The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

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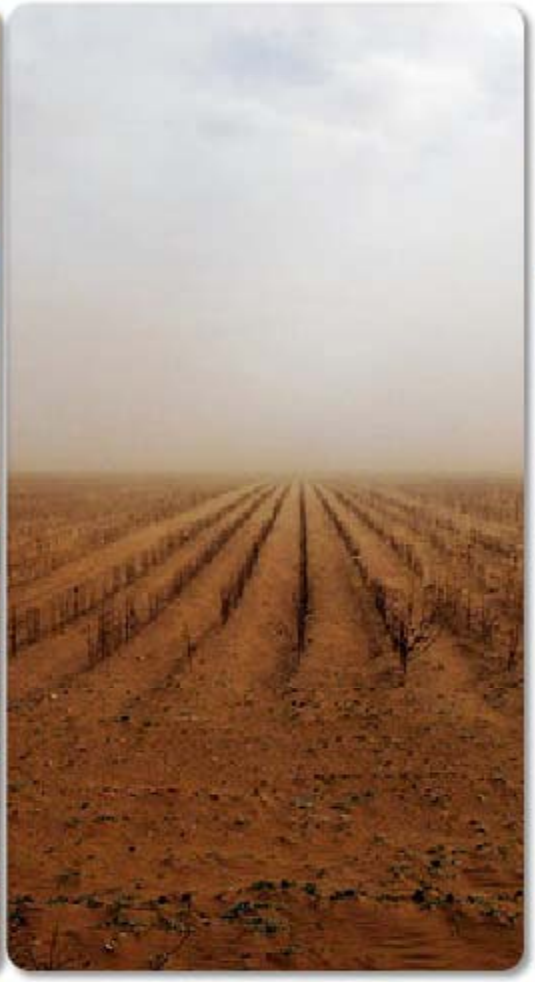
A changing climate leads to changes in extreme weather and climate events





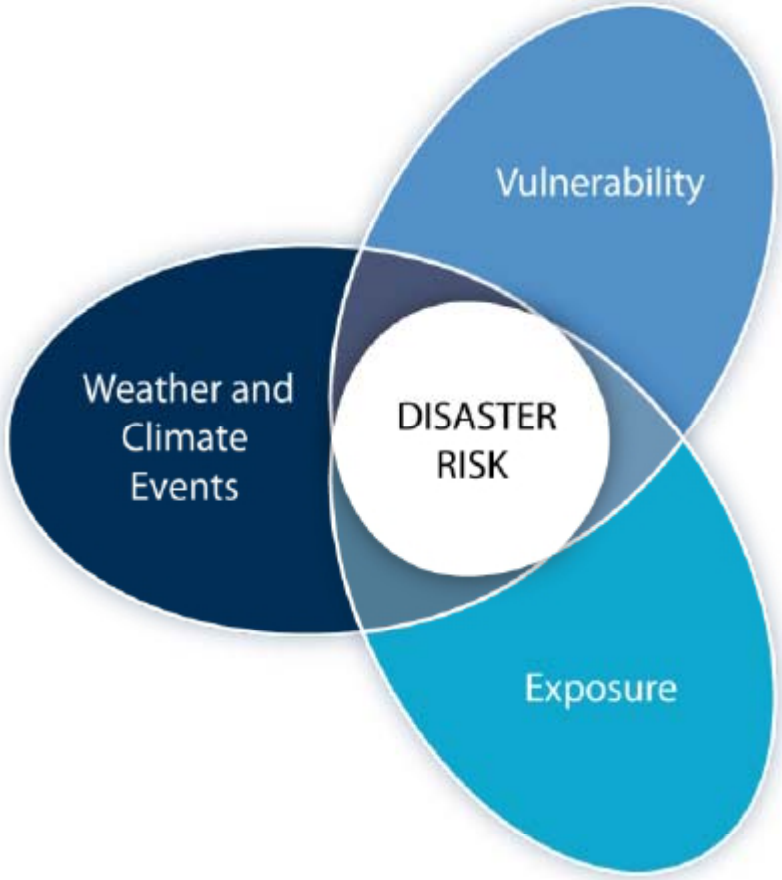

Impacts from weather and climate events depend on:

