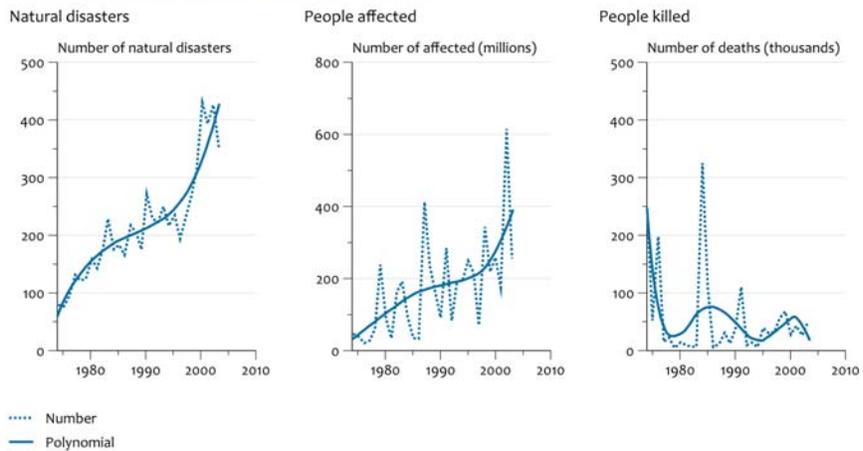
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More people affected

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Natural disasters, people affected and people killed



Source: Centre for Research on the Epidemiology of Disasters (2004)

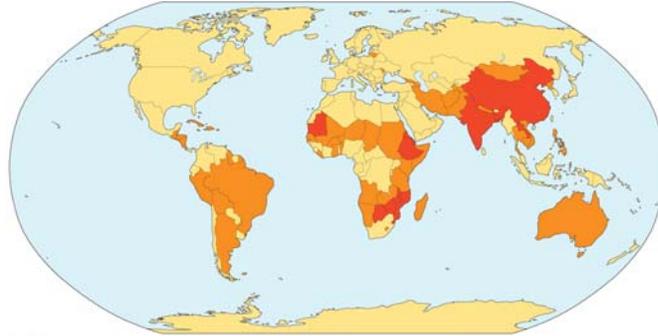
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Mainly lower-income countries affected

Victims of natural disasters, 1974-2003

By 100,000 inhabitants



Source: EM-DAT: The OFDA/CRED International Disaster Database

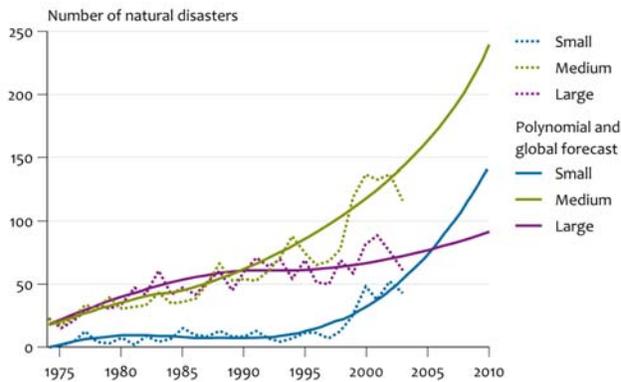
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Small and medium-sized natural disasters are increasing

Natural disasters in low and lower middle income countries

Low and lower middle income countries

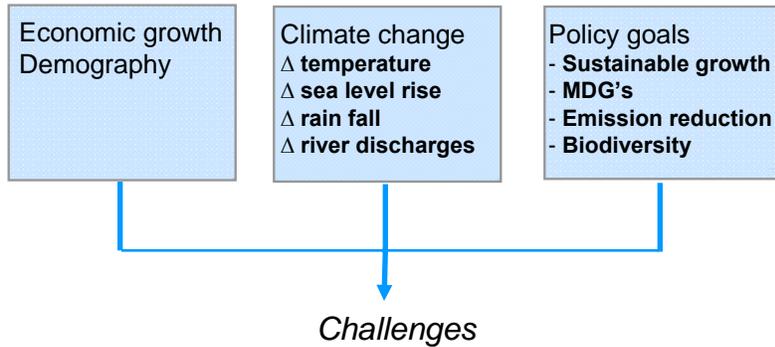


Source: Centre for Research on the Epidemiology of Disasters (2004)

