

# Adapting to Climate Change

## Why and How?

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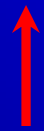
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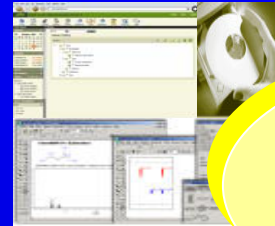
# Outline

- Climate change and its impacts
- Climate adaptation practices
- Strategies for mainstreaming climate adaptation
- Issues for enhanced adaptive capacity

# Economic Growth and Societal Transformation



ECONOMIC GROWTH



**Natural Products**

**Industrial Technology and value added Products**

**Explicit Knowledge through networks**

**Innovative knowledge-Intensive Products/Services**

SOCIETAL TRANSFORMATION

**Agriculture Society**

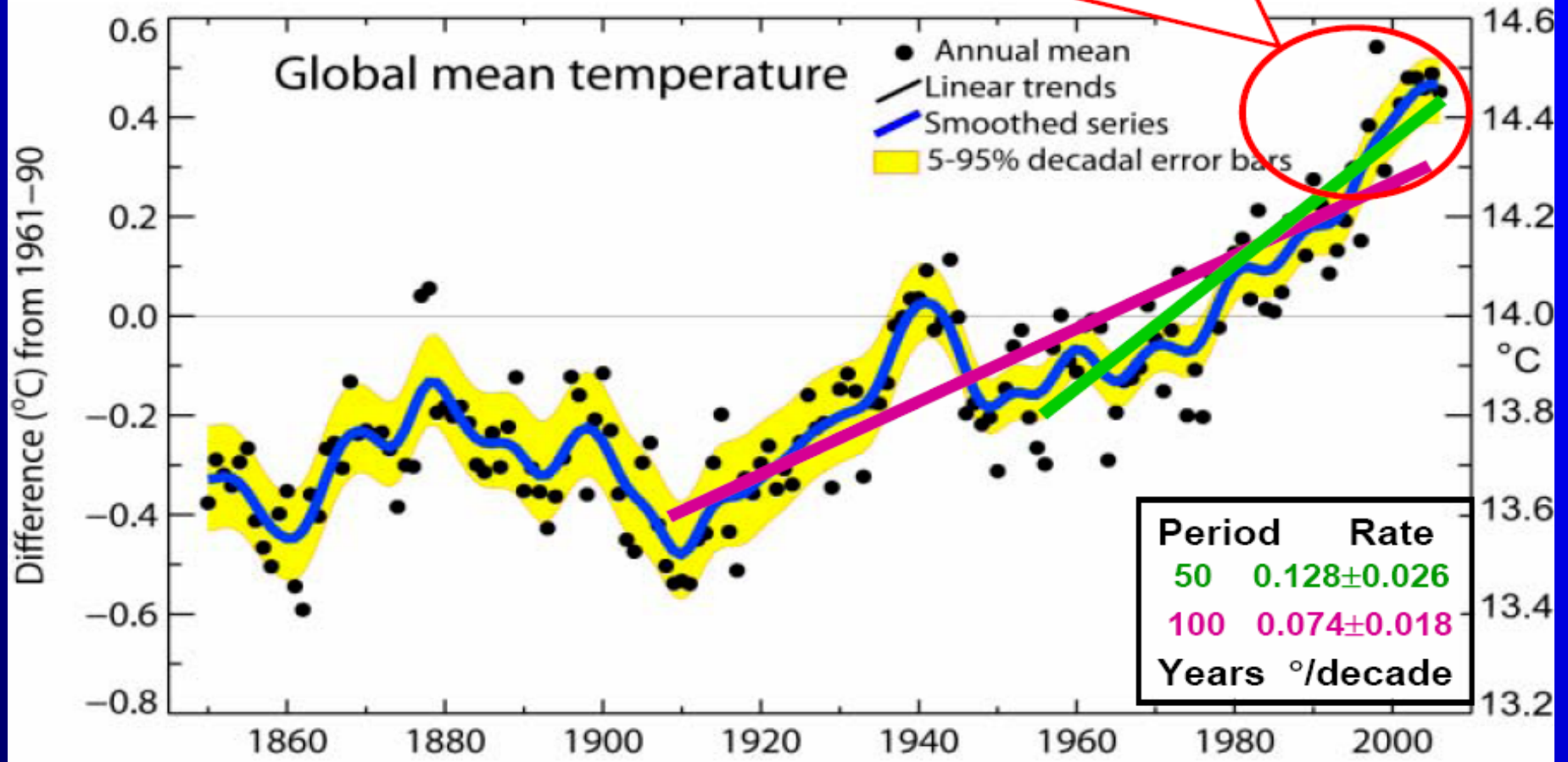
**Industrial Society**

**Information Society**

**Knowledge Society**

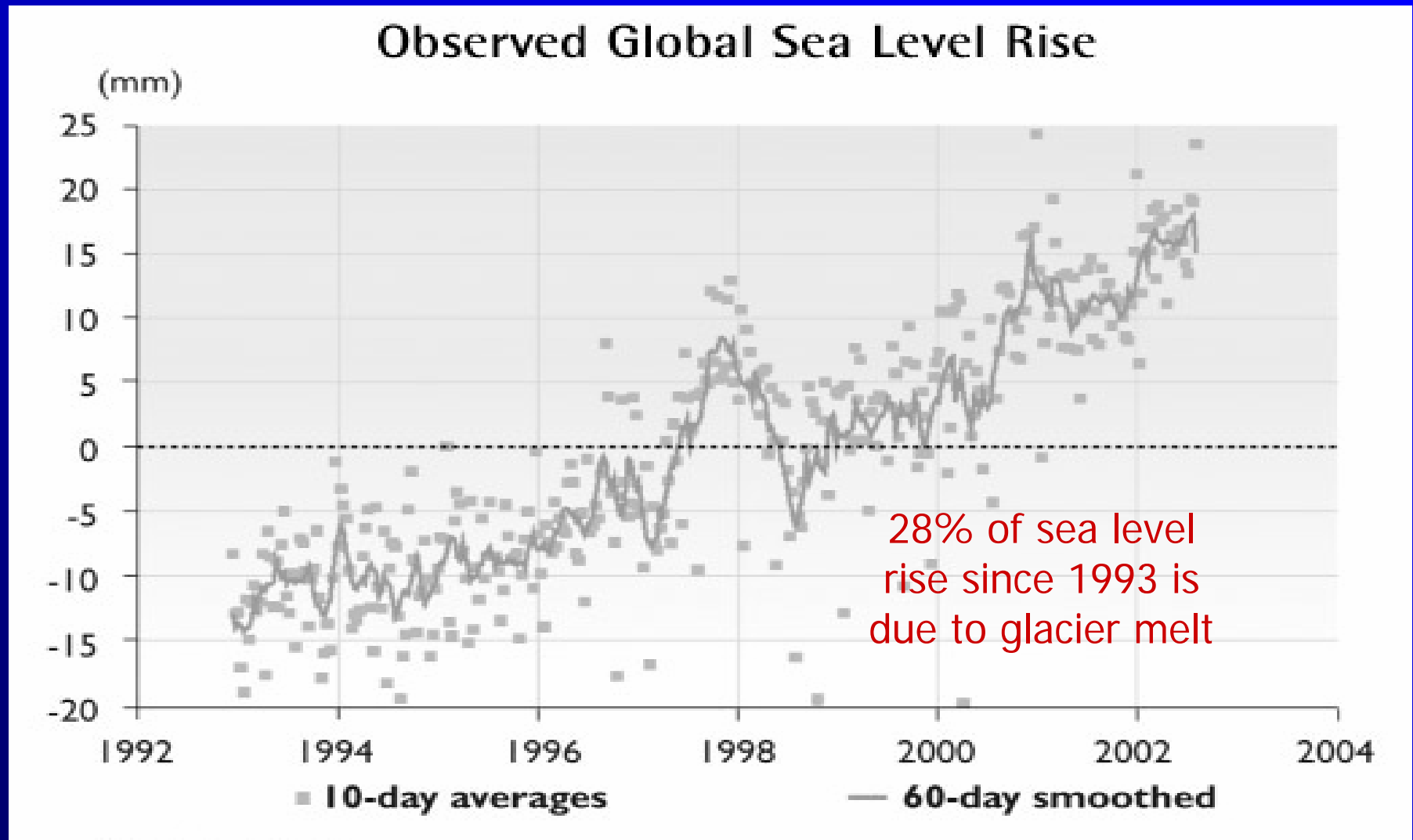
# Signature of Development on Earth (1)