nature and severity of event

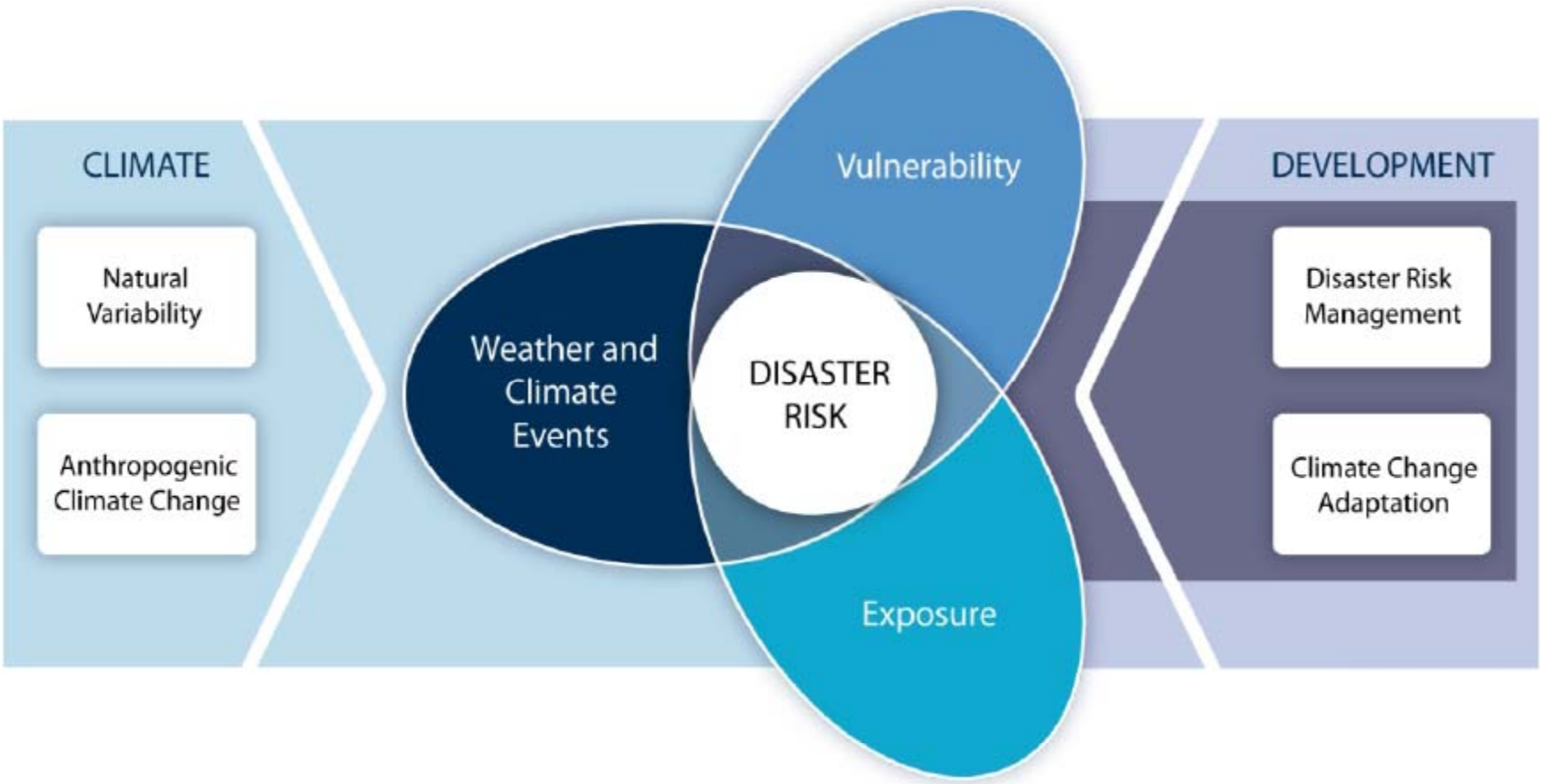
vulnerability

exposure

Socioeconomic development interacts with natural climate variations and human-caused climate change to influence disaster risk



Increasing vulnerability, exposure, or severity and frequency of climate events increases disaster risk



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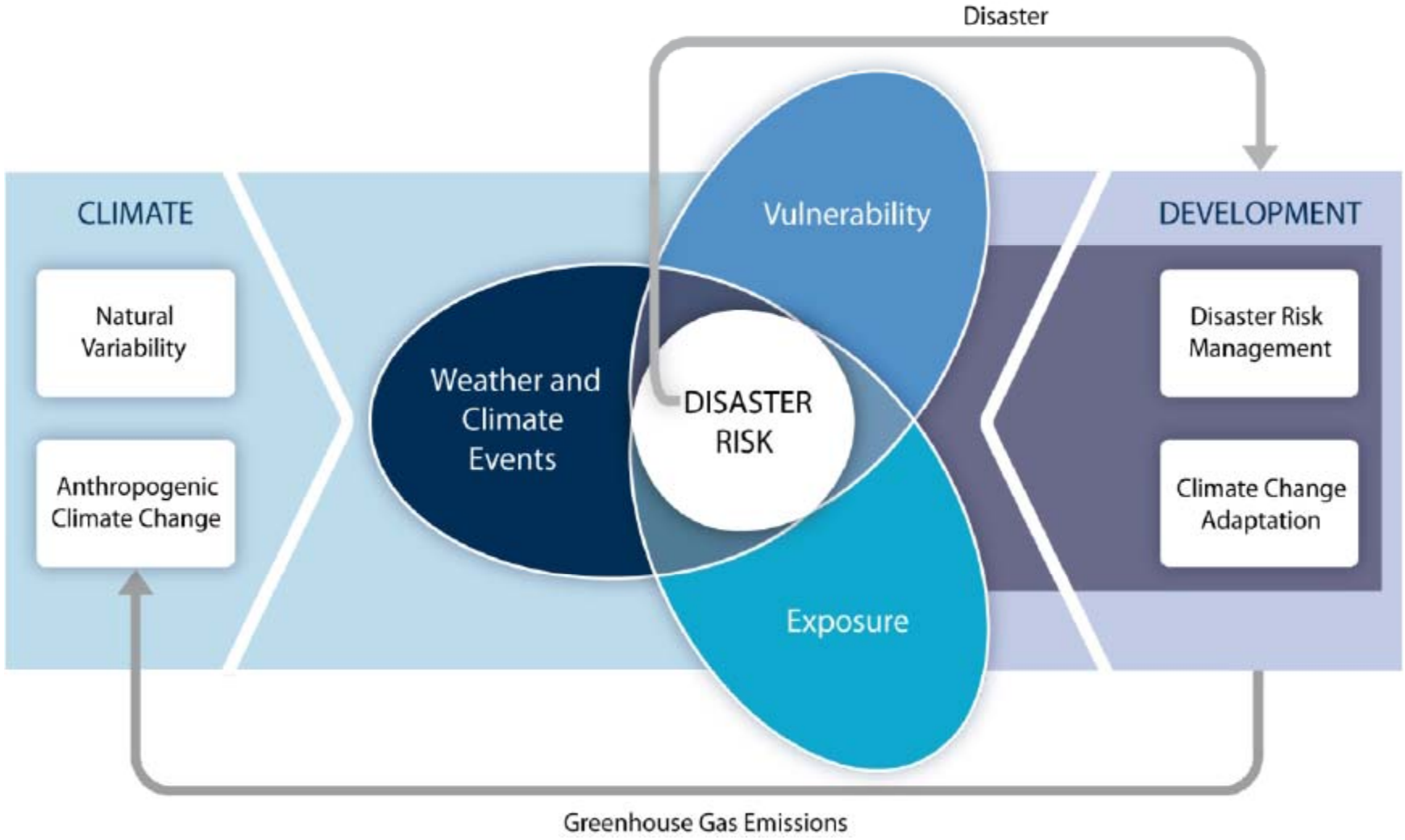


Disaster risk management and climate change adaptation can influence the degree to which ***extreme events translate into impacts*** *and* ***disasters***

