



CLIMATE CHANGE CHALLENGES IN TRANSBOUNDARY RIVER WATER RESOURCES MANAGEMENT

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Outline



1. Water Security = A Global Concern

2. The Global Climate Challenge = A Global Water Challenge

3. Water Security = A Framework for Adaptation

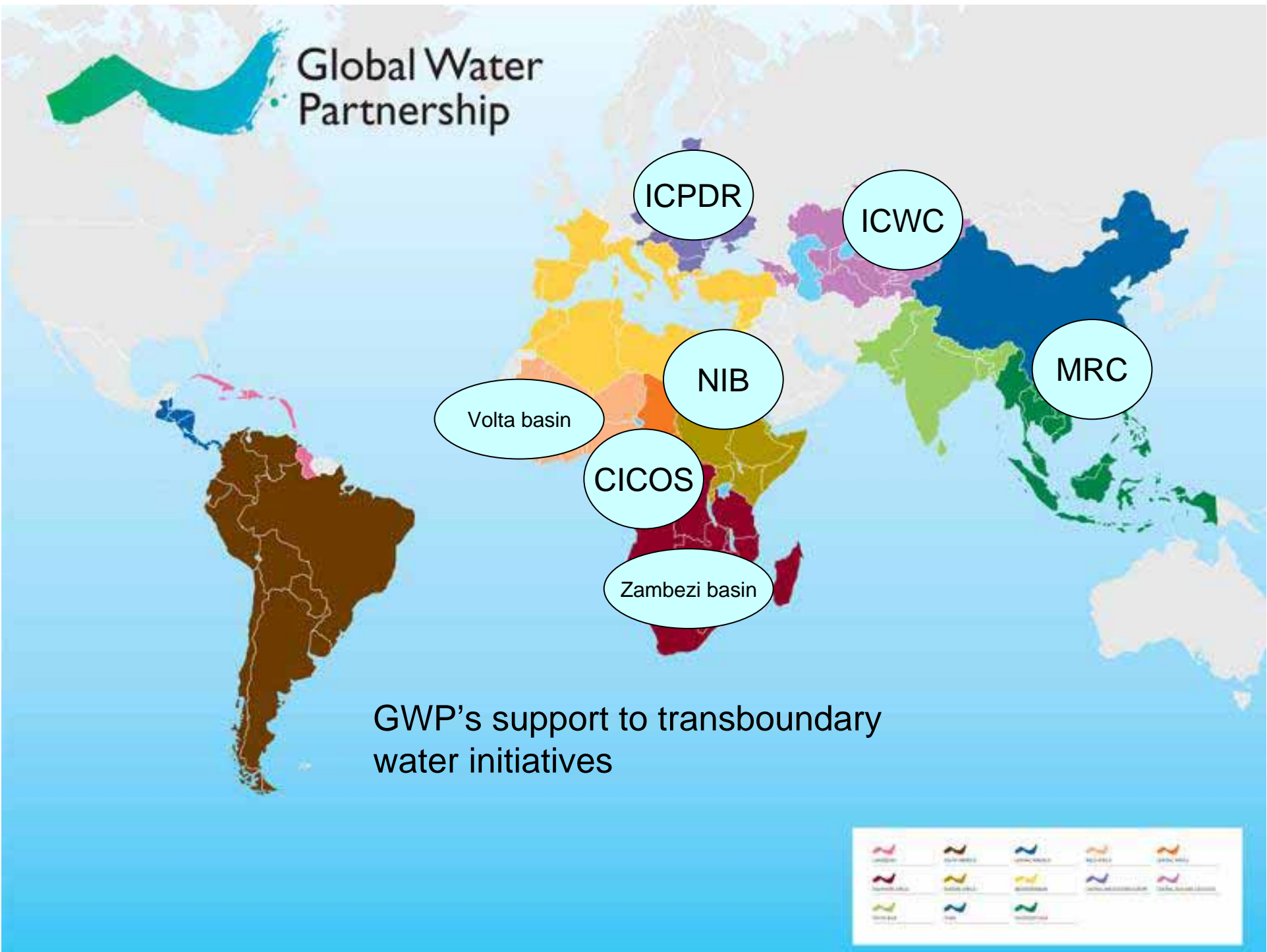
4. A Better Future = Collaborative Adaptation