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So: how to minimise effect of climate change



Adaptation costs estimated on global scale

Estimated costs of technical measures

Sector	Costs (US\$ billion)			≈	ODA
	UNFCCC (2007)	EACC (2009)			
		NCAR	CSIRO		
Agriculture, Forestry, Fisheries	7	5.5	5.4		
Water Supply	9	13.7	19.2		
Human Health	5	2	1.6		
Coastal Zones	5	30.1	29.6		
Infrastructure	2-41	29.5	13.5		
Extreme events	--	6.7	6.5		
Total	28-67	87.5	75.8		

Adaptation costs estimated on global scale

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Estimated costs of technical measures

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Water related:
ca 50% of the
estimated
adaptation costs

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Source: Worldbank (2009)

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Adaptation costs – still large uncertainties

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Estimated costs of technical measures

Sector	Costs (US\$ billion)		
	UNFCCC (2007)	EACC (2009)	
Agriculture, Fisheries			
Water Supply			
Human Health			
Coastal Zones			
Infrastructure			
Extreme events			
Total	28-67	87.5	75.8

But:

- still large uncertainties
- excl. interaction between sectors
- excl. ecosystem services
- excl. “soft measures“
- excl. spatial development measures

Water related:
ca 50% of the
estimated
adaptation costs

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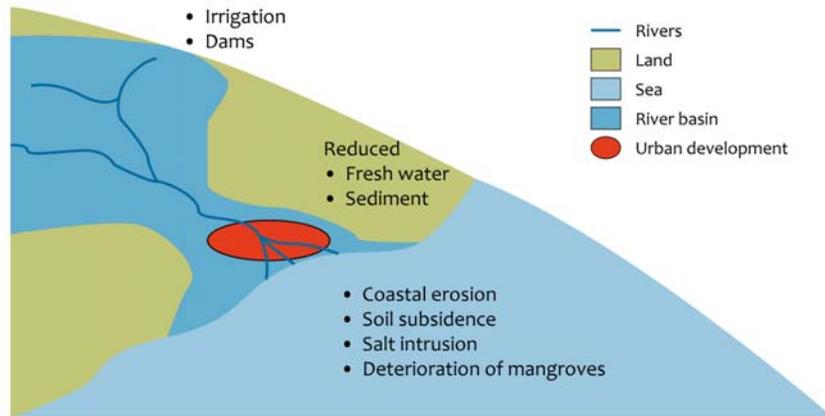
Source: Worldbank (2009)

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Also: interactions within river basins

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Interactions within river basins



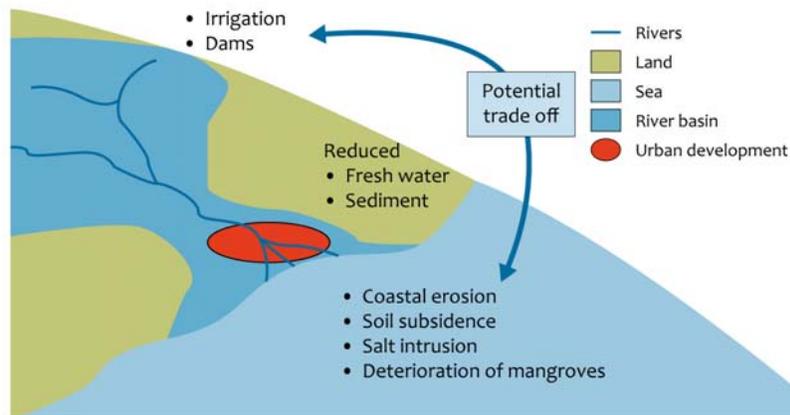
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Also: interactions within river basins

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Interactions within river basins



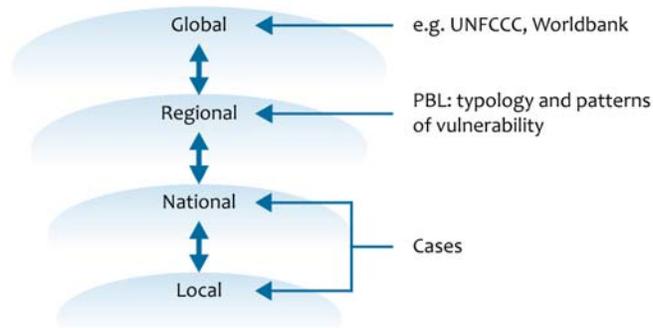
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Challenge: bridging scales