**Warmest 12 years:**  
 1998, 2005, 2003, 2002, 2004, 2006,  
 2001, 1997, 1995, 1999, 1990, 2000



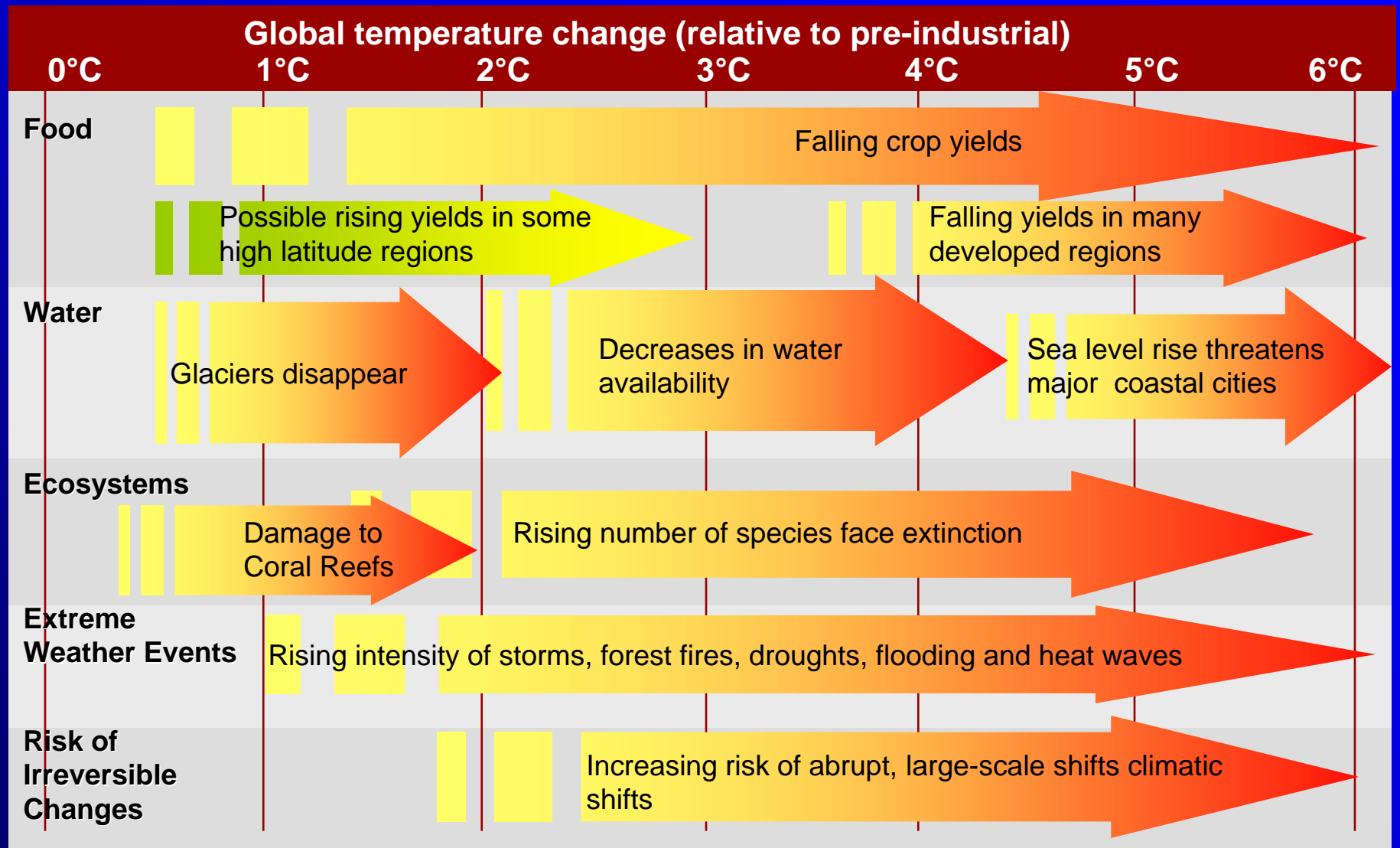
Source: IPCC, 2007

## Signature of Development on Earth (2)



Source: IPCC, 2007

# Projected Impacts of Climate Change



280ppm CO<sub>2</sub>e  
(Pre-Industrial)

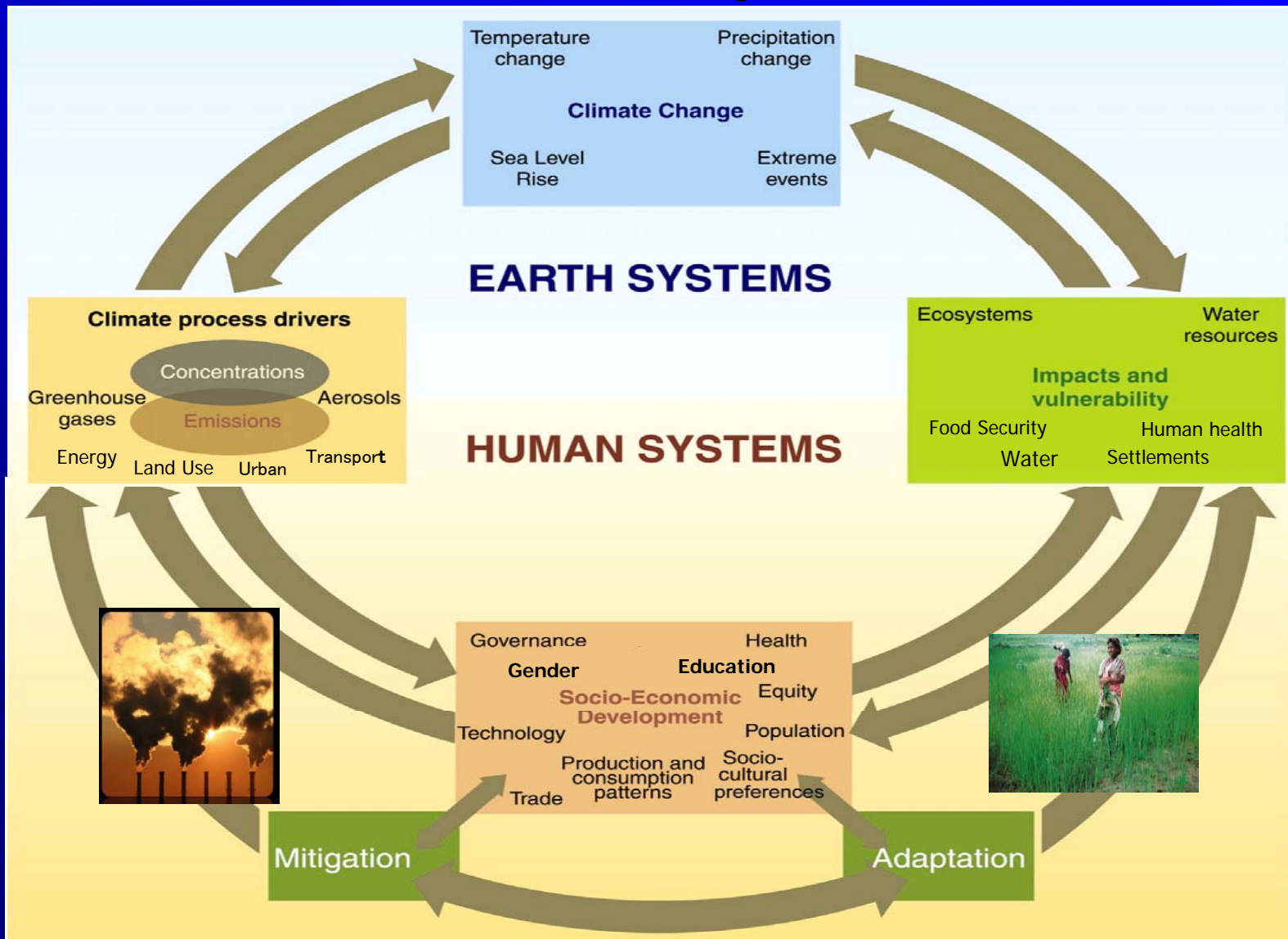
430ppm CO<sub>2</sub>e (Today)