15 YEARS TOWARDS HYDROSOLIDARITY



15th Anniversary
1995 - 2010





ICPDR

ICWC

MRC

NIB

Volta basin

CICOS

Zambezi basin

GWP's support to transboundary water initiatives



1. Water Security = A Global Concern



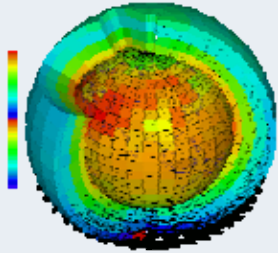
The challenge of securing safe and plentiful water for all of us is one of the most daunting challenges faced by the world today... Our experiences tell us that environmental stress due to lack of water may lead to conflict and would be greater in poor countries

UN secretary-General Ban Ki-moon
WEF, 24 January 2008

Humanity is facing « water bankruptcy » as a result of a crisis even greater than the financial meltdown now destabilizing the global economy ... it is already beginning to take effect, and there will be no way of bailing the earth out of water scarcity ...

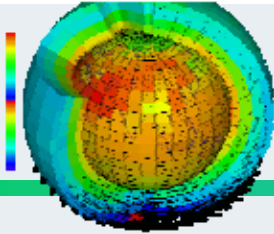
G. Lean, The Independent, 15 March 2009

2. The Global Climate Challenge = A Global Water Challenge



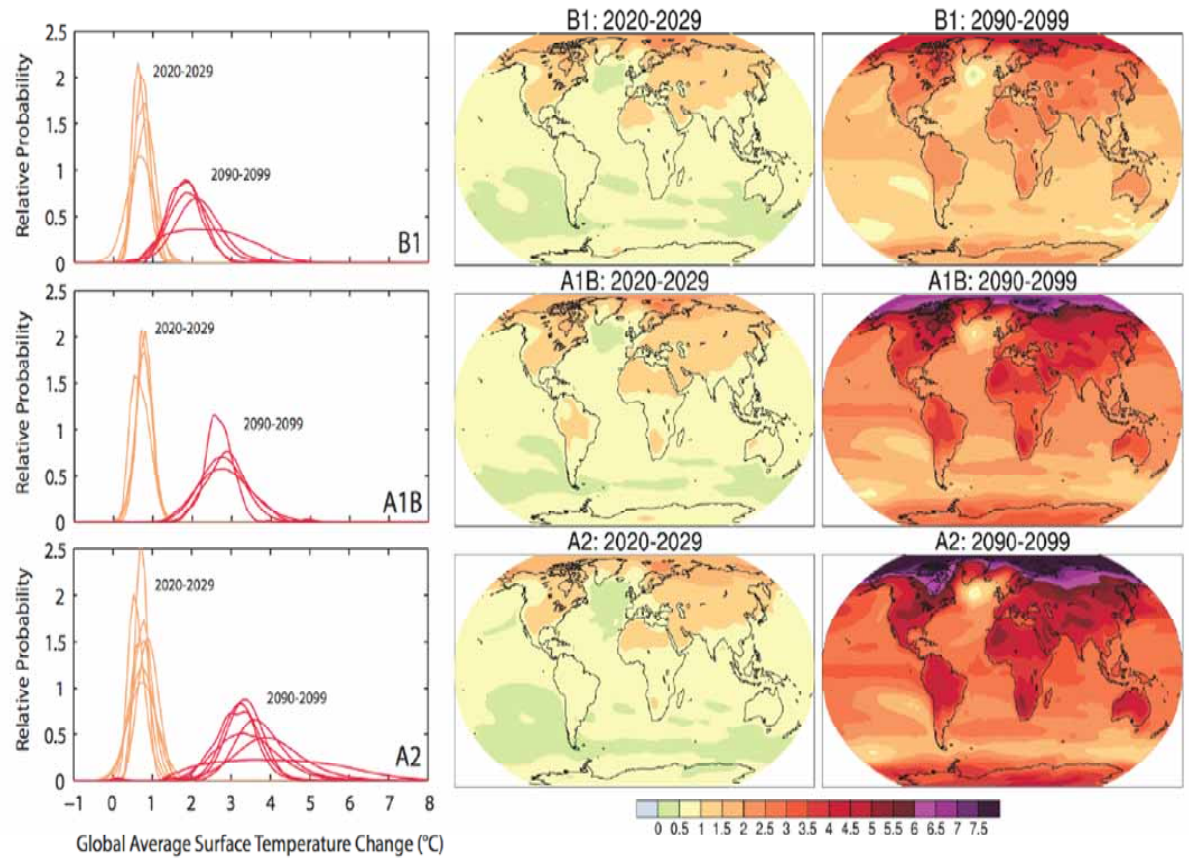
Warming and Water Availability

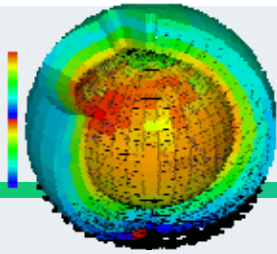
- Higher temperature → less ice
 - Snow-pack loss → **changed runoff timing**
 - Reduced permafrost, seasonally frozen soil → **activation of subsurface storage**
- Higher temperature → more water in atmosphere (7% per degree C) → **global redistribution of precipitation and runoff**



IPCC PROJECTIONS

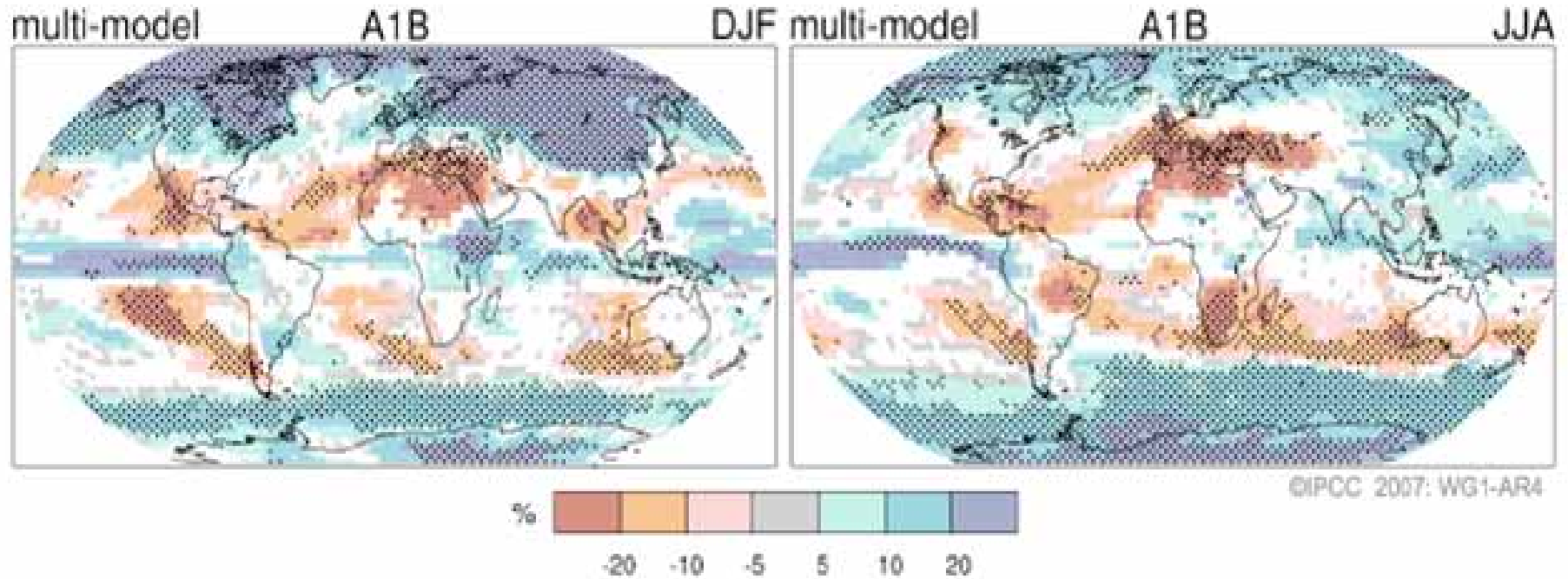
AOGCM Projections of Surface Temperatures