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Challenge: bridging scales



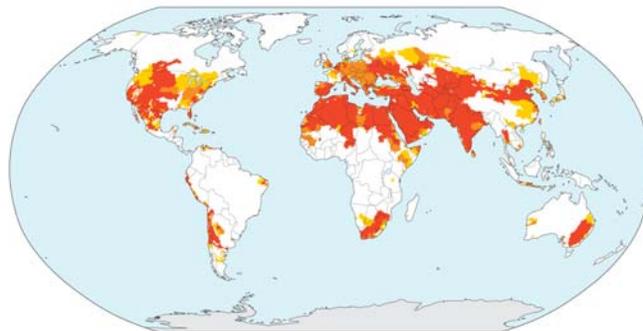
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Example 1: patterns of vulnerability

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Water stress, 2030



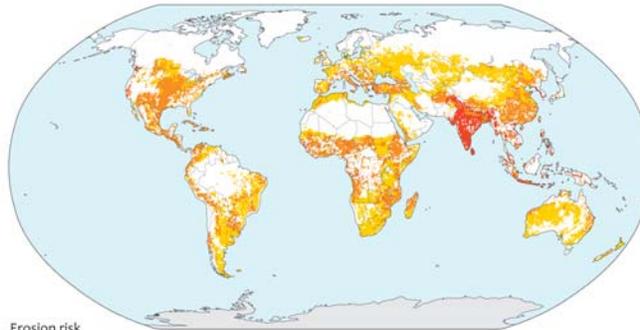
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Example 2: patterns of vulnerability

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Sensitivity to water related soil erosion, 2030



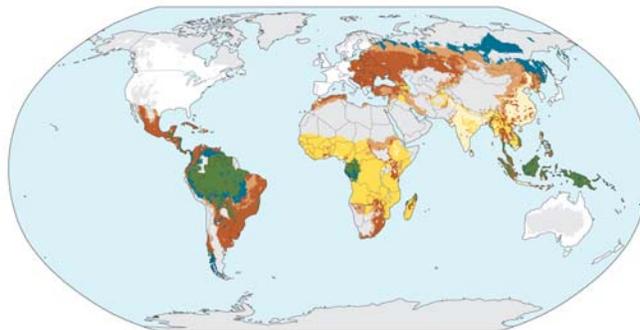
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Example 3: patterns of vulnerability

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Global distribution risk profile of vulnerability of food security due to biofuel production

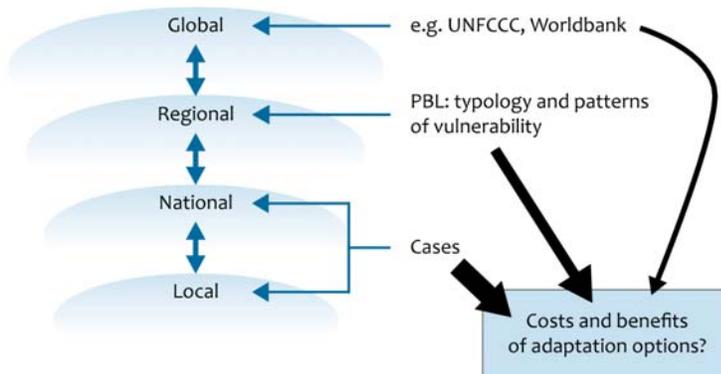


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Challenge: bridging scales

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Challenge: bridging scales



Adaptation options to be considered

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Adaptation options to be considered

Vulnerability types (to be developed)



Adaptation options:

- 1 Adjusting behaviour/operational management
- 2 Technology
- 3 Land-use development
- 4 Migration

Adaptation options to be considered

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Adaptation options to be considered

Vulnerability types (to be developed)



Adaptation options:

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Adaptation options to be considered

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Adaptation options to be considered

Vulnerability types (to be developed)



Adaptation options:

- 1 Adjusting behaviour/operational management
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Adaptive capacity

