

# Water scarcity, drought and challenges related to climate change

by  
Michel Jarraud  
Secretary General Emeritus WMO



**WMO OMM**

World Meteorological Organization  
Organisation météorologique mondiale

# Overview

- **Clarification of concepts (Water scarcity, Drought)**
- **Water Scarcity Trends**
- **Climate Change scenarios and water security (drought and flood)**
- **Economic impacts of water insecurity**
- **Relevant international commitments**
- **Future Perspectives**

# Clarification of concepts

- **Drought** - Deficiency of precipitation over an extended time period which results in water shortage for various activities, groups, or environmental sectors.



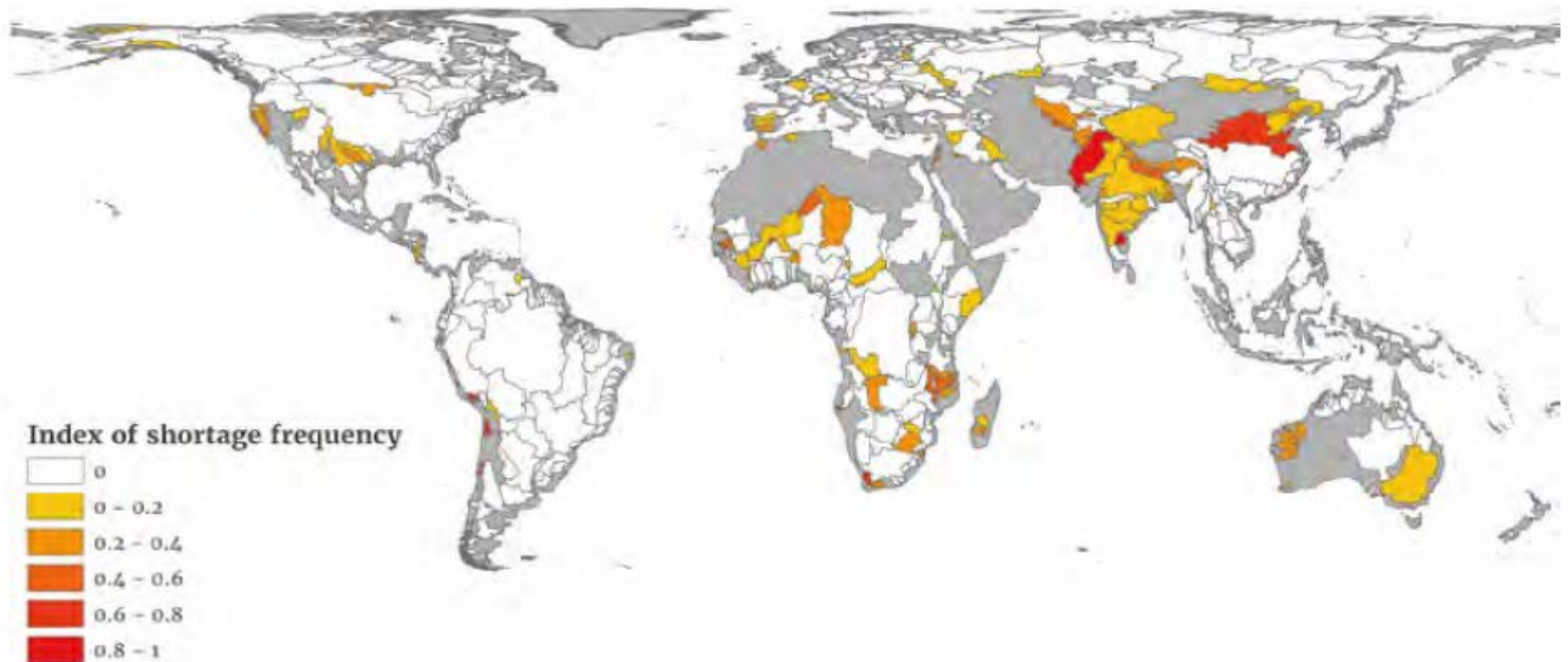
- **Water Scarcity** - Occurs when limited and/or diminishing water resources cannot satisfy long-term average requirements. It refers to long-term water imbalances combining low water availability with a level of water demand exceeding the sustainable supply capacity of the natural system.