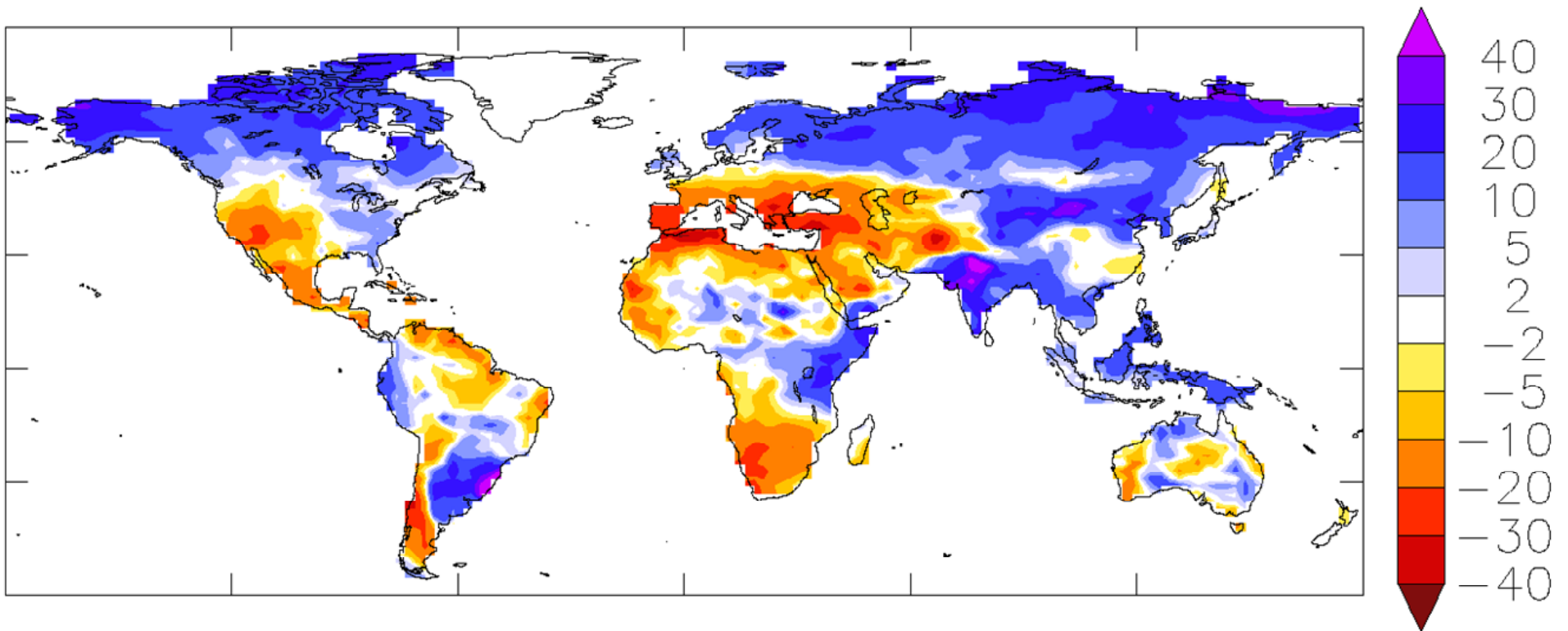


IPCC PROJECTIONS

Projected Patterns of Precipitation Changes



Model-Projected Runoff Change (%) [(2041-2060)-(1900-1970)]