550ppm CO<sub>2</sub>e

650ppm CO<sub>2</sub>e

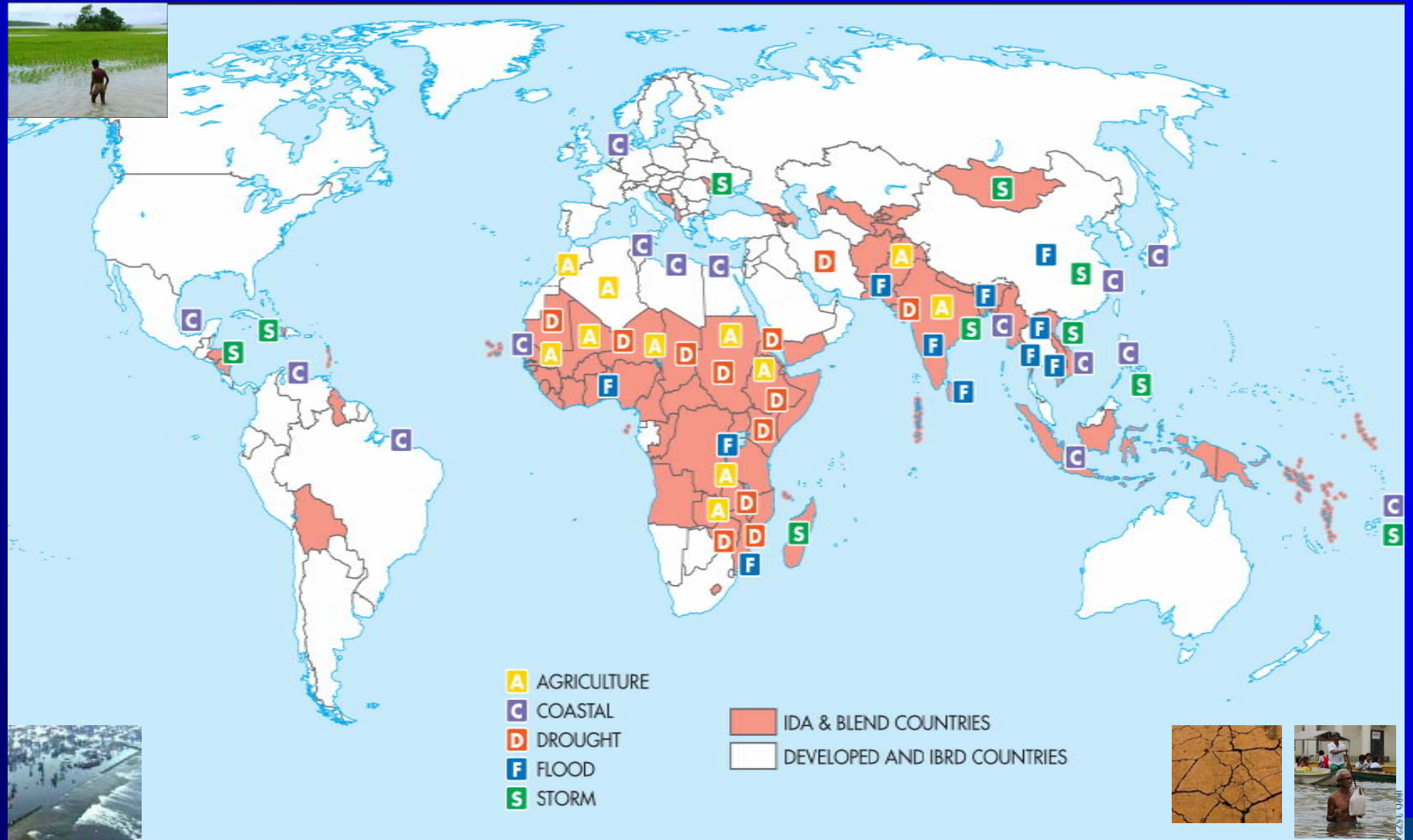


# Climate Change is Closely Linked to Human Security



Source: ADB, IPCC

# Right now - Adaptation is a developmental issue for the Asia Pacific Region



Source: World Bank, 2003

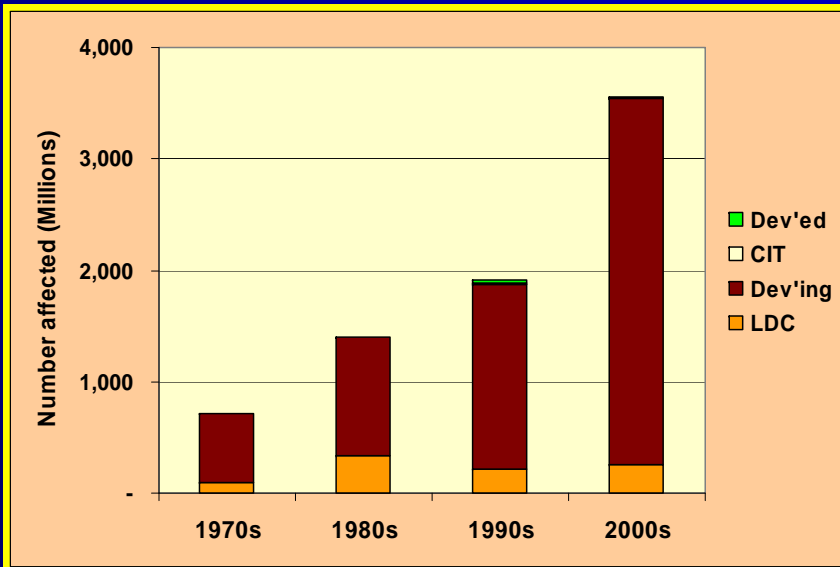
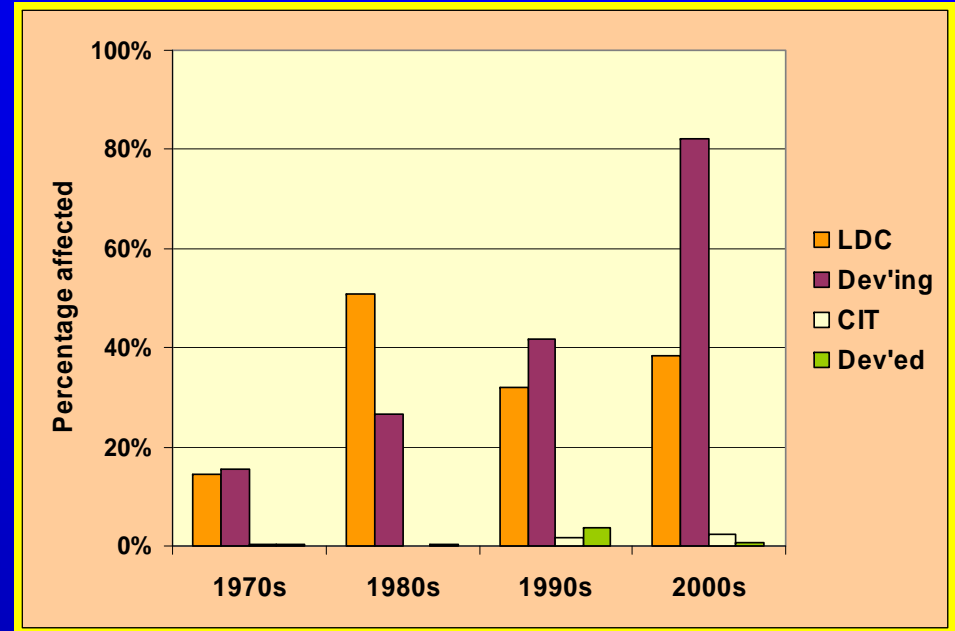
## Climate Change - Uniqueness of Asia

- ❑ 574 million people:
  - 19% living below \$1.25/day
  - 44% living below \$2.00/day
- ❑ Fastest rate of urbanization:
  - Urban population growing at 1.6 – 4.4%
  - Occurring mostly in coastal areas
- ❑ Rank 3<sup>rd</sup> in the world in length of coastline
- ❑ Major producers and suppliers of grains, industrial crops, and forest products
- ❑ Total GHG emissions is 30% of the world in 2006

# Adaptation Challenges are unevenly Distributed

2 billion people in developing countries were affected by a climate related disaster in the 1990s.

The rate has double in this decade



40 to 80% of the population in developing countries versus a few % in more developed countries

# Impacts of Climate Change in Asia

## Agriculture and Food Supply

Decrease in crop yields up to 30% by 2050 due to drought and temperature increase.

## Water Security

Heavy floods will affect more than 1 billion people by 2050

## Coastal Areas

Coastal erosion and inundation in small island countries – climate refugees; bio-diversity

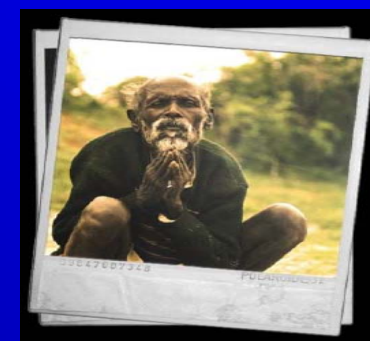
## Human health

Mortality due to diarrhea disease and exacerbation of cholera in mega deltas.



# Adaptation – What can be done?

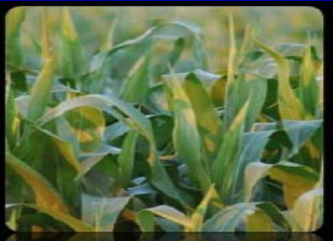



- Change crop species
- Alter cropping patterns
- Improve irrigation systems
- Establish vegetative buffers
- Harvest and store more water
- Improve disaster preparedness
- Strengthen health care systems
- Provide insurance
- Design flexible infrastructure
- Establish early warning systems



Or MIGRATE

Adaptation is a multi-sectoral, multi-stakeholder issue

# A Continuum of Climate Change Adaptation Measures

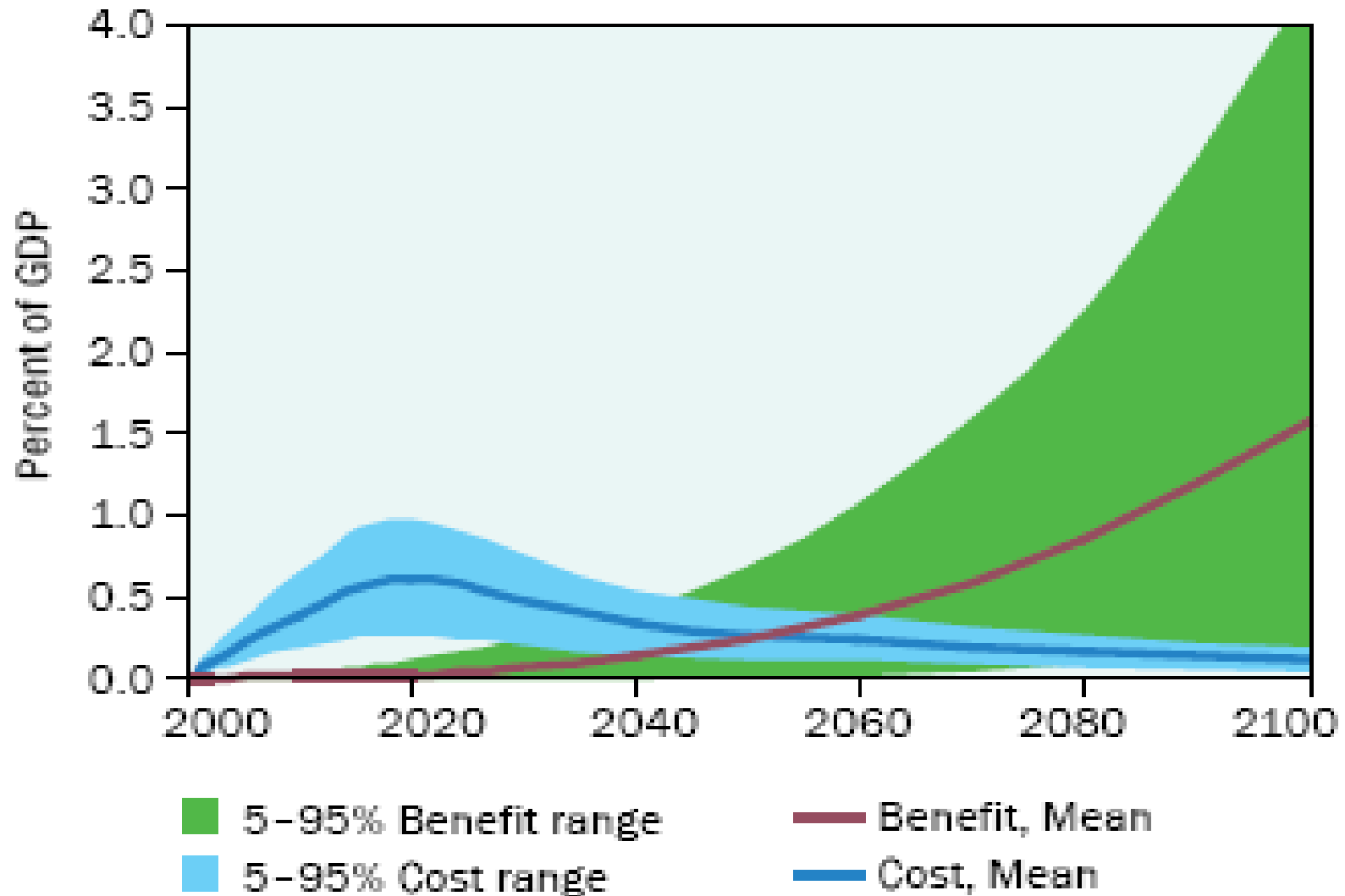
Adaptation focus	Vulnerability reduction		Response to impacts	
Benefit in the absence of CC	100%		0%	
Example	<p><b>CHINA:</b> Providing farmers drought tolerant varieties &amp; training for water saving methods</p> 	<p><b>INDIA:</b> Teaching officials to collect climate data and integrate in their planning decisions</p> 	<p><b>FIJI:</b> Coastal zone protection with vegetative buffers like mangroves</p> 	<p><b>BANGLADESH:</b> Constructing shelters in response to frequent cyclones</p> 
Type	Non-structural		Structural	

## **Mainstreaming of Climate Adaptation into Developmental Agenda – No more an exception, but a necessity**

Incorporation of initiatives, measures, strategies to reduce climate vulnerability to climate change into other existing policies, programs, resource management structures, and other livelihood enhancement activities, so that 'adaptation to climate change' becomes part of, or consistent with, other, well established sectoral programs.