# Water Scarcity Trends - Regional

- **South Asia** - largest global concentration of water-related risks, severe impacts of droughts & floods
  - largest global concentration of people without adequate sanitation, and growing environmental threats
- Exposure to flood risk in **East and Southeast Asia** is increasing rapidly.
  - India, China and Vietnam are ranked 1, 2, 3 in terms of economic risks of flooding
- As proportion of GDP, impacts of inadequate water supply and sanitation greatest in **Sub-Saharan Africa**. Africa also exhibits greatest variability in crop production,
- **USA** estimated to have greatest economic exposure to flood (coastal / fluvial) risk in the world (0.3 % of GDP)

# Frequency of shortages of water availability for use

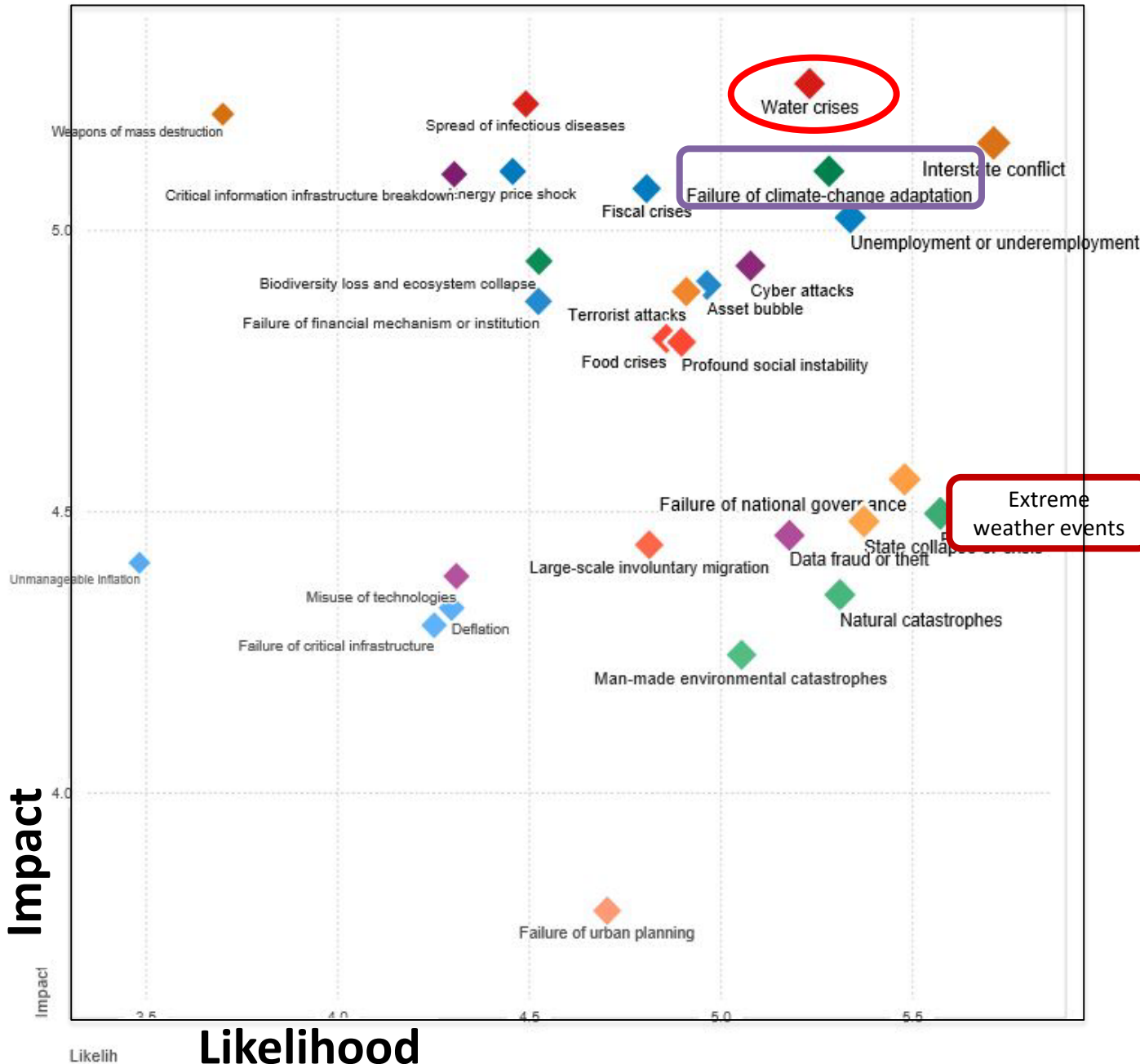


Source: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth, 2015

# The Global Risks Landscape 2015

896 experts and decision-makers were asked to assess the impact and likelihood of each global risk on a scale of 1 to 7 and in the context of a 10-year time frame.