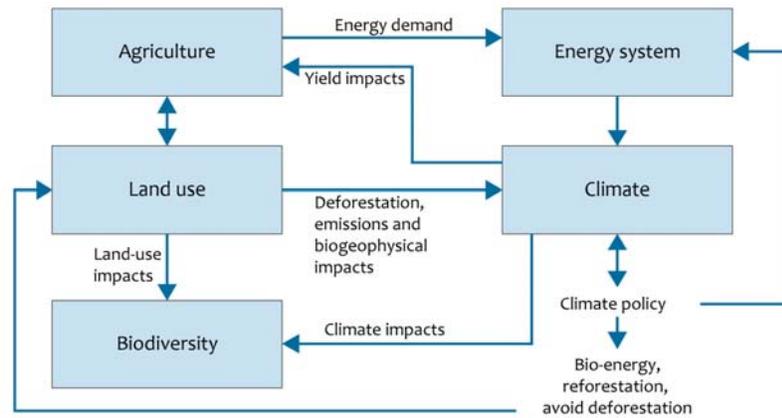
- Institutions
- Education
- Finances



Focus on land use – important interactions

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Thematic relationships



Analysis of costs and benefits

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Analysis of costs and benefits

Adaptation options: a, b, c, d, ...

Analysis of costs and benefits

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Analysis of costs and benefits

Adaptation options: a, b, c, d, ...



Costs and Benefits



US\$

Analysis of costs and benefits

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Analysis of costs and benefits

Adaptation options: a, b, c, d, ...



Costs and Benefits



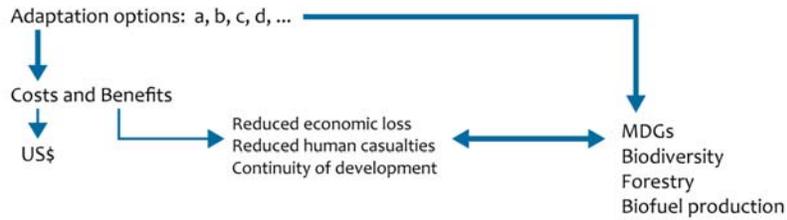
US\$

Reduced economic loss
Reduced human casualties
Continuity of development

Analysis of interaction with other policies

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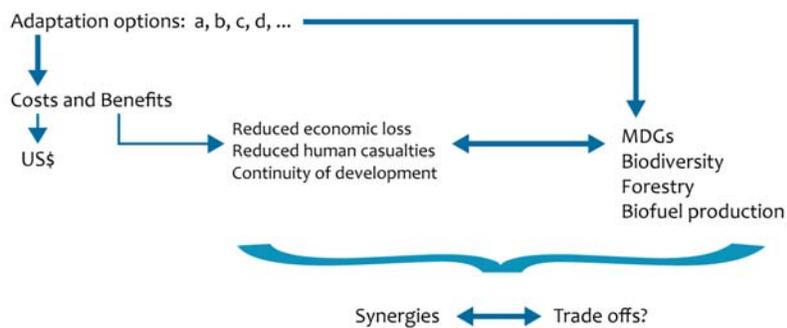
Analysis of costs and benefits



Analysis of interaction with other policies

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Analysis of costs and benefits



Summarising: scope of PBL research on sustainable development and adaptation

29

- Focus climate change ↔ water ↔ land use
- Typology based on:
 - Drought
 - Floods (rivers, coastal zones)
- Costs and benefits
- Synergies/trade-offs with MDG strategies, conserving biodiversity, forestry, biofuel crops

 Building blocks for integrated strategy on sustainable development and adaptation

Summarising: scope of PBL research on sustainable development and adaptation

30

- Focus climate change ↔ water ↔ land use
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 - Floods (rivers, coastal zones)
- Costs and benefits
- Synergies/trade-offs with MDG strategies, conserving biodiversity, forestry, biofuel production

(Climate change and changes in vector borne diseases: PBL study for OECD)

For discussion

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- Comments on approach? Typology /costs and benefits / synergies and trade offs?
- Are cases available (e.g. deltas, dry areas) exploring costs and benefits for different adaptation options: soft – technical – spatial measures?
- How to build up a common knowledge base on costs and benefits of adaptation in different regions?



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