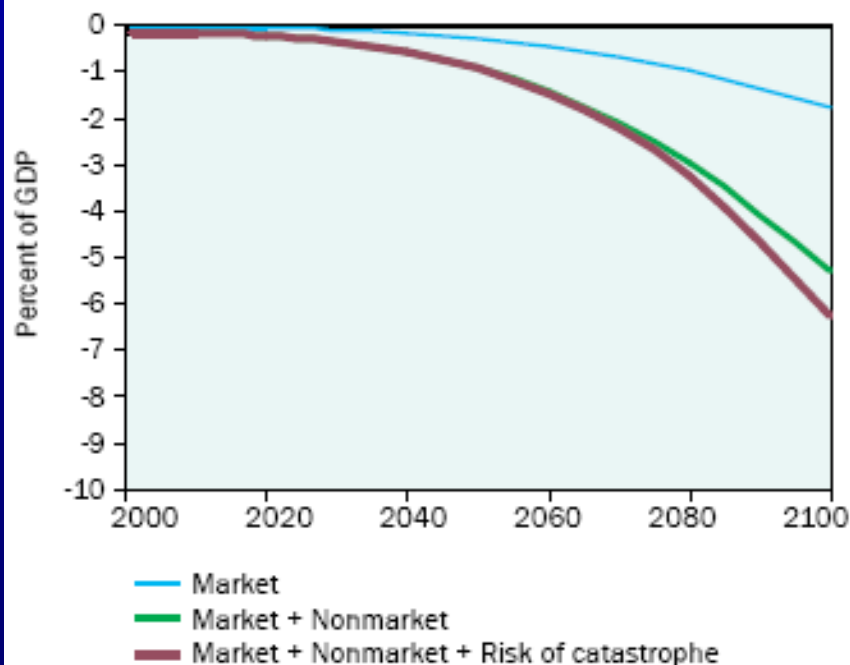
# Adaptation Makes Economic Sense

Figure H13 **Cost and Benefit of Adaptation**

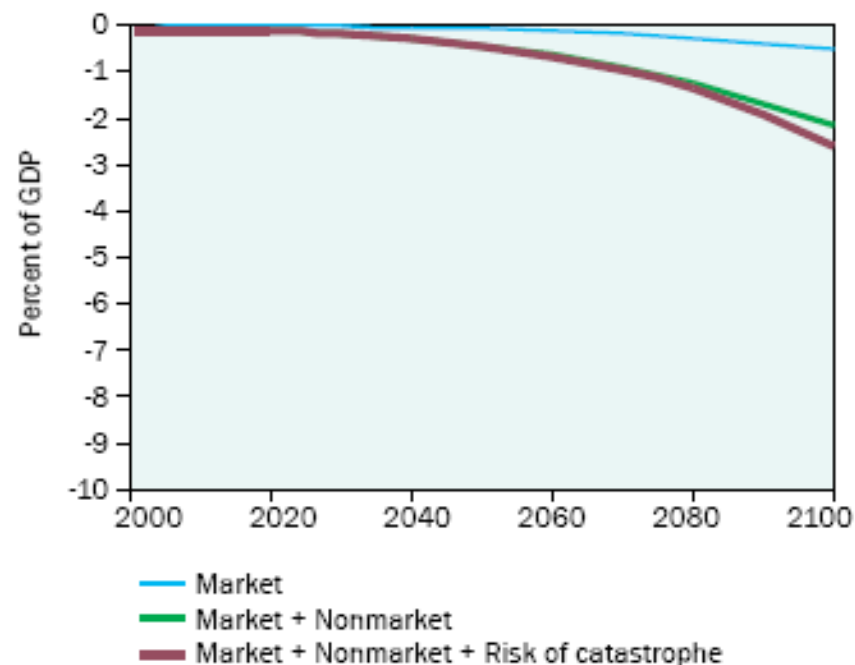


**SEA (5) could lose 6.3% of GDP by 2100, if non-market impacts and catastrophic risks are also taken into account.**

**Figure H9 Impact at Mean in Study Countries under A2 Scenario**



**Figure H10 Global Impact at Mean under A2 Scenario**



Source: ADB, 2009


# Approaches for Mainstreaming

- Top down Vs Bottom up
- Institutional driven Vs Community based
- Policy level Vs Operational level
- Domestic Vs Externally funded

## Benefits of Mainstreaming of climate change adaptation

- No two agendas. Climate adaptation is seen through the lens of development
- Effective and efficient use of institutional and financial resources
- Insurance to ongoing and future developmental projects or programs from climate change risk
- Resilience capacity of community livelihood
- Reduced chances of maladaptation

# Mainstreaming gives a different picture of Economic Growth prospects

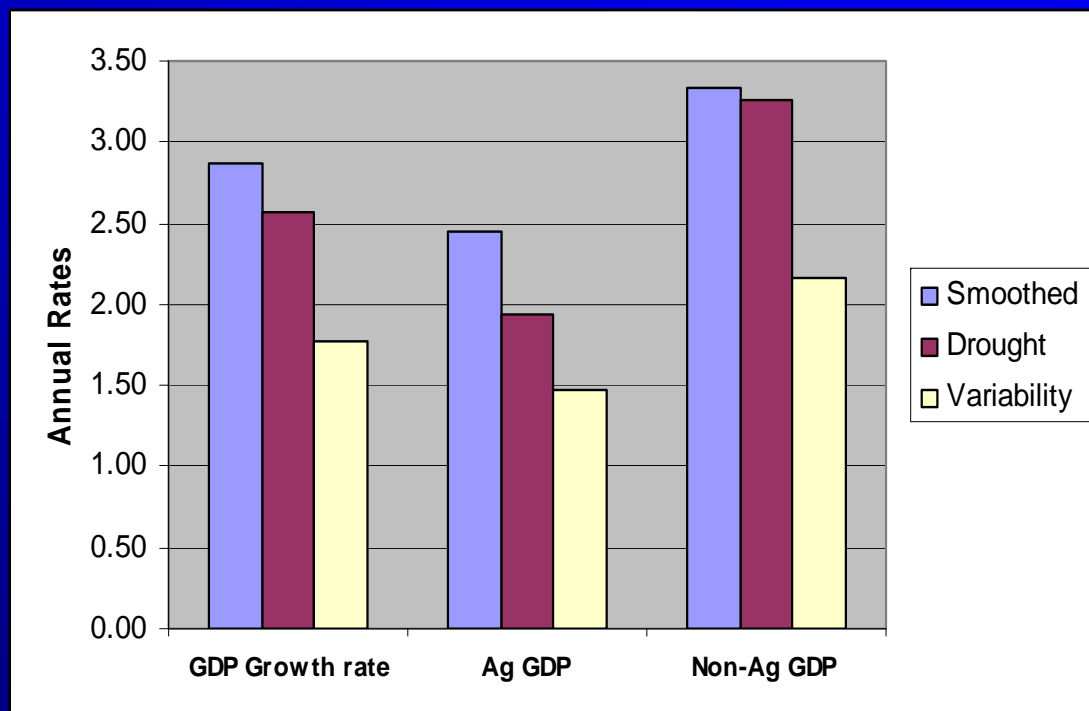
Adaptation Benefit		Temperature change		
Yield change (%) 	Rainfall	< 2° C	2 - 4° C	> 4° C
	Increase	30	19	17
	Decrease	9	11	15

(After Easterling, 2007)