Source: World Economic Forum



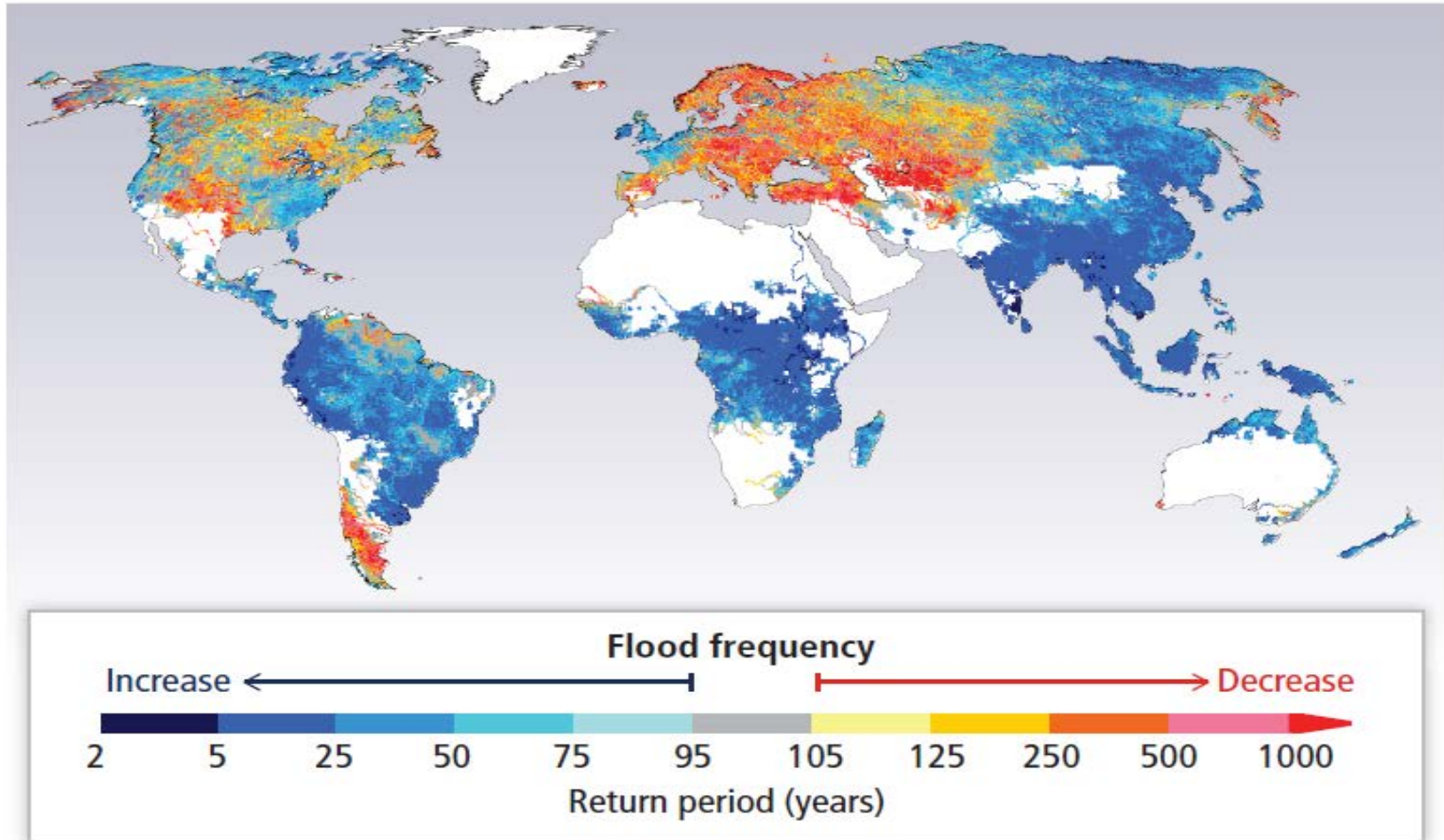


# Climate Change scenarios and related hydrological / freshwater impacts

Type of hydrological change or impact	Description of indicator	Change or Impacts for different scenarios
Decrease of renewable water resources, global scale	% global population affected by water resource decrease > 20% than 1990	Each degree of warming affects additional 7%
Exposure to floods, global scale	% global population annually exposed in 2080, to 100-year flood discharge	Warming 2°C: 0.5% Warming 4°C: 1.2%
Change in irrigation water demand, global scale	Change of required irrigation water withdrawals by 2080	Low emission: -0.2 to 1.6% Med emission: 1.9 to 2.8% High emission: 6.7 to 10.0%
Water scarcity	% global population in countries with low capita blue water resources (2080)	No significant differences
New or aggravated water scarcity	% global population in river basins with new water scarcity (2100 vs 2000)	Warming 2°C: 8% Warming 3.5°C: 11% Warming 5°C: 13%