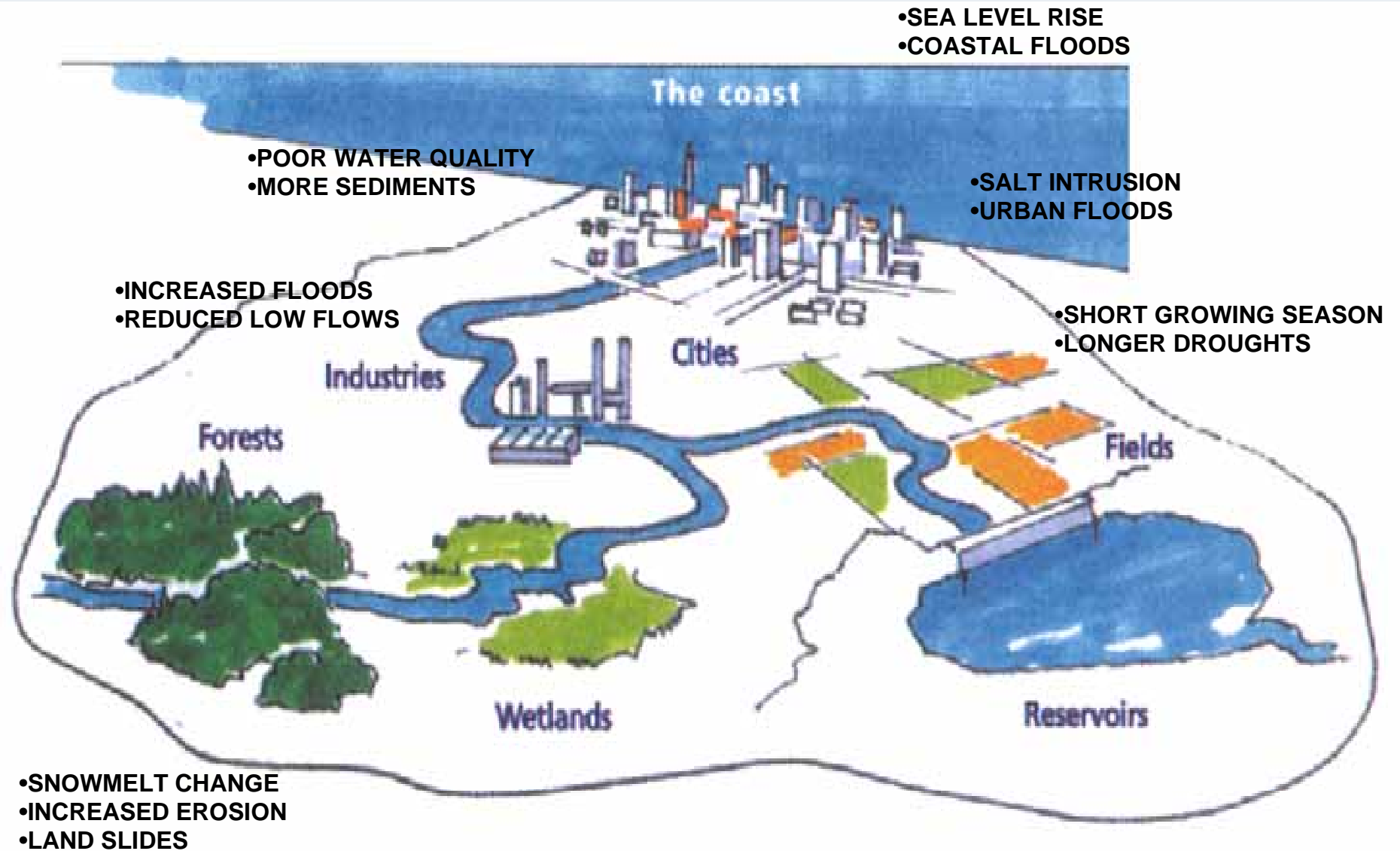


(Milly et al., 2005)