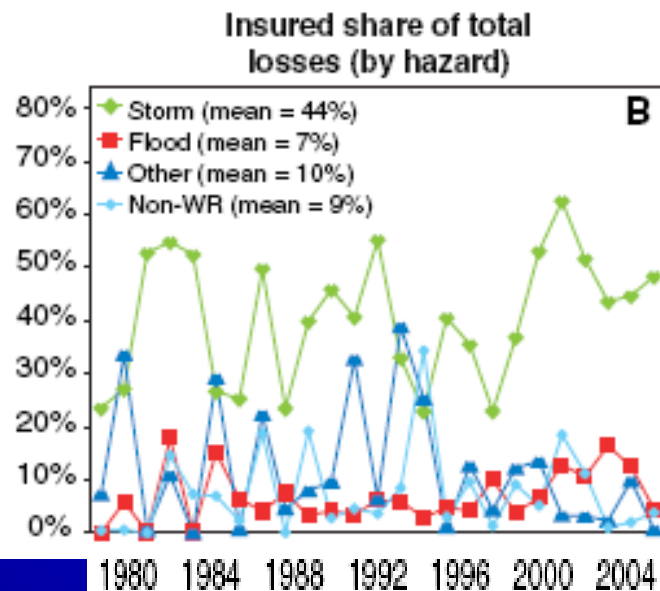
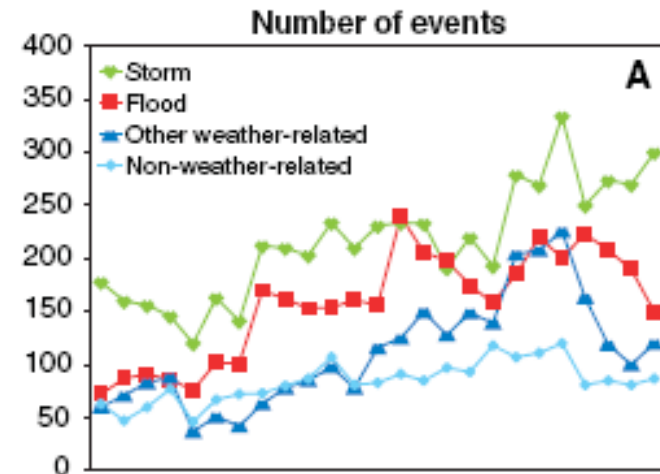
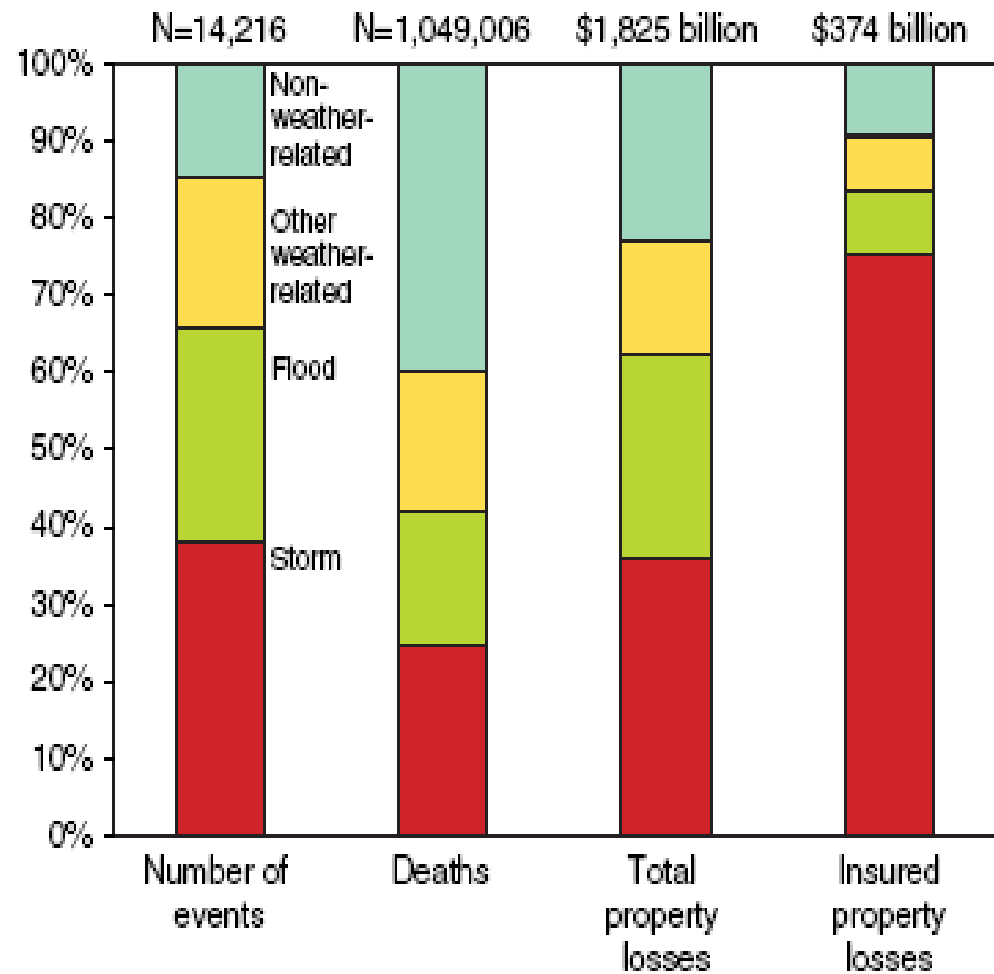
## Key Adaptation measures

- Change in crop varieties
- Alterations in cropping pattern
- Wider use of water harvesting technology
- Improved drainage condition
- Using climate forecasting systems

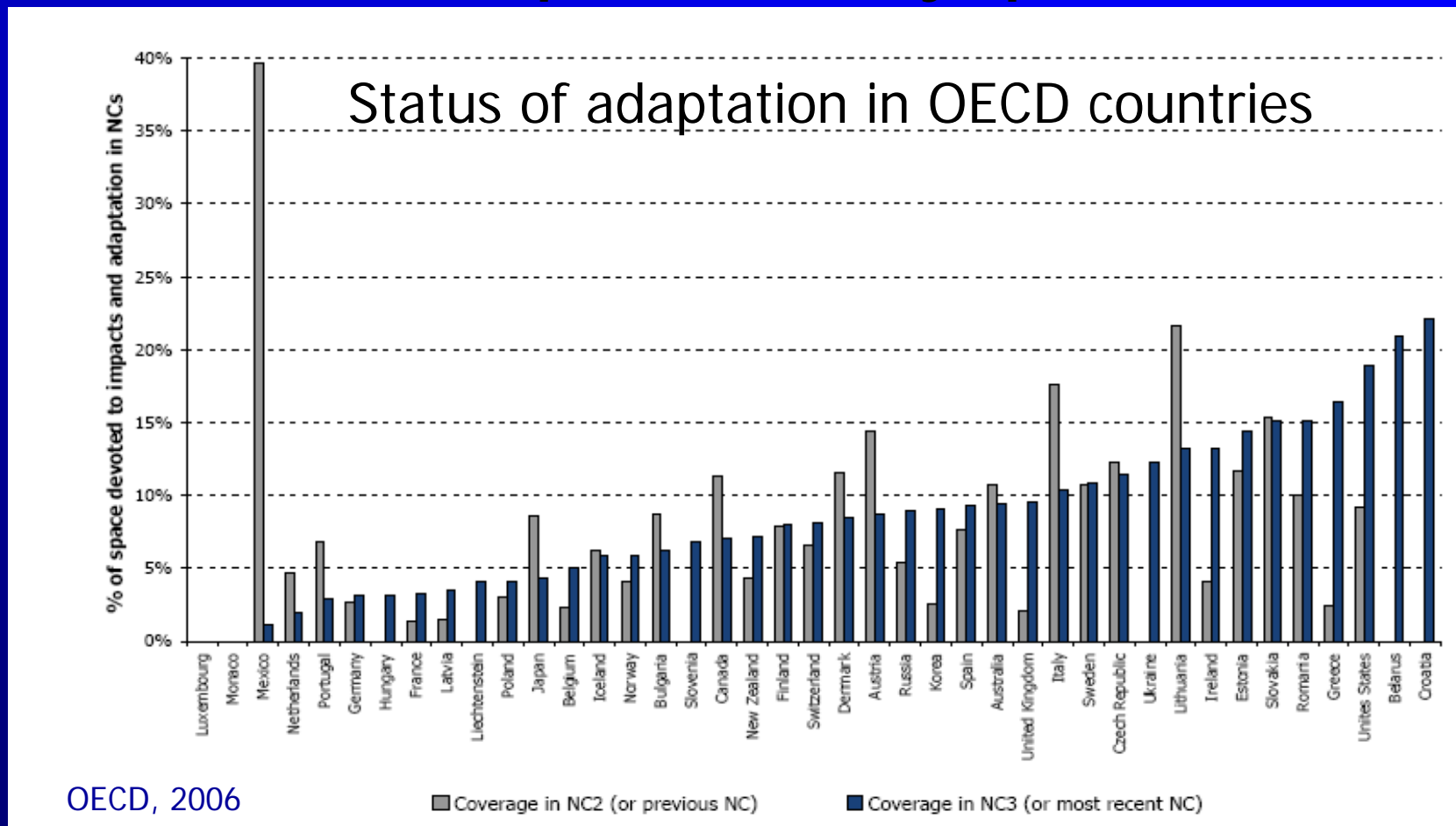
(After Ion, 2007)



# Mainstreaming can avoid Maladaptation



# Adaptation Agendas are getting integrated into Developmental Policy Space



- Integration of adaptation in EIA of infrastructure (Malaysia)
- Climate risk assessment at regional planning level (Vietnam)
- Climate change in national water management plan (Bangladesh)
- New construction codes for coastal infrastructure (Singapore)
- Grants for scientific research on adaptation (India)

## Relative Coverage of Adaptation in the latest National Communication (NC) by Asian Countries

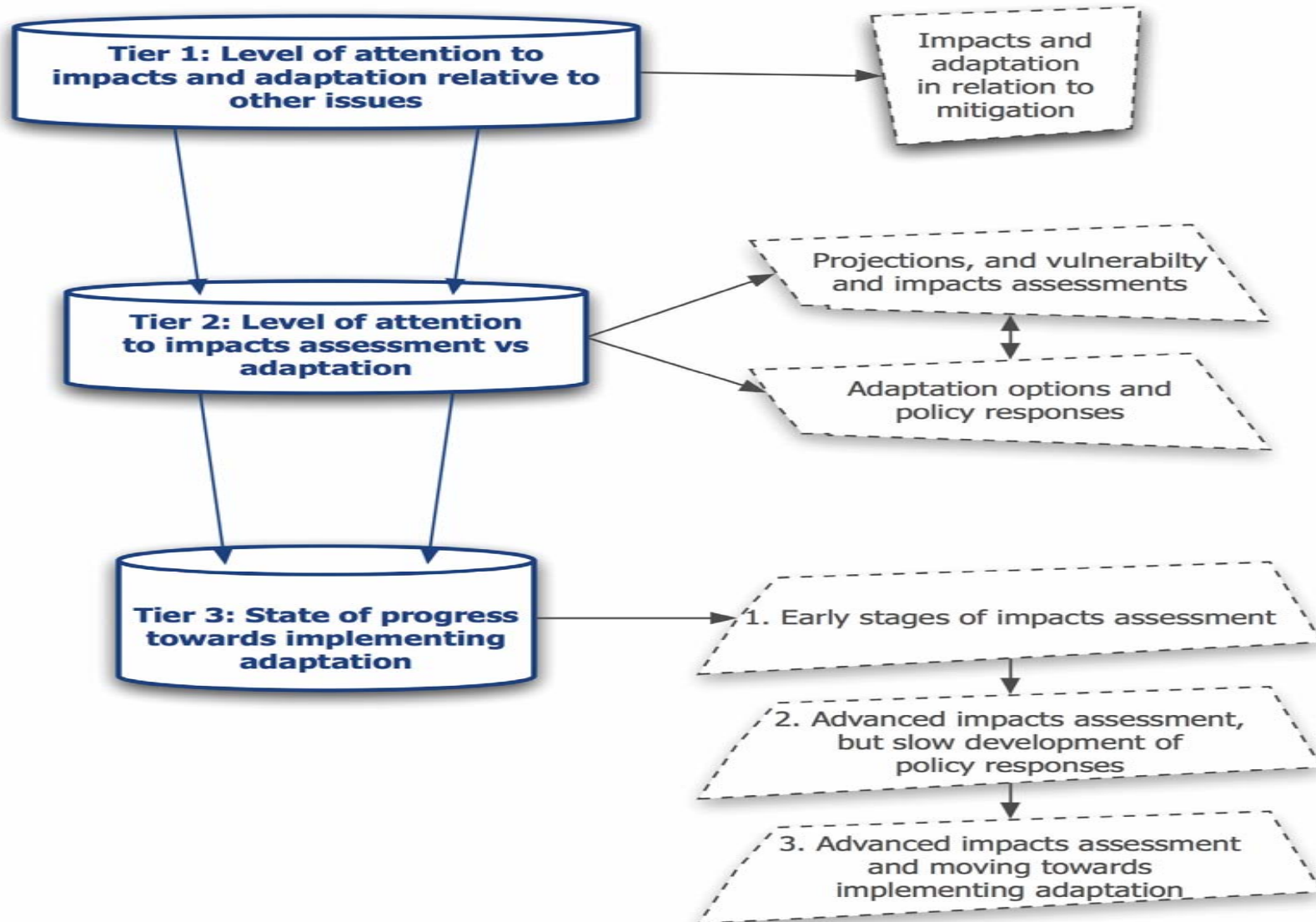
Country	Total number of pages	No. of pages describing impacts and vulnerability	No. of pages discussing adaptation policies
Bhutan	63	10	2
Cambodia	79	8	2
China	112	13	4
India	292	48	8
Indonesia	116	10	3
Japan	314	11	0.5
Lao PDR	97	two lines	one line
Malaysia	131	30	7
Maldives	134	30	10
Mongolia	106	18	7
Nepal	181	41	10
Pakistan	92	14	9
Papua New Guinea	83	20	6
The Republic of Korea	132	8	2
Singapore	75	5	one line
Sri Lanka	122	12	5
Thailand	100	15	2.5
The Philippines	107	20	12
Vietnam	135	17	4