# Return period (years) in 2080 for the 20<sup>th</sup> century 100-year flood



Based on 1 hydrological model with 11 Coupled Climate Models for high greenhouse gas emissions (Scenario RCP8.5)

Source: IPCC 5th Assessment Report

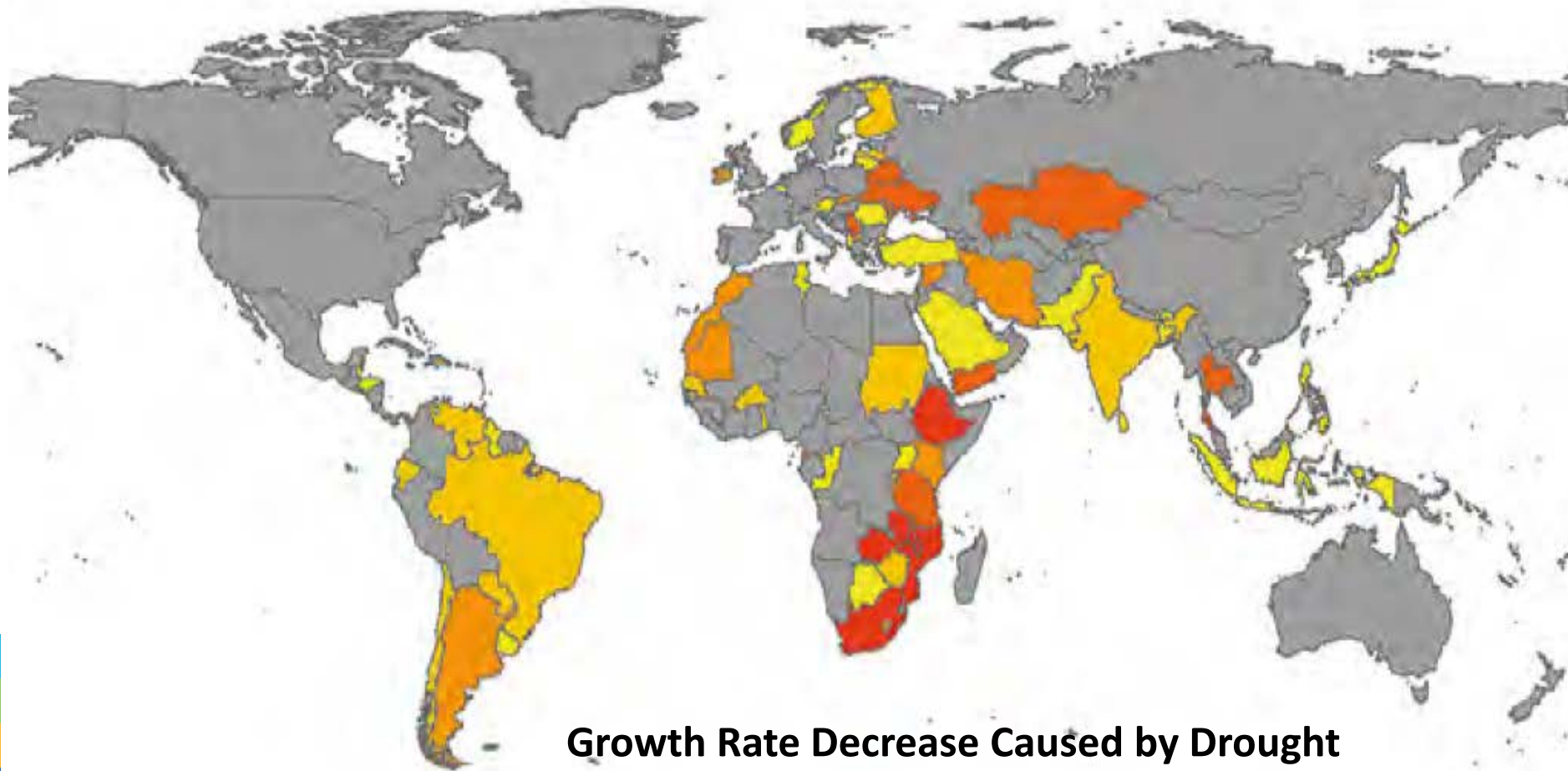
# Economic impacts of water insecurity

- Water insecurity costs the global economy at least US\$ 500 billion annually.
- Flood damage estimated at US\$120 billion per year from urban property damage alone
- Major droughts were found to reduce per capita GDP growth by half a percentage point.

Investing in water security would mitigate many of these losses and promote long-term sustainable growth.