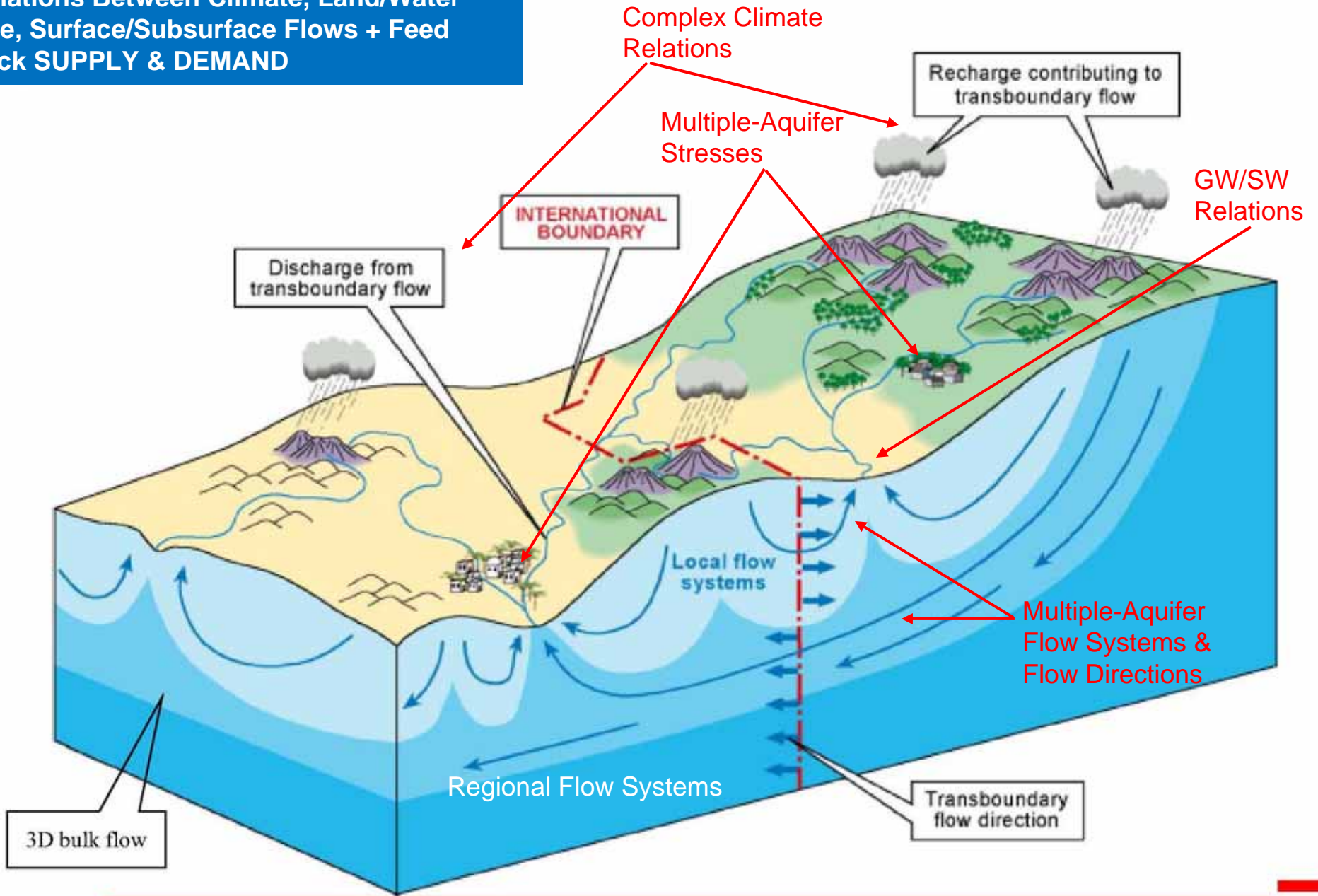
Increased Frequency & Intensity of Floods & Droughts



Cascading effects on the Economy , Society & Ecosystems



Need to Understand the Complex Relations Between Climate, Land/Water Use, Surface/Subsurface Flows + Feedback SUPPLY & DEMAND