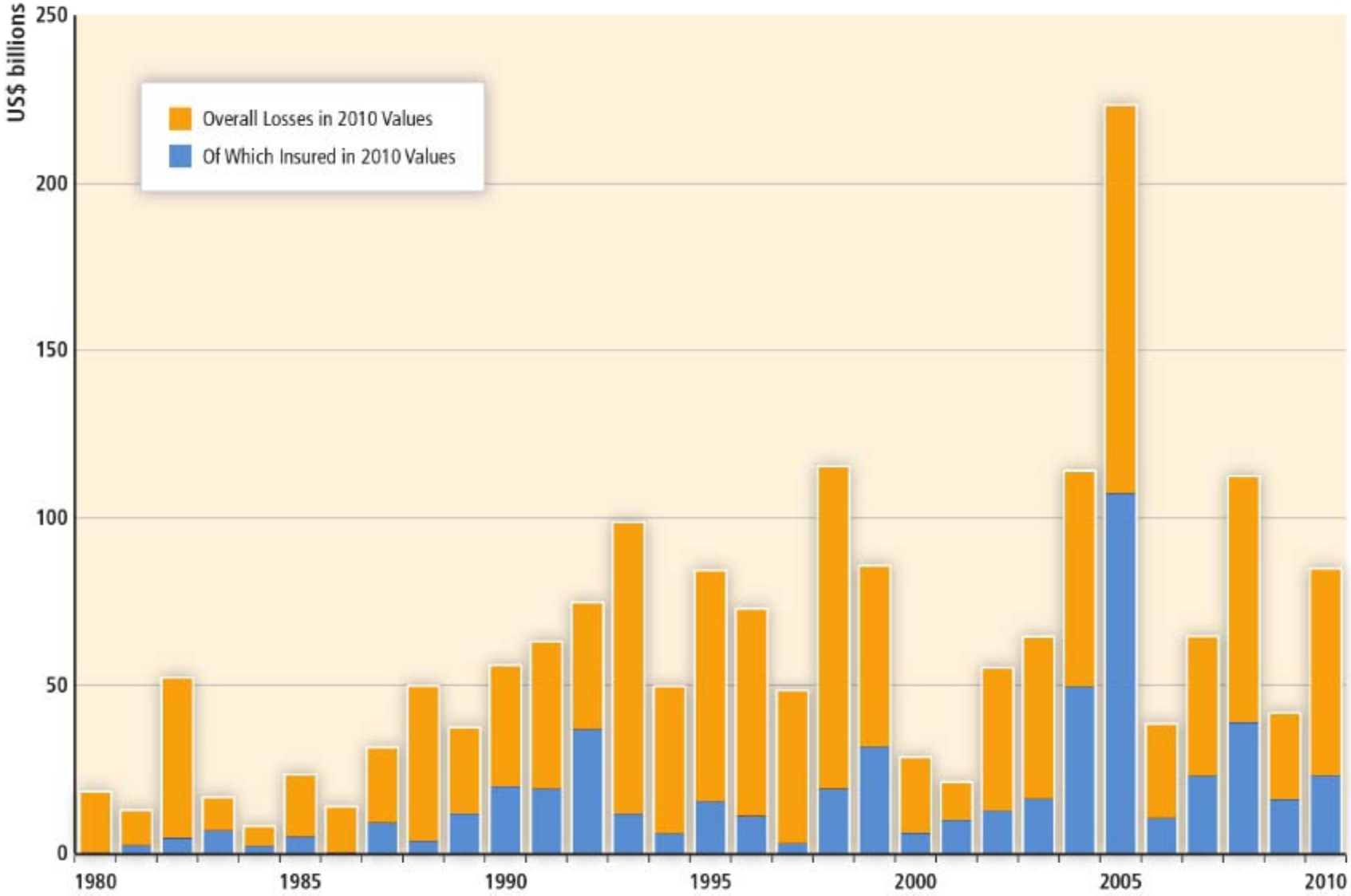
For exposed and vulnerable communities, even non-extreme weather and climate events can have extreme impacts

- Africa's largest recorded cholera outbreak
- over 90,000 affected
- over 4,000 killed
- began following onset of seasonal rains
- Vulnerability and exposure increased risk

Impacts of climate extremes can be felt locally or regionally

AGRICULTURE	**"Russia, Crippled by Drought, Bans Grain Exports"** *August 5, 2010,* ***The New York Times***
ENERGY	**"Heatwave hits French power production"** *August 12, 2003,* ***The Guardian***
WATER	**"Lake Mead is at Record Low Levels. Is the Southwest drying up?"'** *August 08, 2010,* ***The Independent***
PUBLIC HEALTH	**"Pakistan floods: Aid trickles in for victims as cholera spreads in Pakistan's worst-ever floods"** *August 14, 2010,* ***The Guardian/Observer***
TOURISM	**"Alpine resorts feel heat during record warm spell"** *December 08, 2006,* ***CNN***
TRANSPORTATION	**"Flash flooding causes train to derail"** *July 30, 2001,* ***Chicago Sun Times***

Economic losses from climate-related disasters have increased, with large spatial and interannual variations



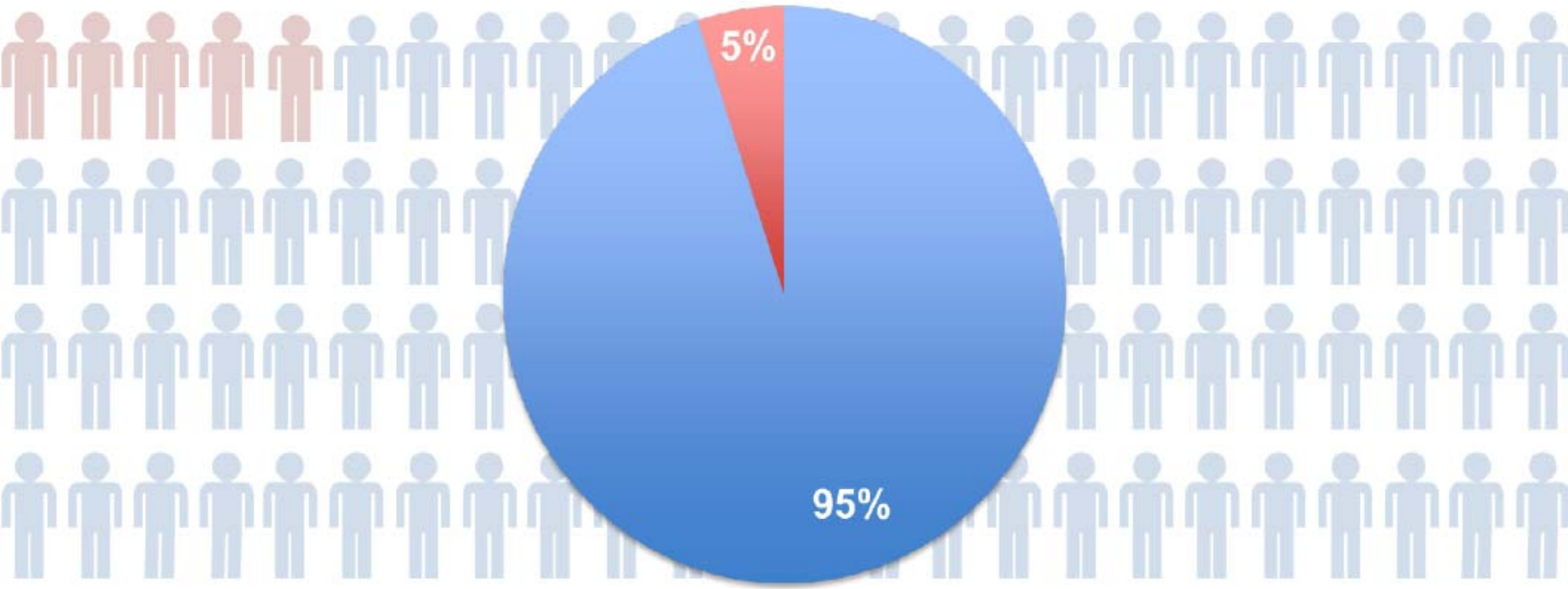
Data from Munich Re, 2011

Increasing exposure of people and assets has been the major cause of changes in disaster losses