Sources: National Communications submitted to UNFCCC

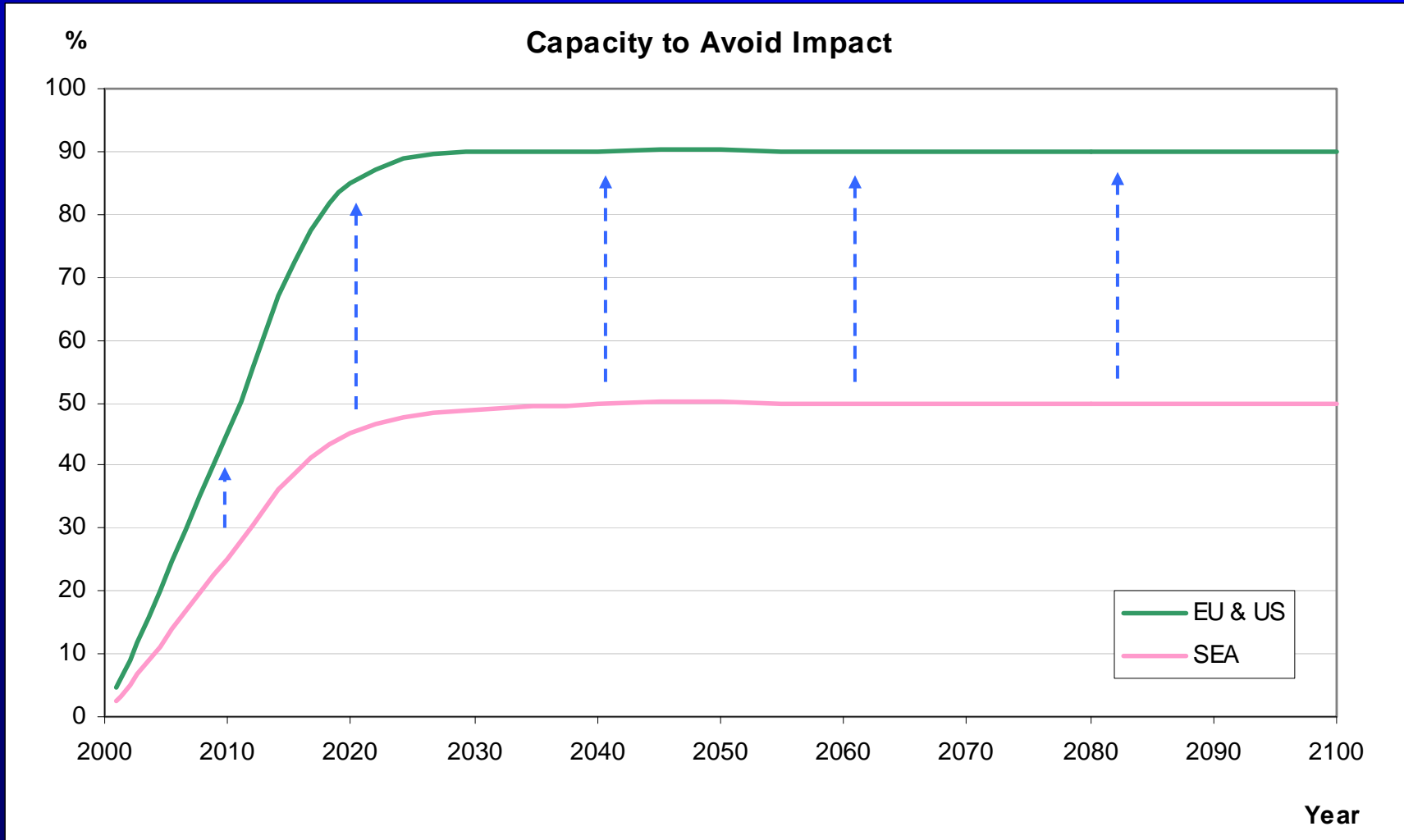
After IGES (2008)

Adaptation is not a Priority Developing countries have more immediate concerns to deal with, such as water and food security, education and health

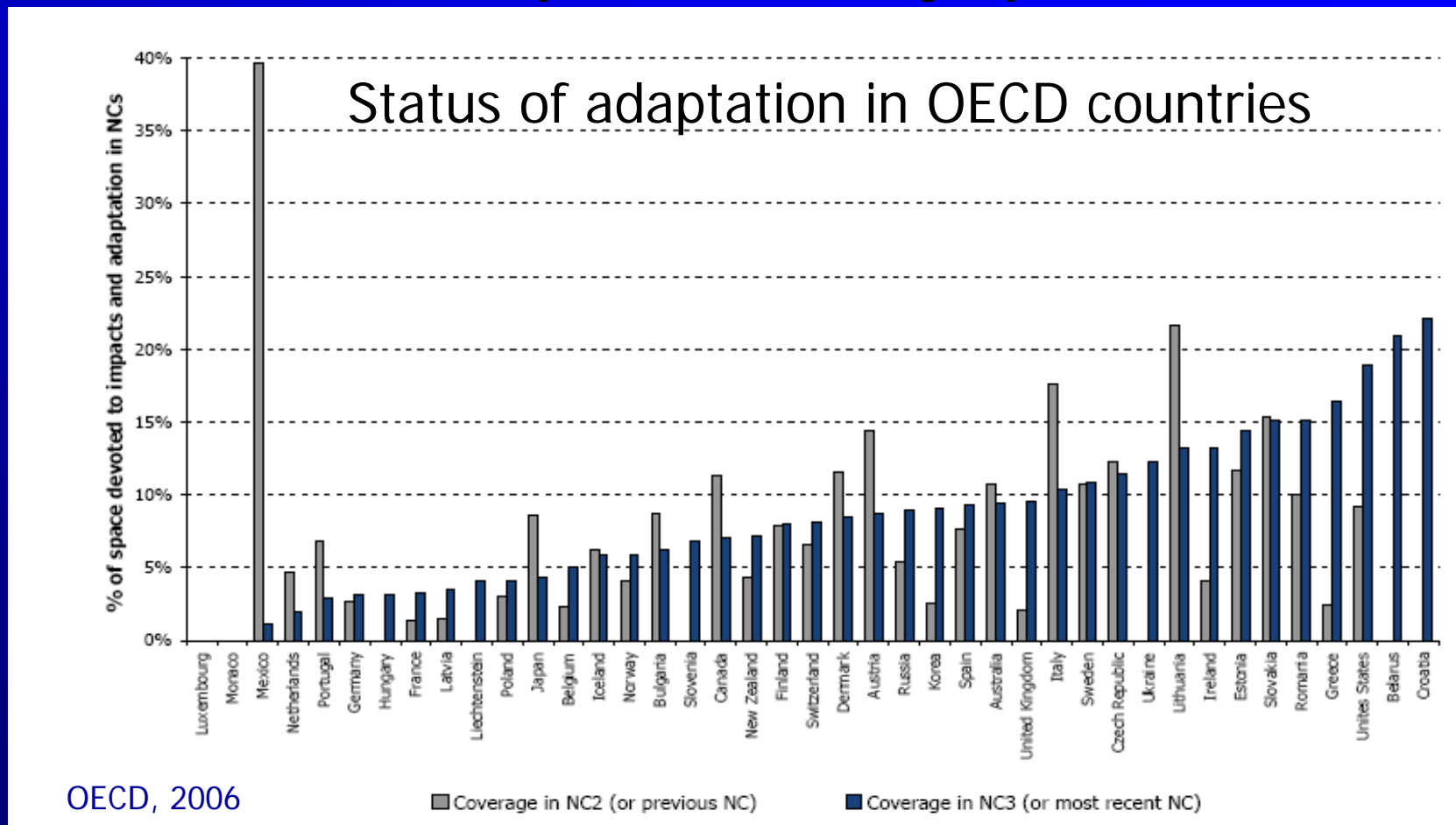
# Positioning of countries CCA Responses