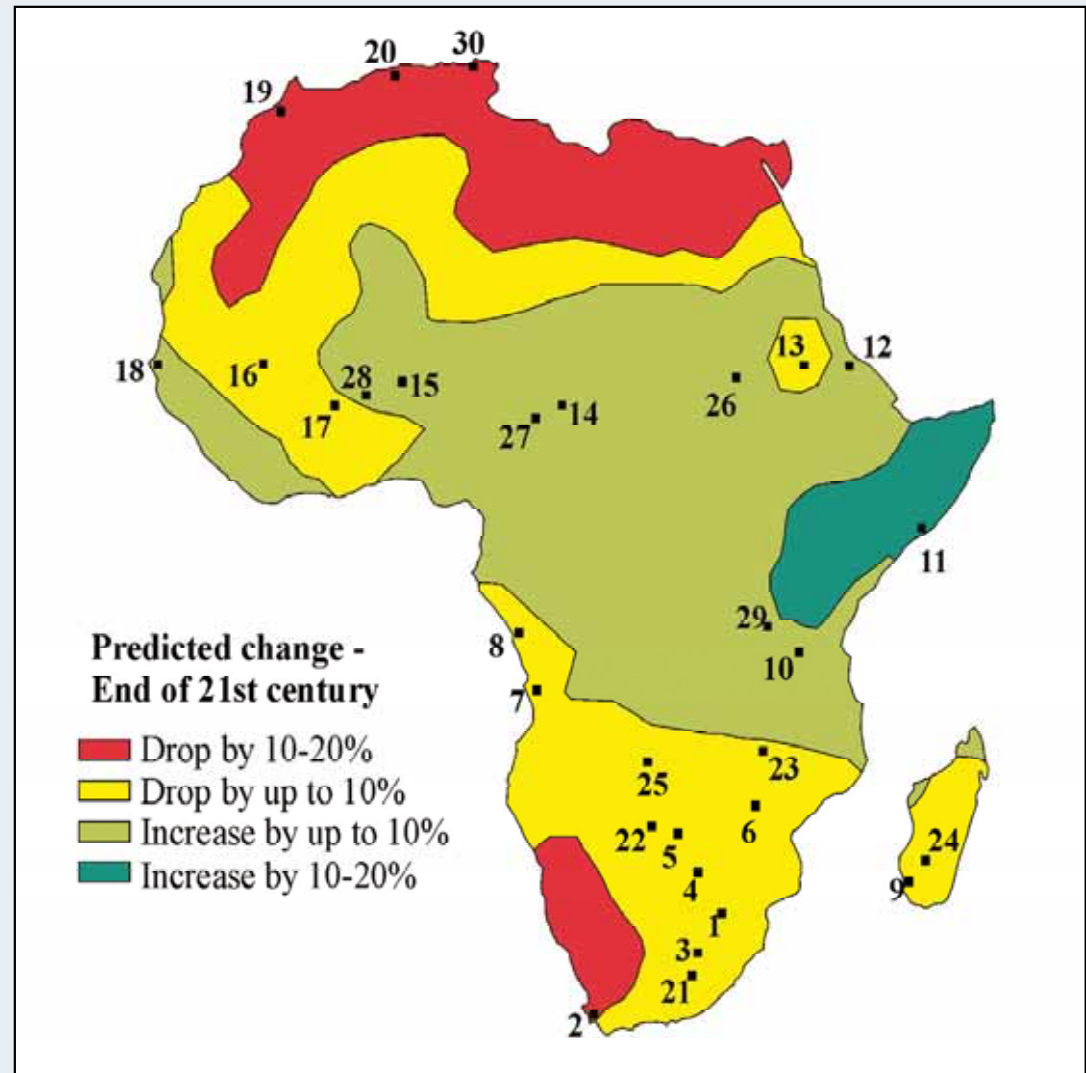
Climate Change: A Game Changer

Increased Complexity of Transboundary water management

➤ Availability

➤ Access

➤ Conflict



3. Water Security = A Framework for Adaptation

Water Security = { Reliable Availability + Acceptable level of Risks }

- A focus on water security provides a framework for developing appropriate response strategies
- Much of the challenge focuses on managing hydrological variability -- economic impacts of variability today are far-reaching, and climate change will increase such variability
- The scale of the water security challenge depends on a basin's natural hydrology, and countries' mix of institutions and infrastructure for water management

3. Water Security = A Framework for Adaptation

Implementing IWRM supports Adaptation

- Planning at the river basin level
- Strong intersectoral cooperation
- Managing trade-offs
- Good governance



4. A Better Future = Collaborative Adaptation

Type of Cooperation	The Challenge	The Opportunities
Increasing the benefits to the river	Degraded water quality, watersheds, wetlands, and biodiversity	Improved water quality, river flow characteristics, soil conservation, biodiversity and overall sustainability
Increasing benefits from the river	Increasing demands for water, sub-optimal WRM-D	Improved WRM (Agri +hydrop) flood-drought management, navigation, environmental conservation, water quality and recreation
Reduced costs because of the river	Tense regional relations and political economy impacts	Coop&Dev < Dispute/conflict, food/ energy selfsufficiency > security, ..
Increasing benefits beyond the river	Regional fragmentation	Integration of regional infrastructure, markets and trade

4. A Better Future = Collaborative Adaptation

- Transboundary cooperation is both necessary and beneficial in adapting to climate change
- Barriers to collaborative adaptation in the legal, institutional and policy spheres should be removed
- When planning for adaptation across boundaries, riparian countries should focus on transboundary impacts, sharing benefits and risks in an equitable and reasonable manner
- Sharing information, including that from early warning systems, between riparian countries is essential for effective and efficient climate change adaptation

Conclusions

- The international rivers of the world are coming under growing pressure from climate change
- Water security as a framework of adaptation can be achieved on the basis of « hydrosolidarity » which embraces collective action, interdependence, and shared responsibility
- The approach to collaborative adaptation is IWRM supported by strong management institutions, a high level of cooperation among all interests and continuous adaptation to new conditions
- **If the focus from competing national interests can be shifted to attaining common benefits, genuine transboundary water security can be achieved and sustained**