Pakistan floods, 2010
6 million left homeless

Economic disaster losses are higher in developed countries

Fatalities are higher in developing countries

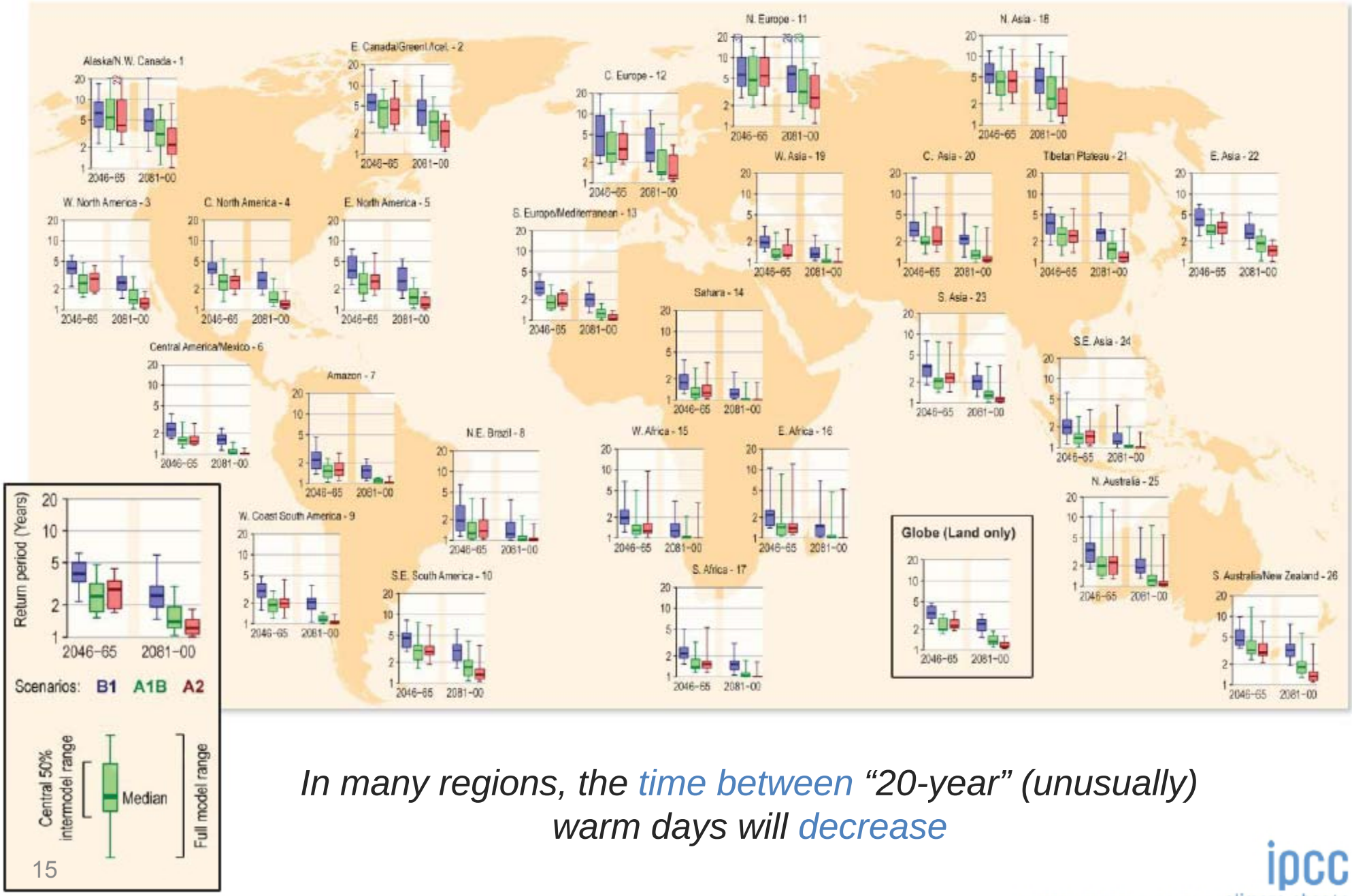


From 1970-2008, over **95%** of natural-disaster-related deaths occurred in developing countries

Since 1950, extreme hot days and heavy precipitation have become more common

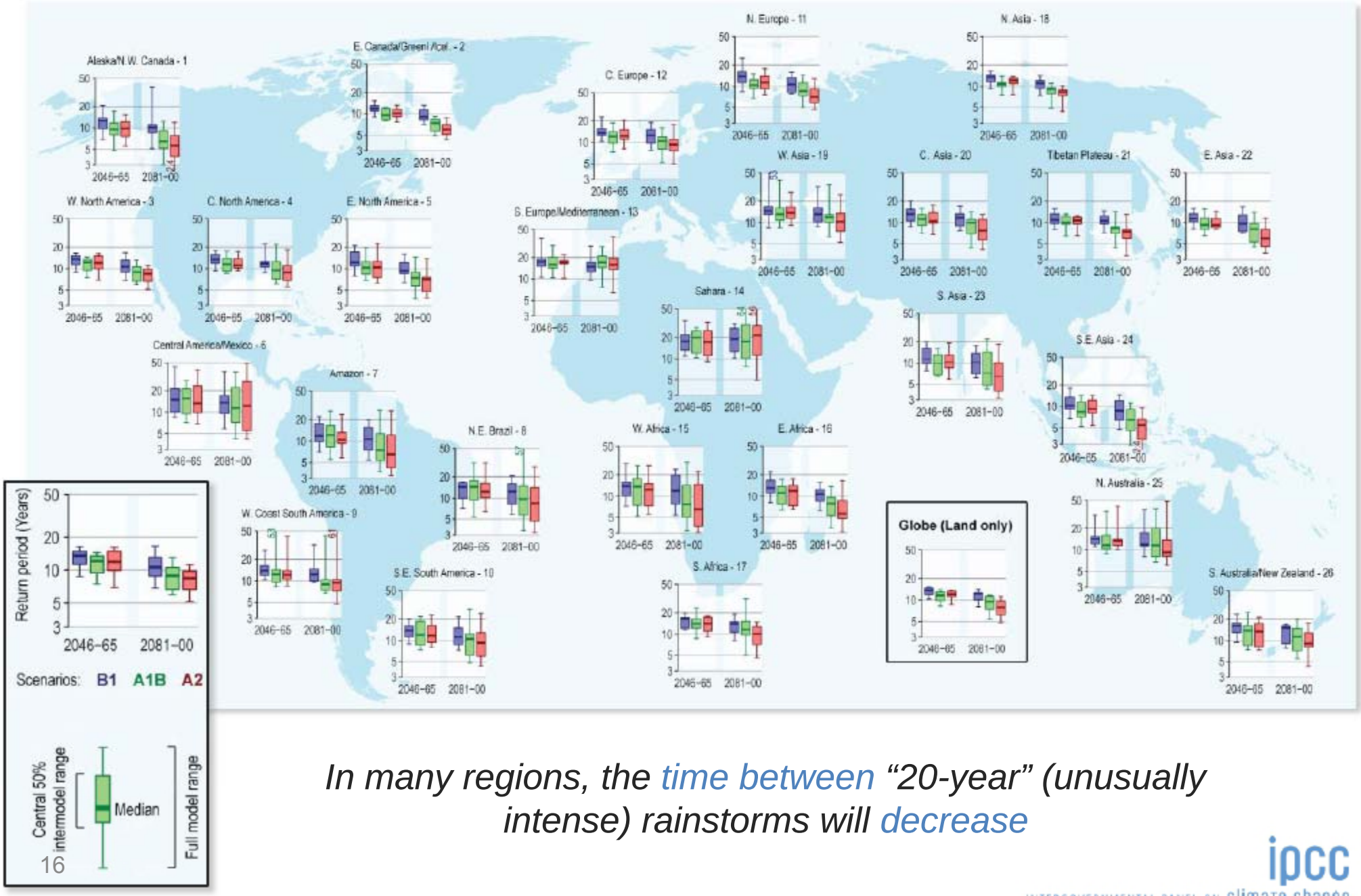
There is evidence that anthropogenic influences, including increasing atmospheric greenhouse gas concentrations, have changed these extremes