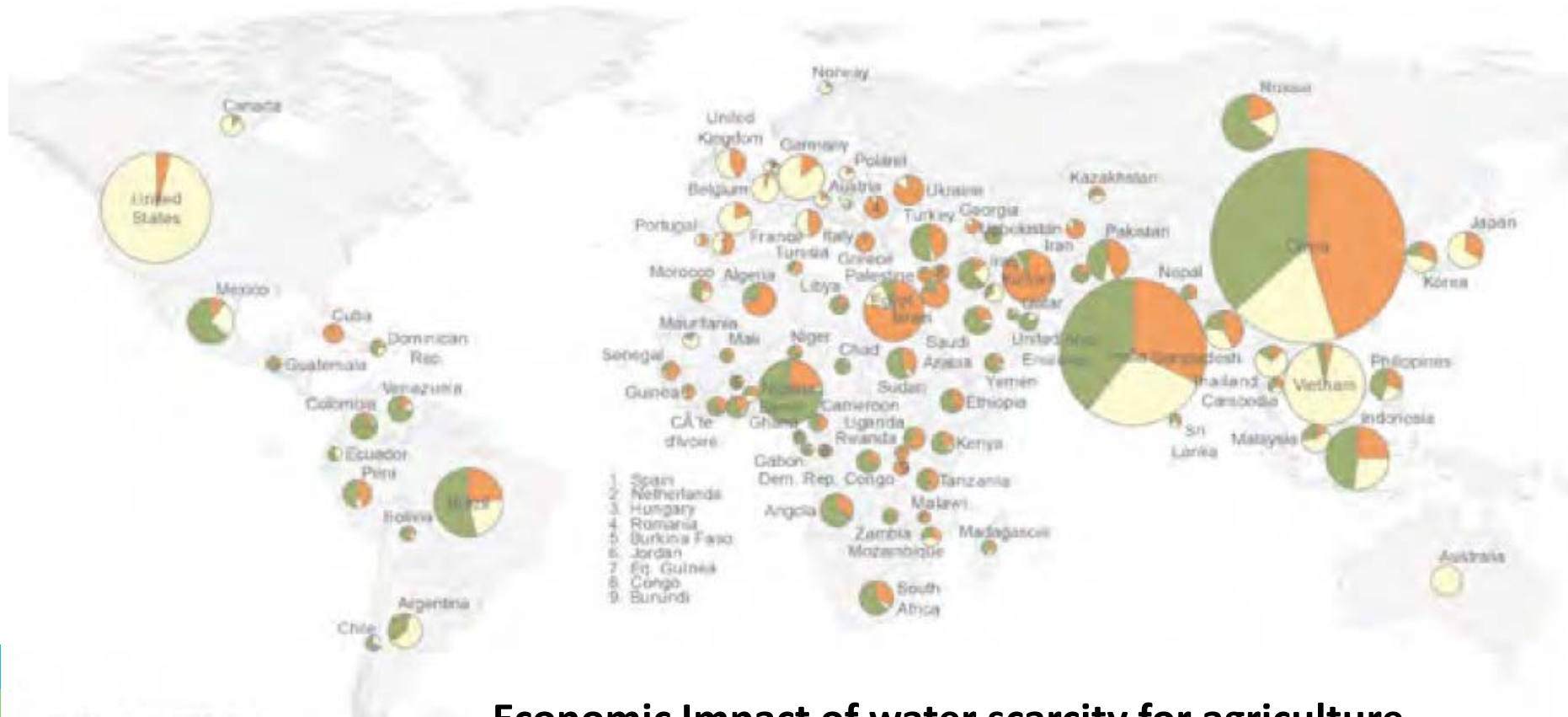


# Countries with the largest reduction in growth due to drought



**Growth Rate Decrease Caused by Drought  
Decrease in GDP Growth (%)**

# Relative economic impacts of water insecurity

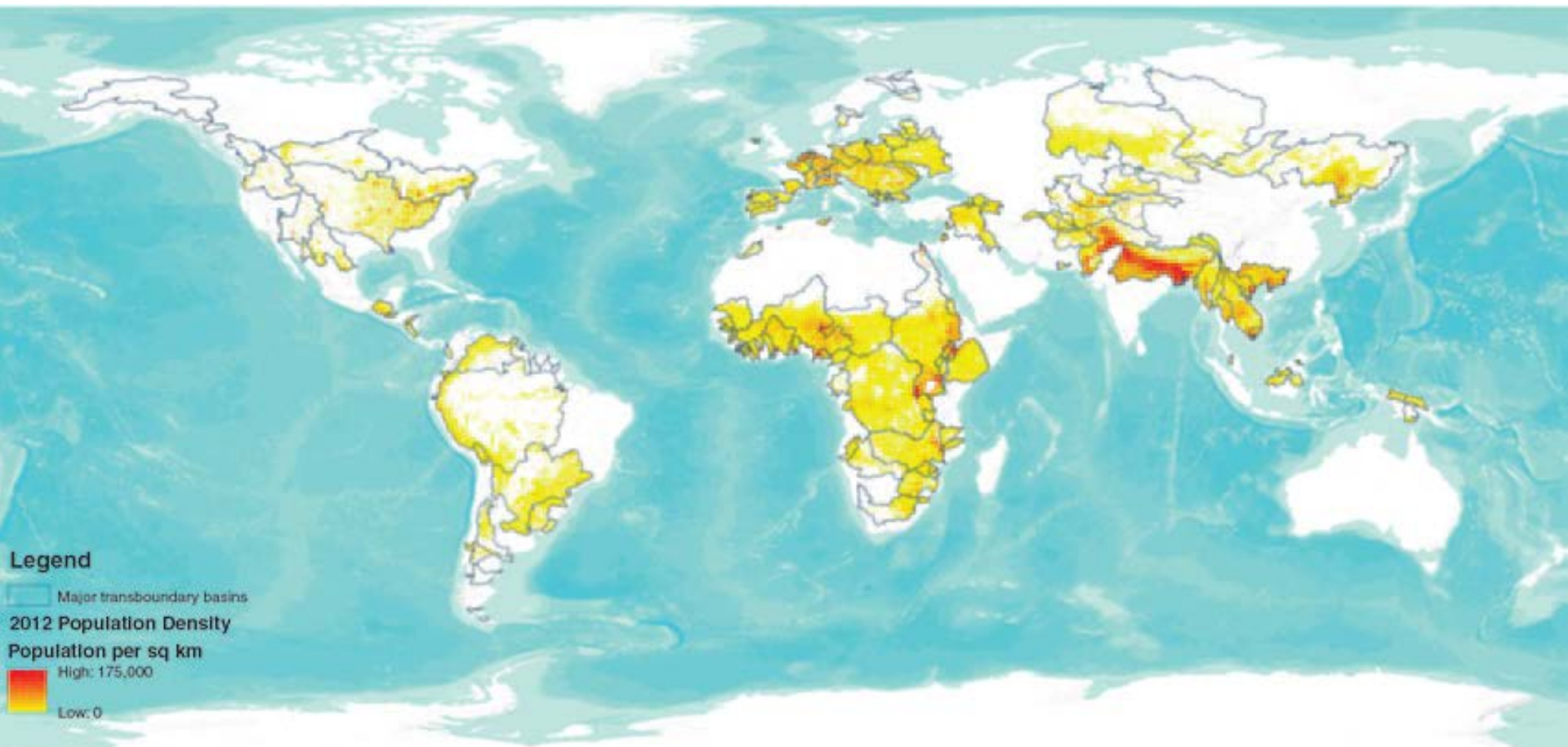


**Economic Impact of water scarcity for agriculture**

**Economic Impact of flooding**

**Economic Impact of inadequate water supply / sanitation**

# Water resources are essentially transboundary



**40 percent of the world's population resides in 275 transboundary river basins that span almost half of the Earth's land surface**  
**Transboundary rivers account for 60 percent of the world's freshwater flows**

Source: World Bank

# Water and the SDGs

1 NO POVERTY



2 NO HUNGER



3 GOOD HEALTH



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 RENEWABLE ENERGY



8 GOOD JOBS AND ECONOMIC GROWTH



9 INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE AND JUSTICE



17 PARTNERSHIPS FOR THE GOALS



**THE GLOBAL GOALS**  
For Sustainable Development



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# Sendai Framework for DRR Priorities