# Enhancing Adaptation Capacity



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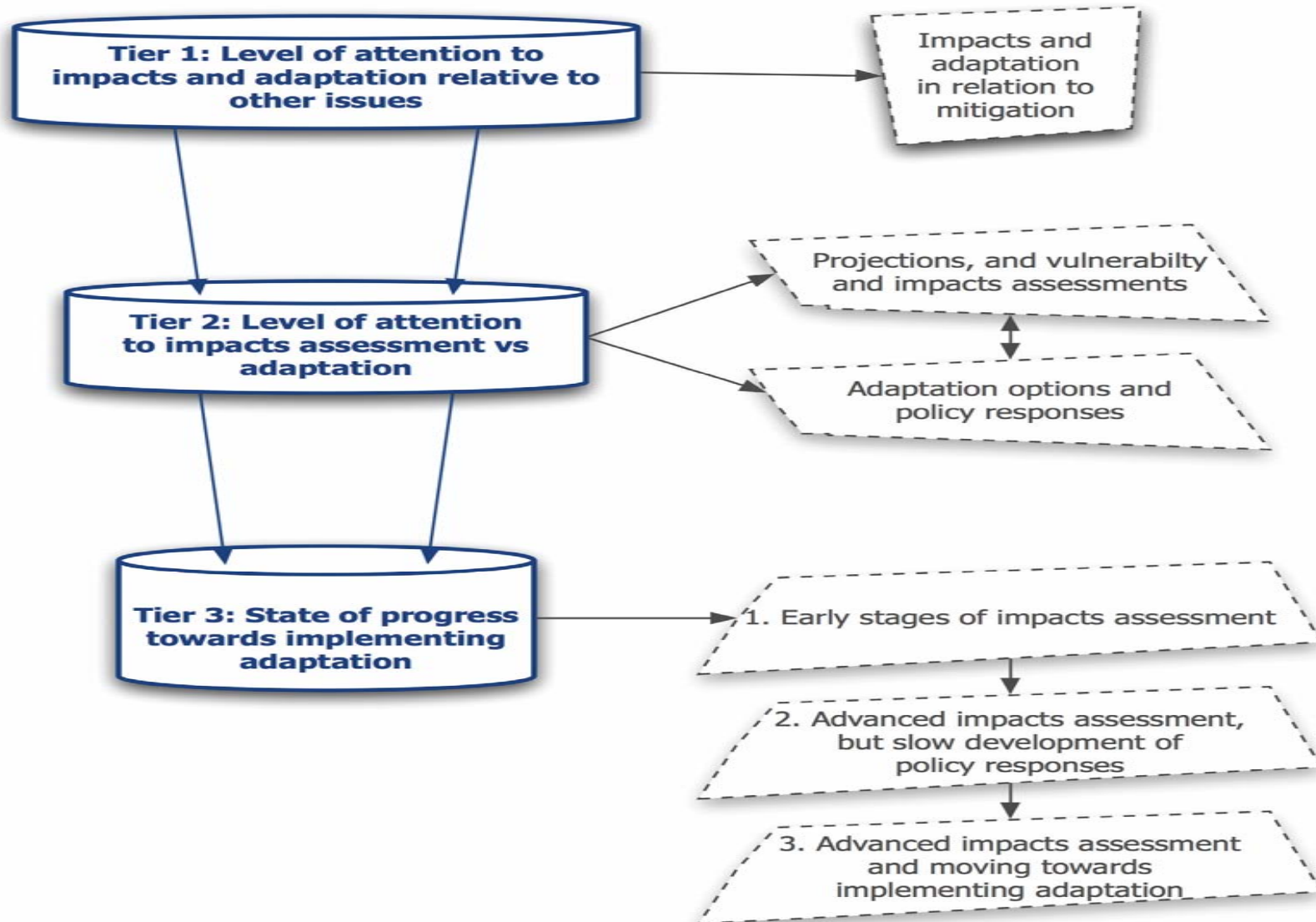
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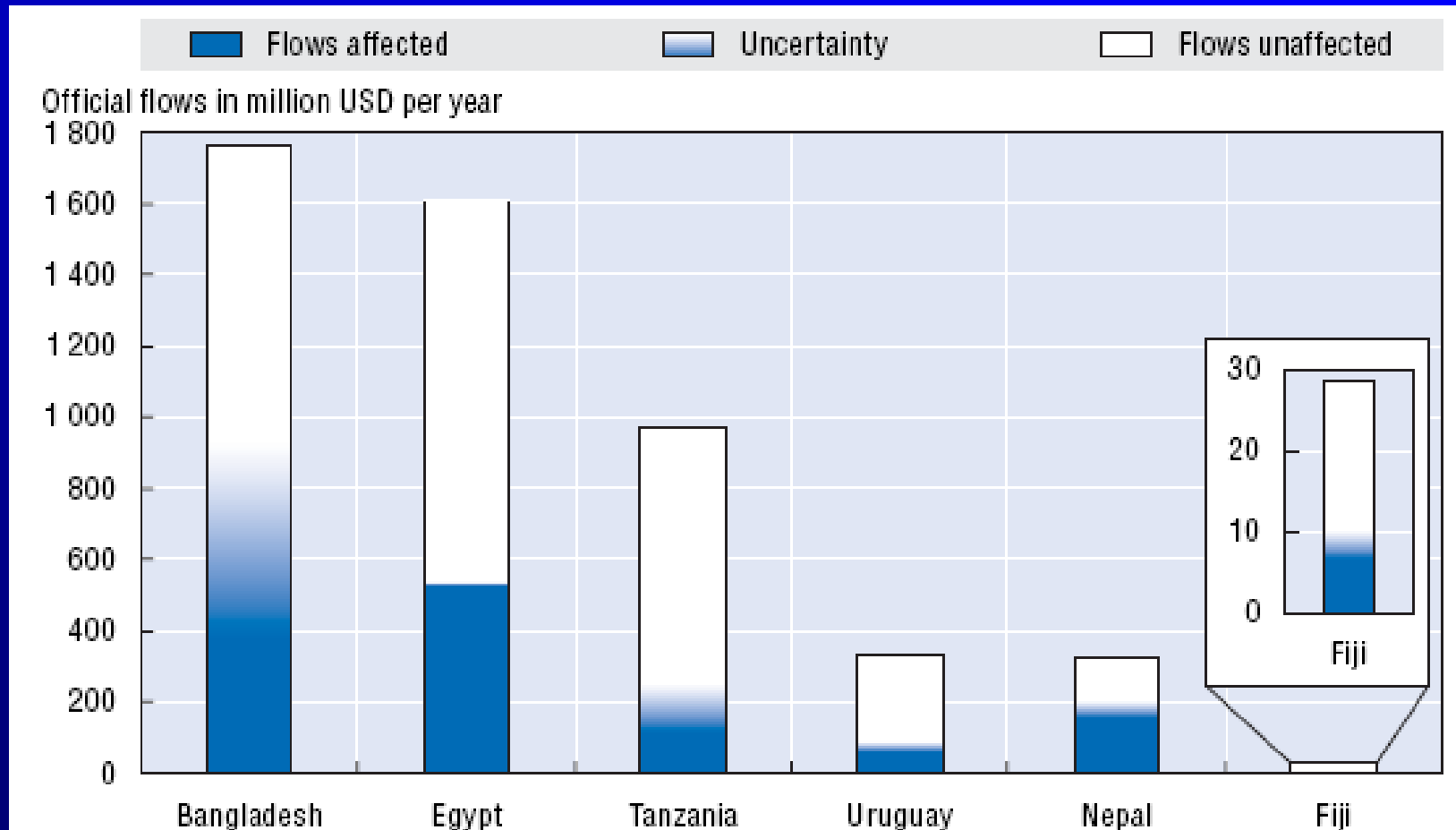
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## Annual Adaptation Costs in Developing Countries

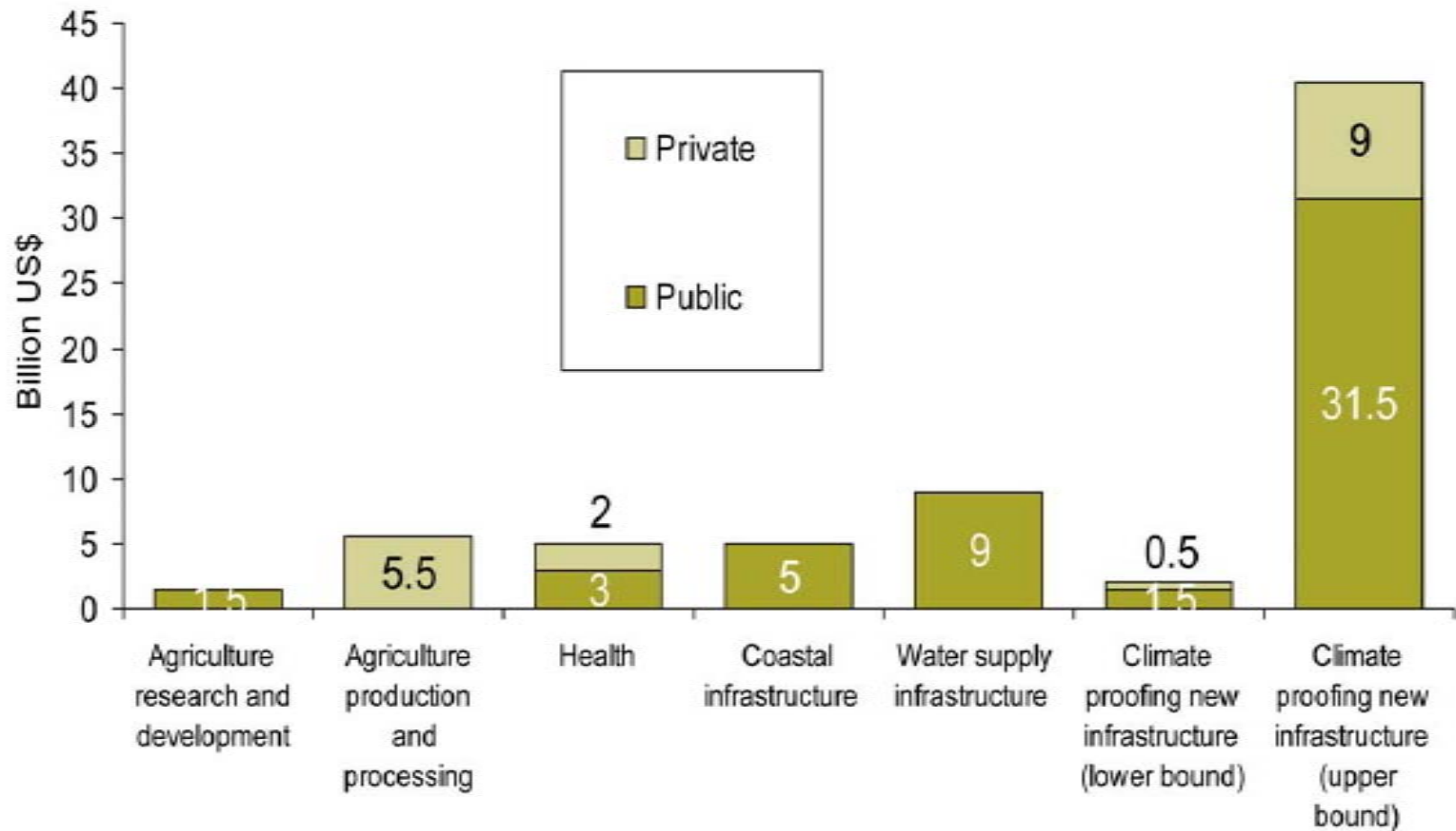
Assessment	Annual Cost (\$)	Year
UNDP 2007	86 billion	2015
UNFCCC 2007	28-67 billion	2030
Worldbank 2006	9-41 billion	present
Oxfam 2007	50 billion +	present
Stern Review 2006	4-37 billion	present

# Mainstreaming has implications for ODA



OECD studies suggest that about 40% of ODA flows are subject to some climate risk.