Climate models project more frequent hot days throughout the 21st century



In many regions, the time between "20-year" (unusually) warm days will decrease

Climate models project there will be more heavy rain events throughout the 21st century



In many regions, the time between "20-year" (unusually intense) rainstorms will decrease

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Climate models also project changes in droughts, tropical cyclones and extreme sea level events

- Increase in intensity and frequency of droughts*: low-medium confidence, depending on region*

- increase in tropical cyclone intensity: *likely*
- decrease or no change in tropical cyclone frequency: *likely*

- Increase in extreme sea level events: *very likely*

Effective risk management and adaptation are tailored to local and regional needs and circumstances

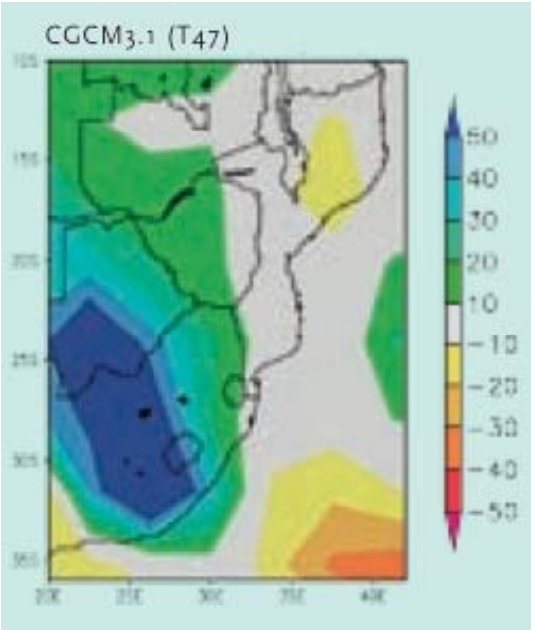
- changes in climate extremes vary across regions
- each region has unique vulnerabilities and exposure to hazards
- effective risk management and adaptation address the factors contributing to exposure and vulnerability

A real case:
Southern Africa, UN disaster managers, 2009

Background:
- global attention for climate change: it's happening NOW!
- several bad flood seasons in a row

Science inputs:
- IPCC AR4: increase in frequency of heavy precipitation events over most areas
- one GCM: all blue in the region

Conclusion: let's prioritize floods,
and deprioritize d



Heavy precipitation events. Frequency increases over most areas	Very likely

Phenomenon[a] and direction of trend	Likelihood of future trends based on projections for 21st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems [4.4, 5.4]	Water resources [3.4]	Human health [8.2]	Industry, settlement and society [7.4]
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	Virtually certain[b]	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snow melt; effects on some water supply	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	Very likely	Reduced yields in warmer regions due to heat stress; wild fire danger increase	Increased water demand; water quality problems, e.g., algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially-isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on elderly, very young and poor.
Heavy precipitation events. Frequency increases over most areas	Very likely	Damage to crops; soil erosion, inability to cultivate land due to water logging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries, infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property

The confidence in projected changes in climate extremes at local scales is often more limited than the confidence in projected regional and global changes.

- There is a real risk of over-interpretation of global and regional information at local scale
- But there is a lot that *can* be done to better manage risk

Managing the risks: heat waves in Europe

Risk Factors

- lack of access to cooling
- age
- pre-existing health problems
- poverty and isolation
- infrastructure

France, August 2003 (over 14,000 dead)

Risk Management/ Adaptation

- cooling in public facilities
- warning systems
- social care networks
- urban green space
- changes in urban infrastructure

Projected: *likely* increase in heat wave frequency and *very likely* increase in warm days and nights across Europe

Managing the risks: hurricanes in the USA and Caribbean

Risk Factors

- population growth
- increasing property values
- higher storm surge with sea level rise

Risk Management/ Adaptation

- better forecasting
- stricter building codes
- regional risk pooling

Projected globally: *likely* increase in average maximum wind speed and associated heavy rainfall (although not in all regions)

Managing the risks: flash floods in Nairobi, Kenya

Risk Factors

- rapid growth of informal settlements
- weak building construction
- settlements built near rivers and blocked drainage areas


Nairobi, Kenya

Risk Management/ Adaptation

- reduce poverty
- strengthen buildings
- improve drainage and sewage
- early warning systems

Projected: *likely* increase in heavy precipitation in East Africa

Managing the risks: sea level rise in tropical Small Island Developing States

Risk Factors

- shore erosion
- saltwater intrusion
- coastal populations
- tourism economies

Risk Management/ Adaptation

- early warning systems
- maintenance of drainage
- regional risk pooling
- relocation

Projected globally: *very likely* contribution of sea level rise to extreme coastal high water levels (such as storm surges)