**Priority 1:** Understanding disaster risk

**Priority 2:** Strengthening disaster risk governance to manage disaster risk

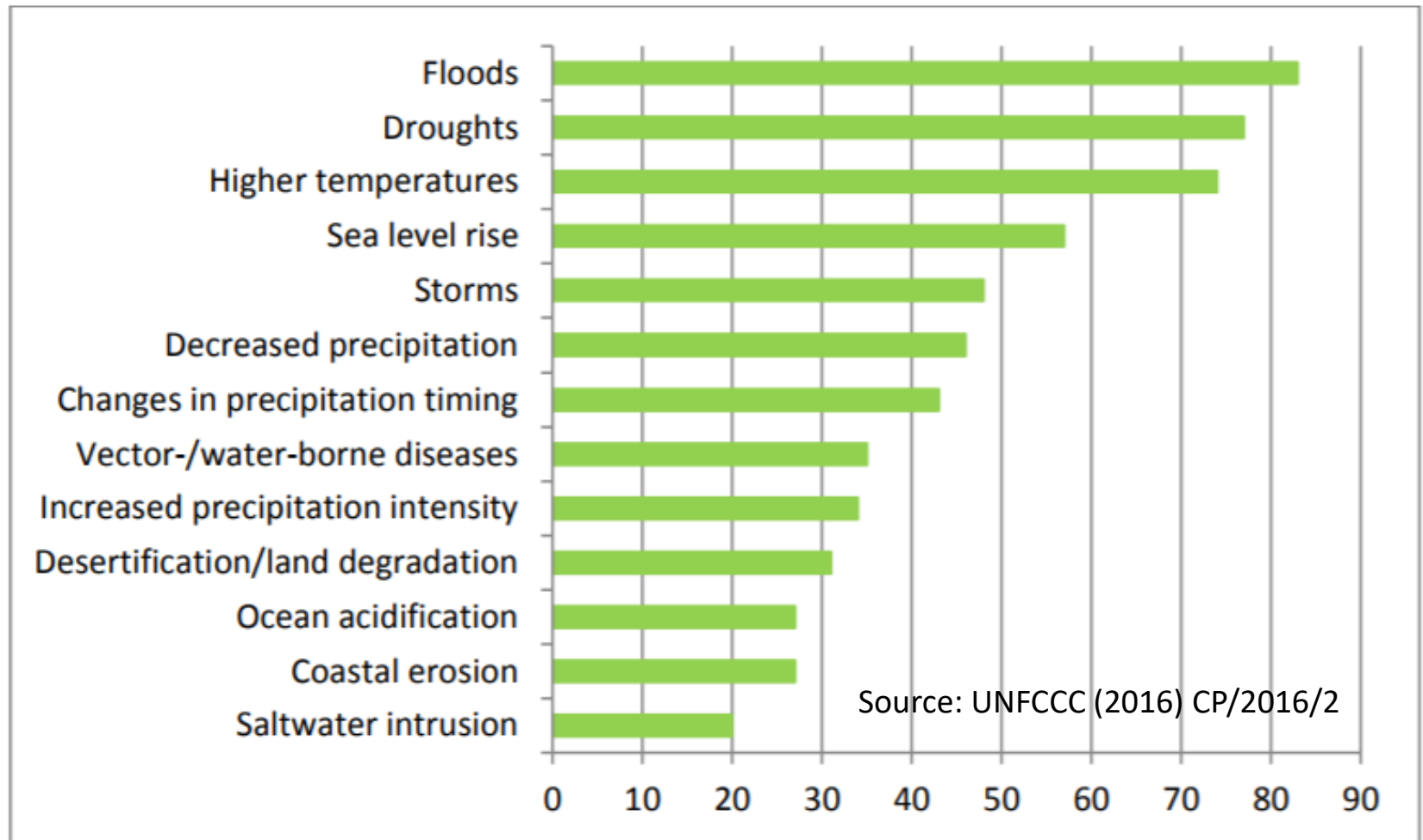
**Priority 3:** Investing in disaster risk reduction for resilience

**Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

**...and** Role of stakeholders

International cooperation and partnerships

# Climatic hazards in Nationally Determined Contributions (UN-FCCC)

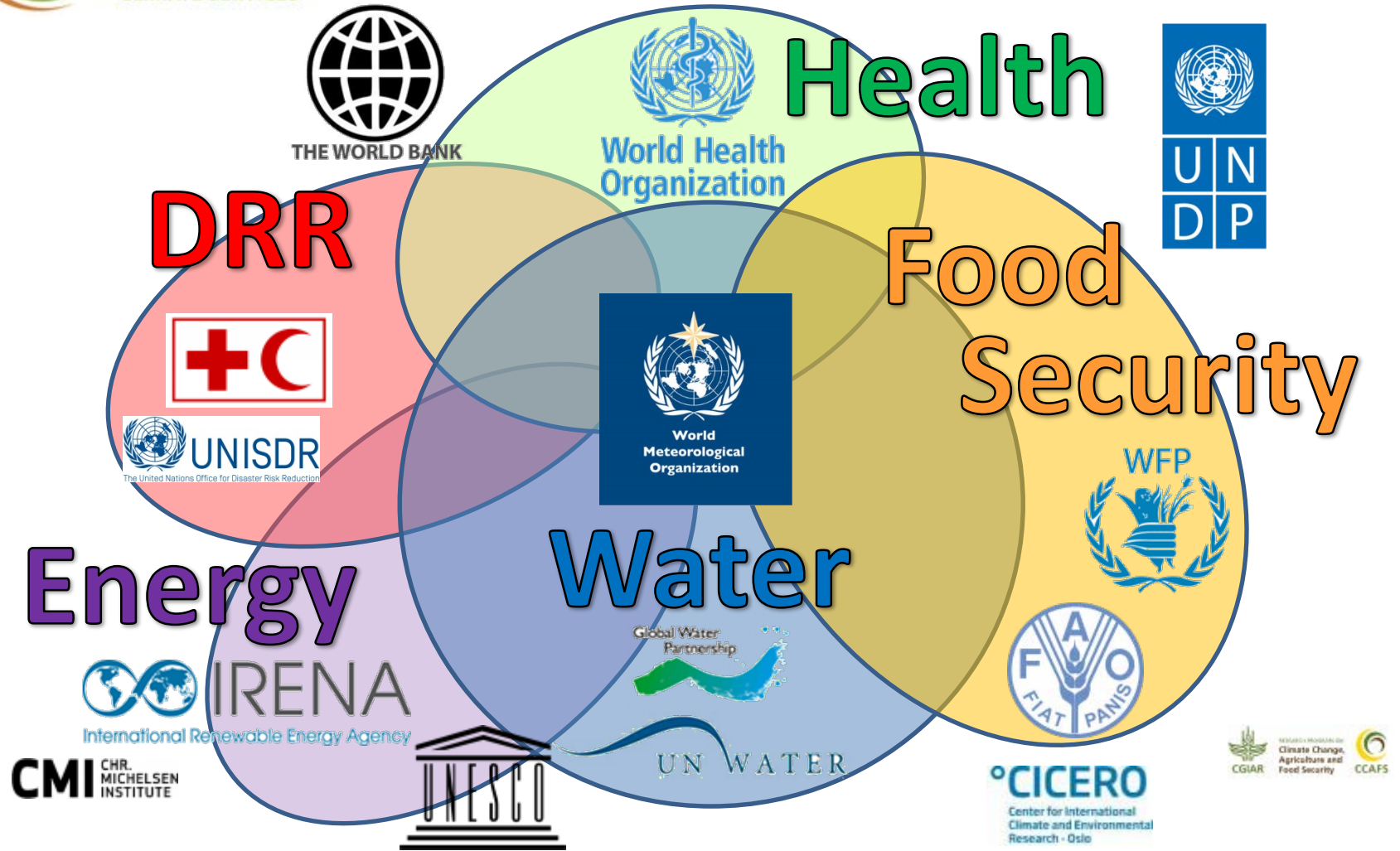




# Other Considerations

- **Water is one the ultimate cross-cutting issues**
- **Access to safe drinking water is now recognized as a fundamental human right**
- **Need more focus on gender issues: women and girls are on the frontline of water issues**
- **Relationship between water and migrations: droughts and floods can cause migrations or aggravate migrants living conditions**
- **Social impact**
- **Need to strengthen cooperation on water issues at all levels (international-regional-national-subnational)**

# The Global Framework for Climate Services a partnership



**Successful adaptation will require substantially increased investment in climate services**

# Future Steps

- **Priorities to be consistent with the overarching 2030 Agenda**
- **Address root causes, such as climate change and disaster reduction**
- **Invest in water security**
- **Invest in knowledge and people**
- **Take into account long term perspective and possible scenarios**
- **Ethical and equity issues. Need for more solidarity**
- **Multi-disciplinary and transboundary cooperation**
- **Improve governance at all levels**

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谢谢

Gracias

Merci

Thank you

спасибо

WEATHER CLIMATE WATER  
TEMPS CLIMAT EAU



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# Global Watercourse Conventions

- 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (**Water Convention**). Entered into force in 1996, originally regional instrument, opened in 2013 to all UN Member States, currently 41 Parties
- 1997 Convention on the Law of the Non-navigational Uses of International Watercourses (**Watercourses Convention**) adopted by UN General Assembly. Entered into force in 2014, currently 36 Parties

The two Conventions can help to address water scarcity in transboundary basins:

- Through their objective: Protection, preservation and management of international watercourses, also in situations of water scarcity and droughts
- Through their substantive norms: equitable and reasonable utilization, no-harm,
- Through their technical obligations: Set joint water quality objectives, use best available technology, exchange information, follow the precautionary principle, develop joint monitoring and common research, assist each other...
- Principle of cooperation as catalyst for implementation of substantive norms
- Both Conventions are recognized as evidence of international customary law and influenced many agreements (SADC, Albufeira Convention, etc.)

**The two Conventions are entirely compatible and complementary**