# Categorized Estimates of Adaptation Funds



Source: UNFCCC 2007.

## International Funding for Adaptation How we are going?

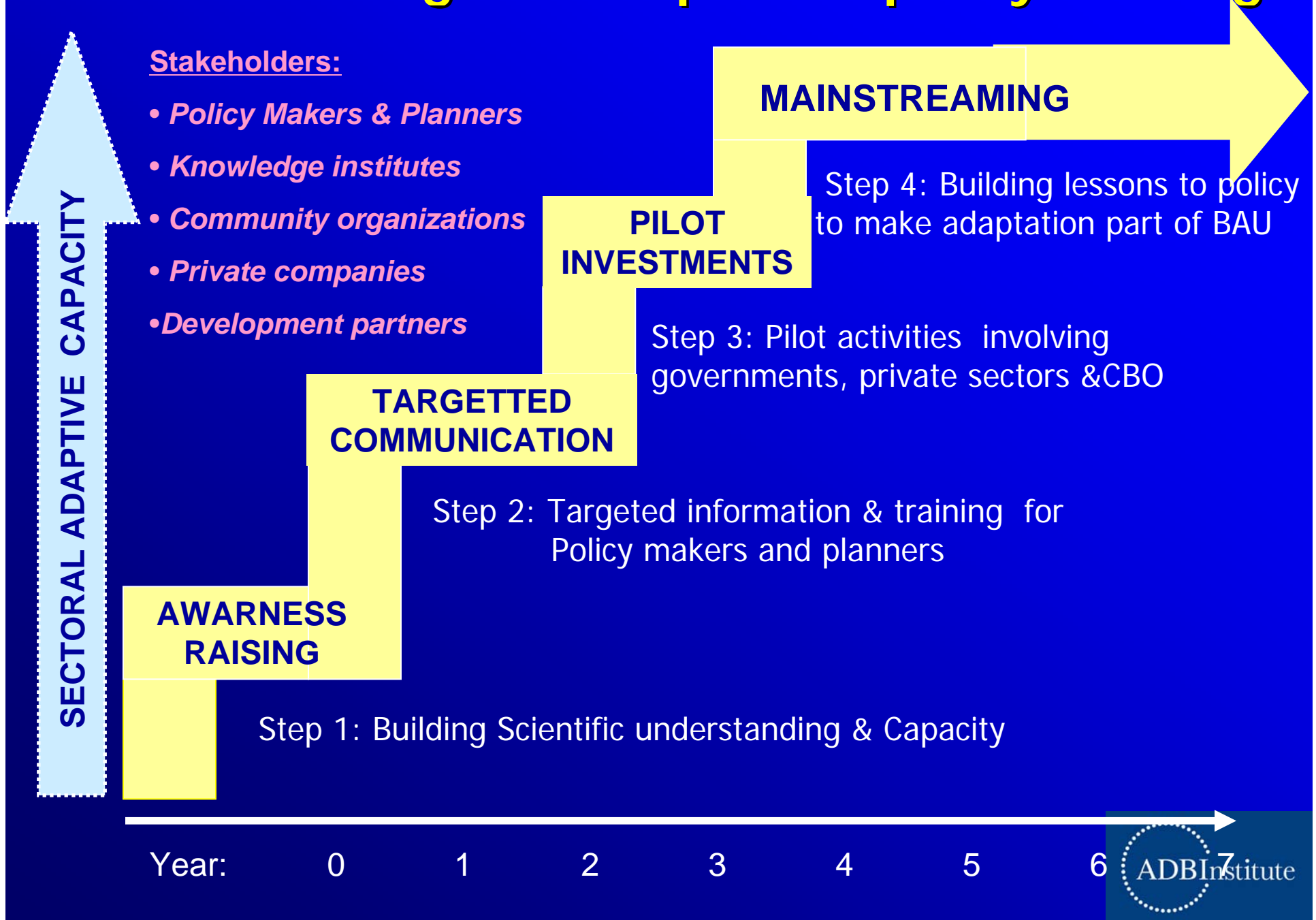
Adaptation Fund	Annual Revenues	Year
2% CDM levy (current)	\$ 80 – 300 million	- 2012
5% CDM levy (proposal)	\$ 200-750 million	- 2012
2% levy to JI & ETS (proposal)	\$ 10 – 50 million	- 2012
Auctioning AAU (proposal)	\$ 15-25 billion	- 2012

Source: UNFCC, 2007

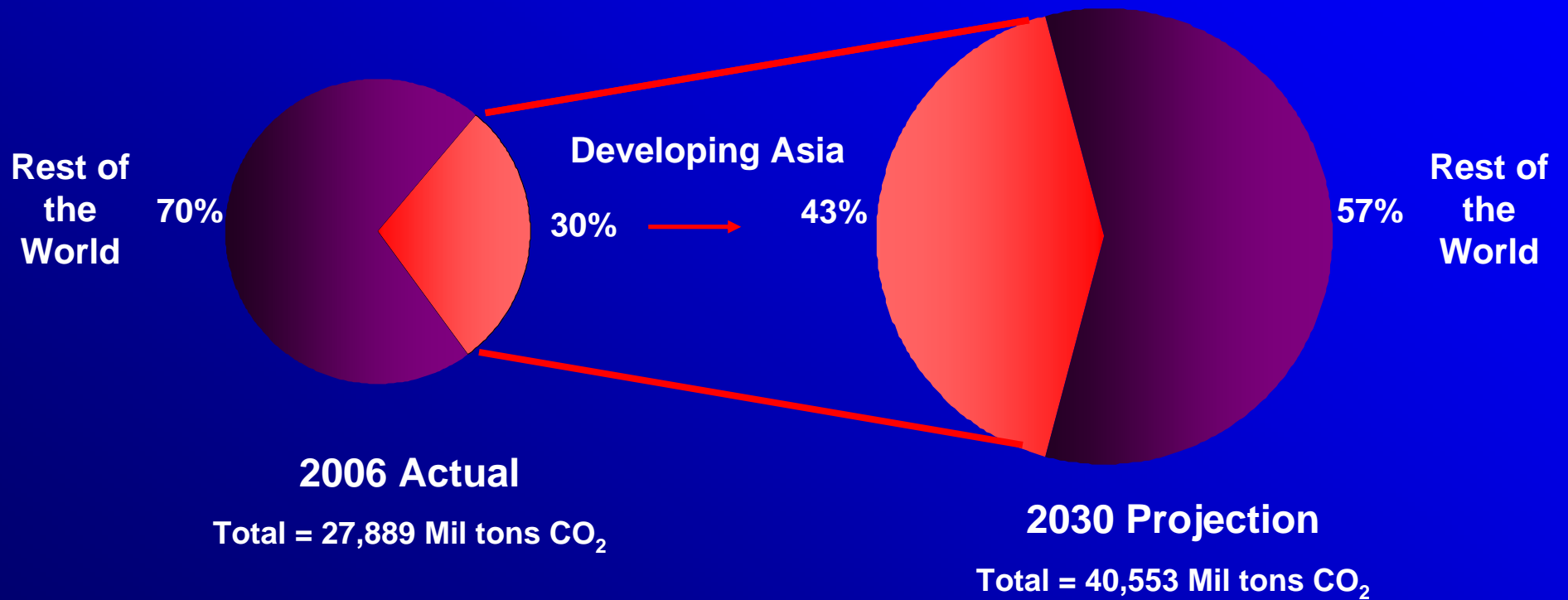
# Barriers to Mainstreaming Adaptation

- Limited understanding of nature and extent of risks and vulnerabilities
- Lack of knowledge of adaptation (and effective implementation)
- Lack of supportive policies, standards, regulations and design guidance
- Existing legal or regulatory restrictions
- Lack of availability or restricted access to finance
- Differences in willingness to accept uncertainties

# Mainstreaming and Adaptive Capacity Building



# Mitigation is equally important for Asia



Source: IEA World Energy Outlook 2008

# Key Stakeholder in the CCA Framework



## Summary

- ❑ Climate change is already affecting Asia, and the worst is yet to come. Keeping "business-as-usual" could leave the region to suffer damages equivalent to over 6% of GDP by 2100, more than two times as high as the global average (Stern Review). There is no time to delay actions to combat climate change.
- ❑ Adaptations in the region are mostly reactive so far. The current level of adaptation is still inadequate to cope with the future challenge. There is an urgent need for staged approaches and more research to better understand climate change challenges, in particular at the local levels.

## Summary

- ❑ Essential to enhance adaptive capacity - cost effective adaptation solutions.
  - ❑ Structural Measures: Drought resistant crops, Water conservation technologies, Improved farming systems/practices.
  - ❑ Non-structural measures: Strengthen risk and vulnerability assessment, Weather data collection and forecasts, Early warning systems, Effective policy coordination and institutional arrangements.
  
- ❑ Awareness and capacity building is essential for the success of adaptation. The region should enhance its capacities to make better use of the existing international and local knowledge.
  
- ❑ Regional cooperation by key stakeholders offers effective means to deal with many cross-boundary issues, such as water resources management, extreme weather events, and outbreak of diseases.

# Thank you

We will be over 10 billion by 2050 in a much different living condition than what we have today.



The ultimate measure of an individual is not where he/she stands in times of comforts and conveniences but in times of challenges and controversies

-Martin Luther King

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