Managing the risks: drought in the context of food security in West Africa

Risk Factors

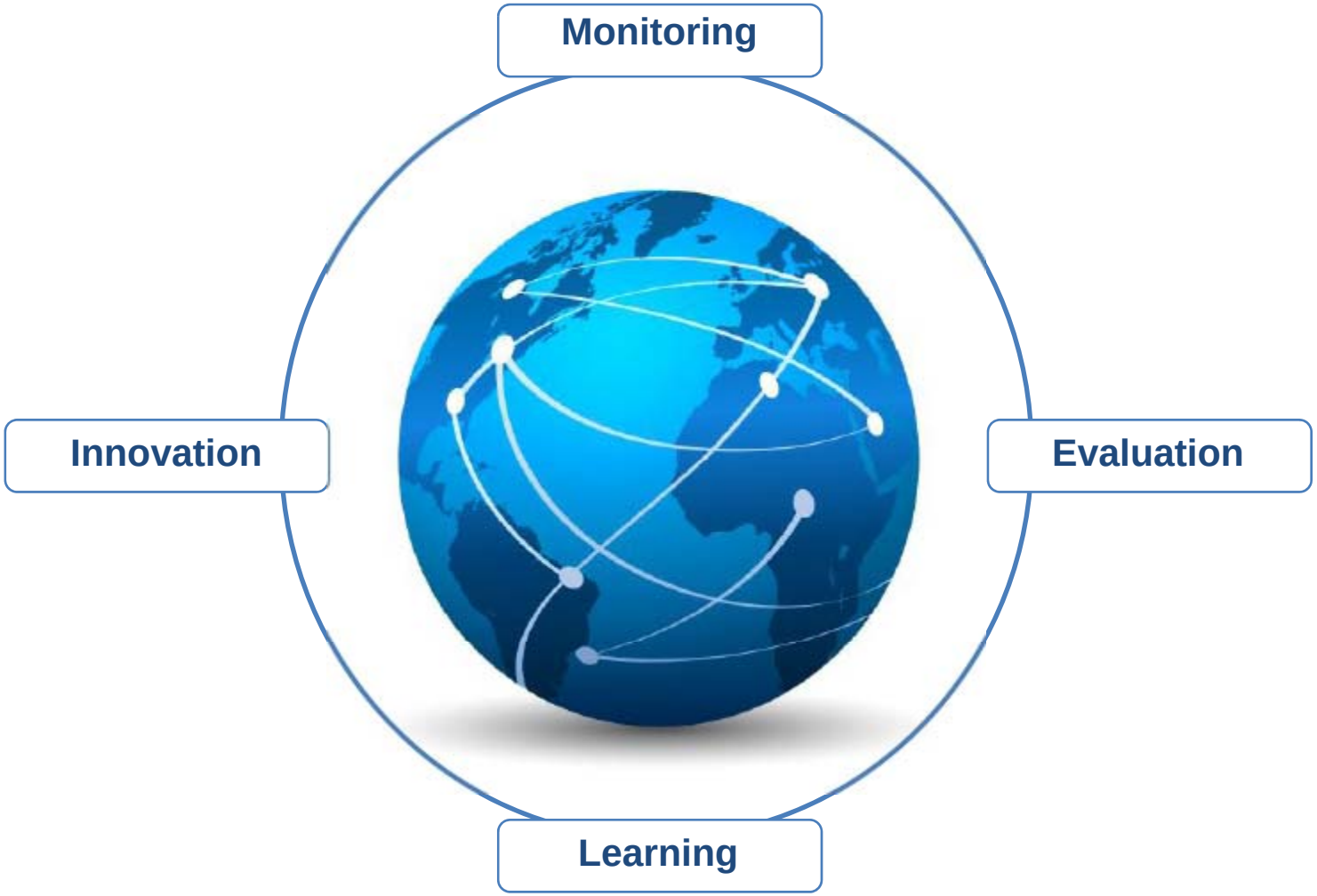
- more variable rain
- population growth
- ecosystem degradation
- poor health and education systems

Risk Management/ Adaptation

- improved water management
- sustainable farming practice
- drought-resistant crops
- drought forecasting

Projected: *low confidence* in drought projections for West Africa

Managing risks of disasters in a changing climate benefits from an iterative process



Learning-by-doing and low-regrets actions can help reduce risks now and also promote future adaptation

There are strategies that can help manage disaster risk now and also help improve people's livelihoods and well-being

The most effective strategies offer development benefits in the relatively near term and reduce vulnerability over the longer term

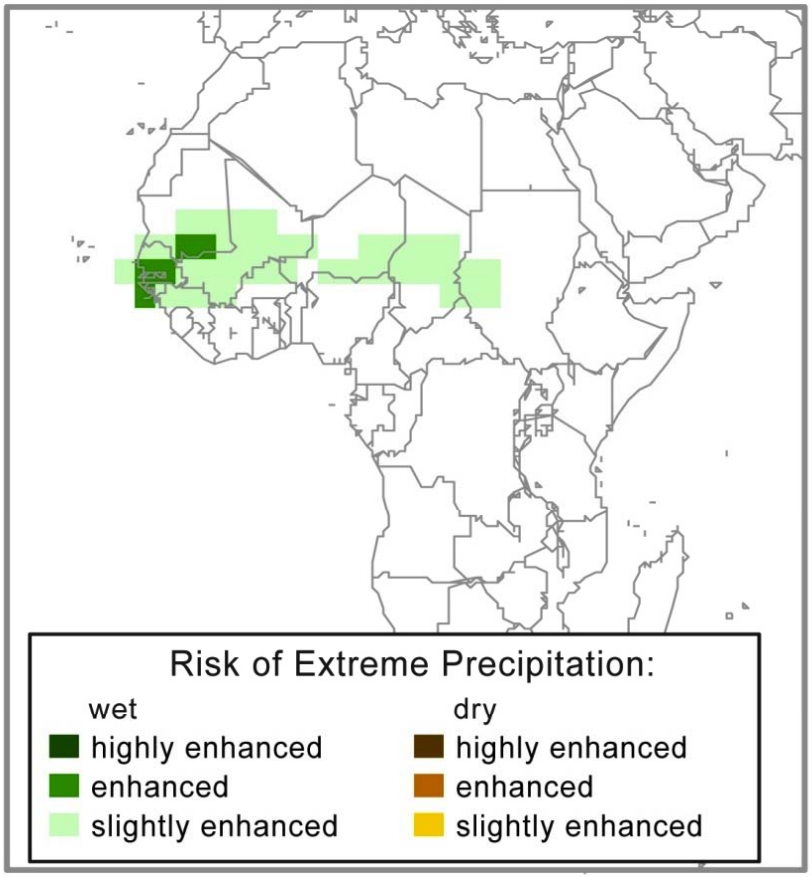
Red Cross/Red Crescent perspective

- Response: prepare for *more* but also *smarter* response operations

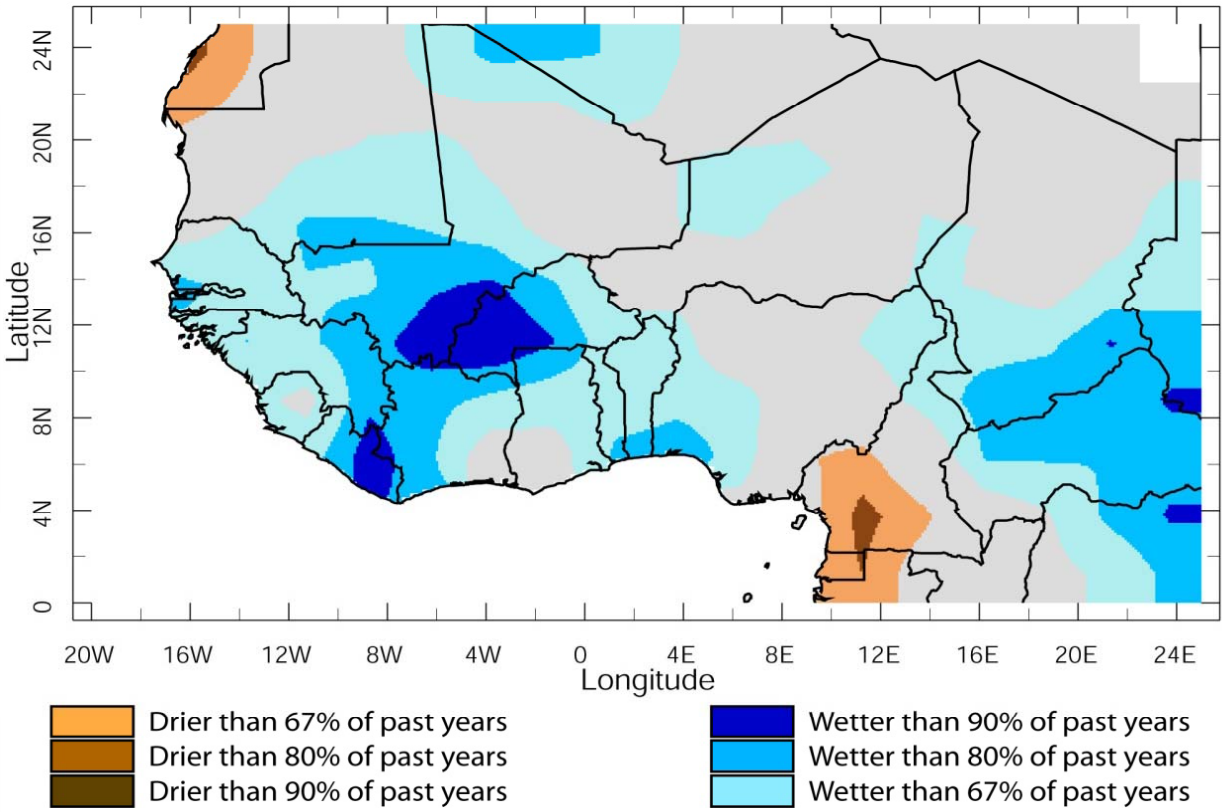
- Risk reduction: invest in community resilience *before disasters happen*

IFRC West Africa 2008
Seasonal preparedness appeal

Forecast for Jun-Aug 2008 issued May 2008



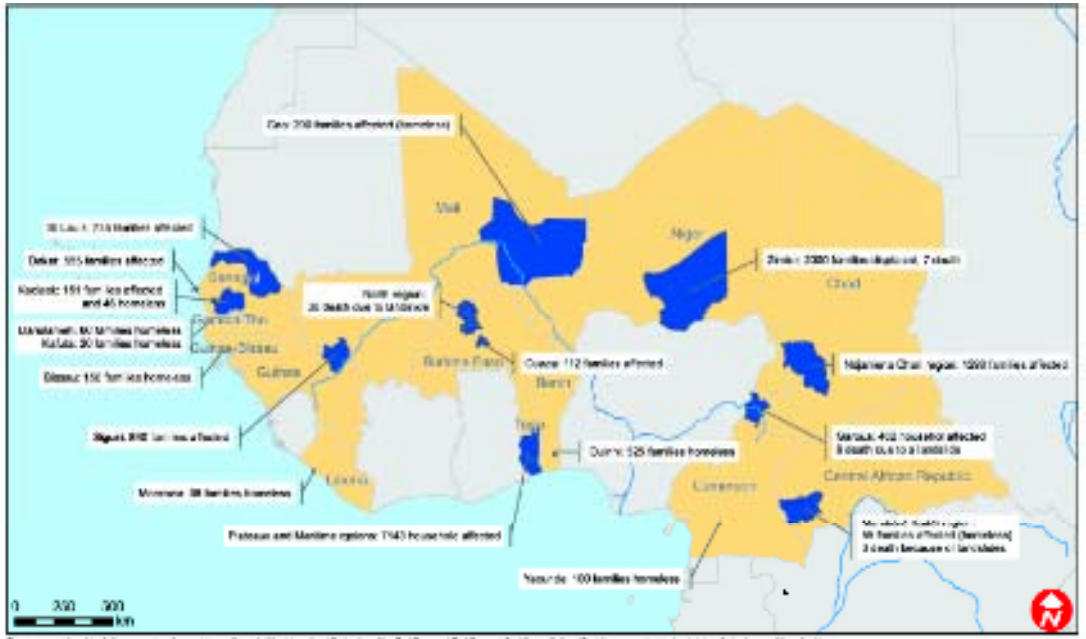
Observed rainfall for Jun-Aug 2008



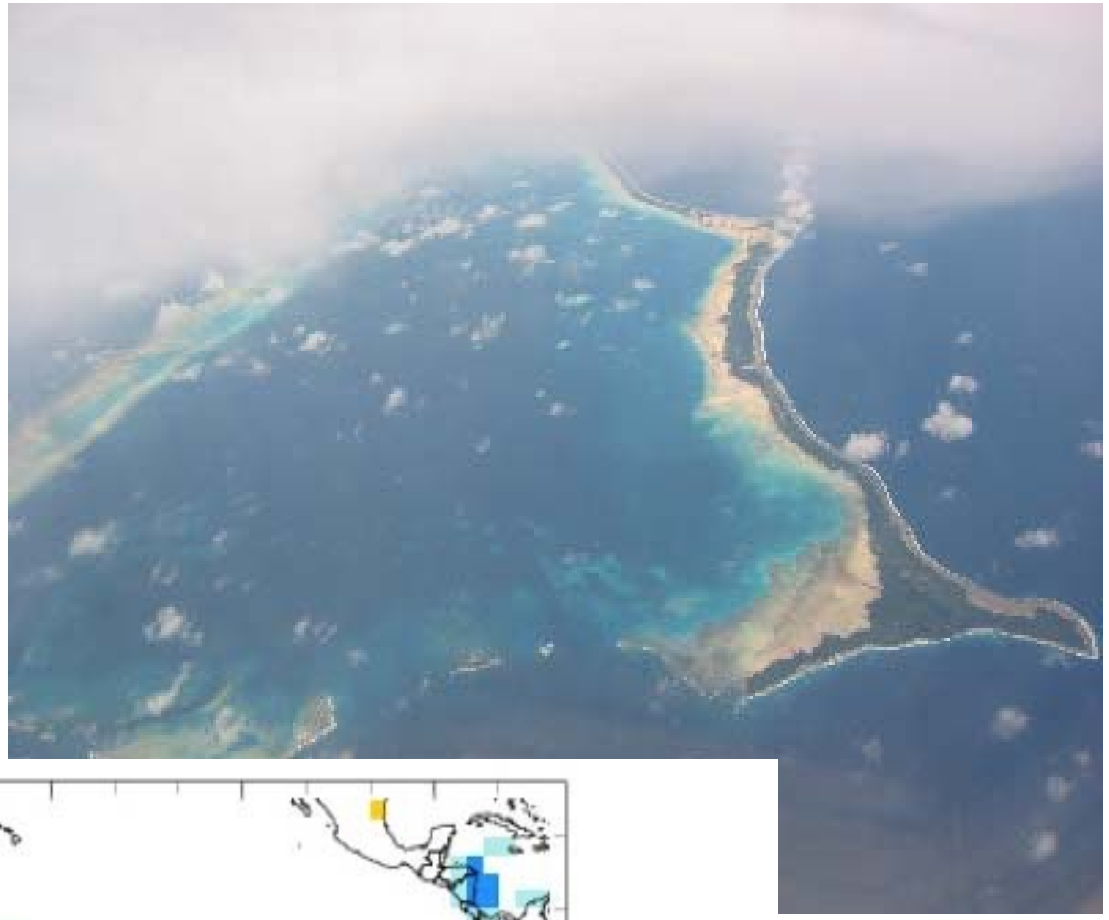
Early Action paid off:

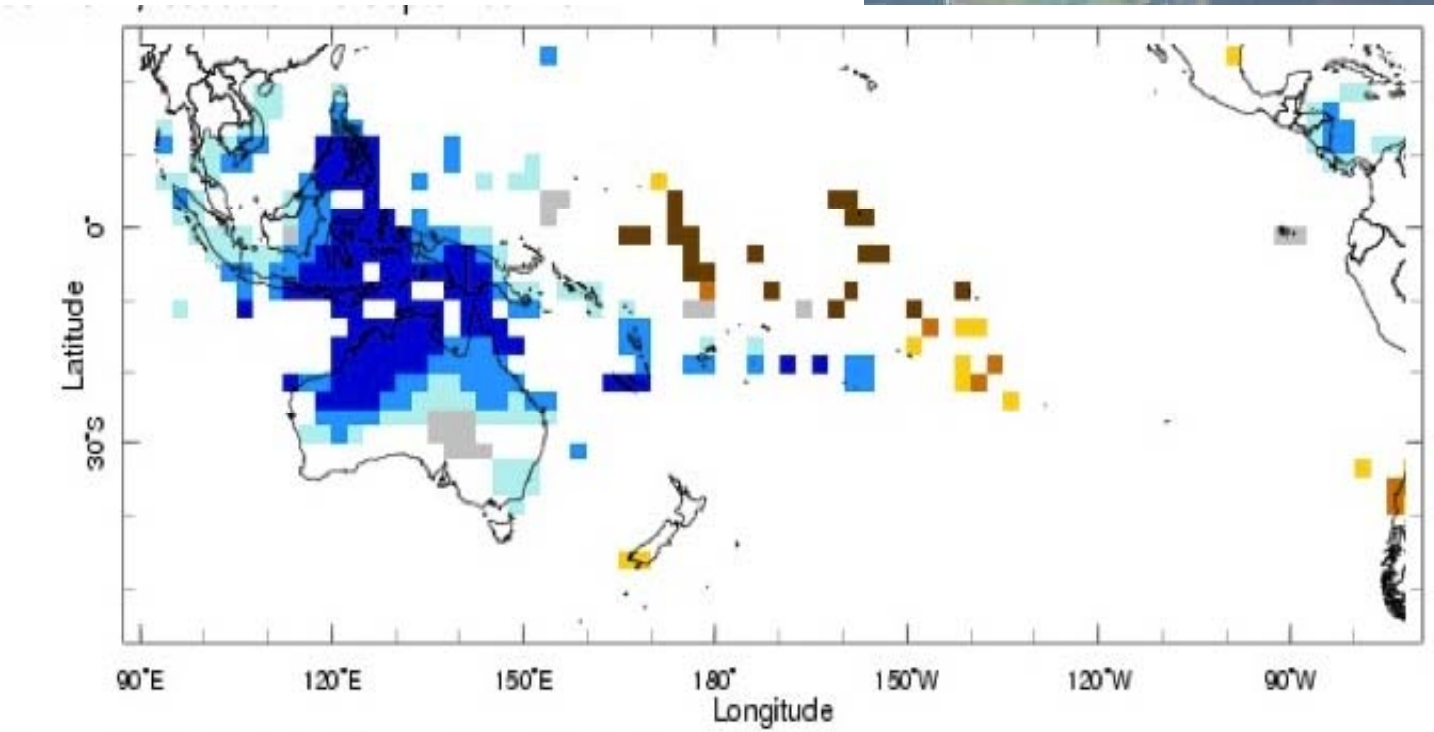
- Faster response: **1-2 days**
  rather than 40 in 2007
- Fewer victims (**30** instead of hundreds)
- Lower cost per beneficiary (**30%**)

Example: Red Cross volunteers in Ghana saving lives by alerting Volta fishermen that the Bagre dam would be spilled.



Tuvalu:
La Niña preparedness





Forecast for Oct-Dec 2011, Forecast Issued Sep 2011

How confident can we be that the next 3 months will be unusually wet?

Tuvalu Red Cross response

(based on capacity built in previous years)

- Follow-up with regional and national climate service providers
- Joint drought action plan with government agencies
- Outreach to communities (water conservation, hygiene&sanitation)