



WMO

World Meteorological Organization

Working together in weather, climate and water

Challenges and Opportunities with Development of Meteorological, Hydrological and Climate Services for DRR and Climate Adaptation

A framework for scaling UP

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Chief, Disaster Risk Reduction Programme

13-15 May 2014, Almaty, Kazakhstan

Central Asia Climate Knowledge Forum: Moving Towards Regional Climate Resilience



Agenda

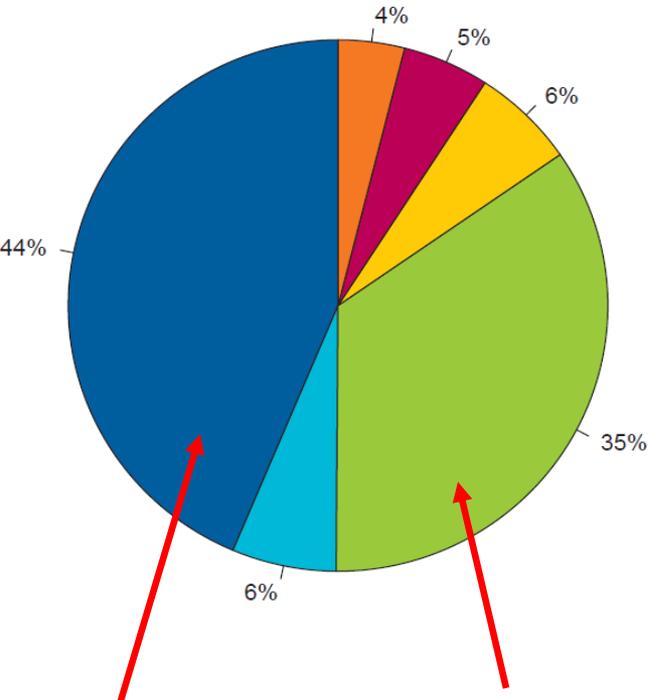
- Managing risks associated with climate
 - Concerns, challenges and opportunities
- Harnessing WMO research and operational systems
 - Scaling up the development of meteorological and climate services
- Conclusions

Global Distribution of Reported Disasters Caused by Weather Extremes (1970-2012)

Events

Global Distribution of Disasters per Hazard Type (1970-2012)

Total = 8 835 disasters



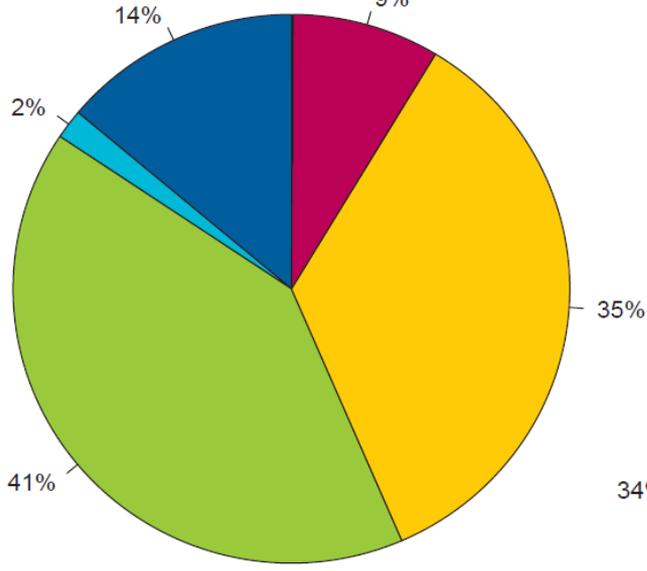
Floods

Storms

Deaths

Global Distribution of Deaths per Hazard Type (1970-2012)

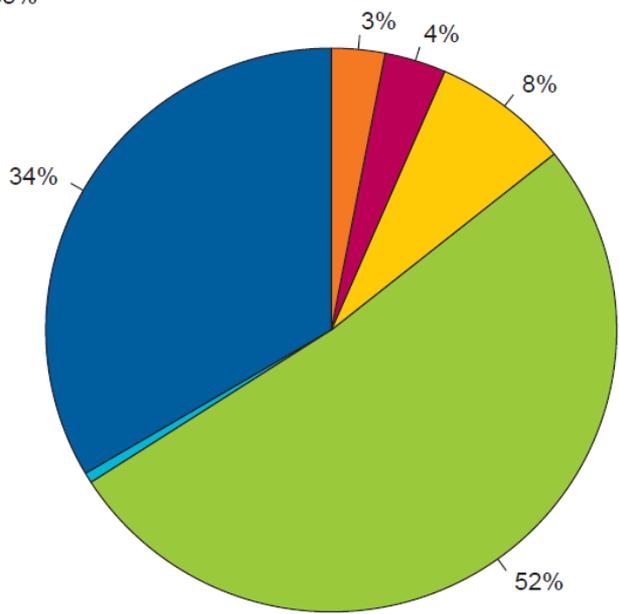
Total = 1 944 653 deaths



Economic Losses

Global Distribution of Economic Losses per Hazard Type (1970-2012)

Total = US\$ 2 390.7 billion (adjusted to 2012)



- Floods
- Mass Movement Wet
- Storms
- Droughts
- Extreme Temperature
- Other

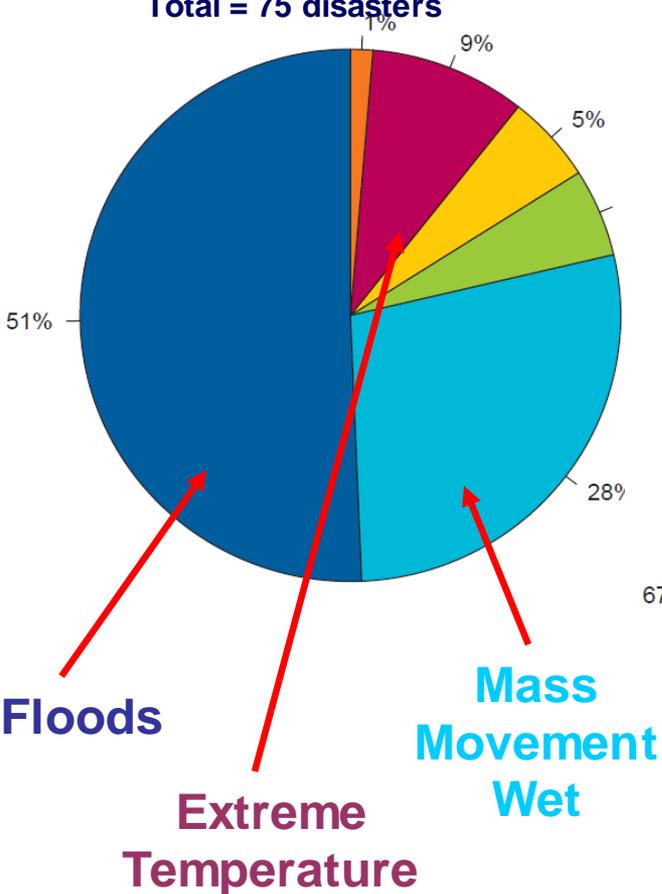
Source: WMO/CRED 2014

Distribution of Reported Disasters Caused by Weather Extremes (1970-2012) in Central Asia

Events

Global Distribution of Disasters per Hazard Type (1970-2012)

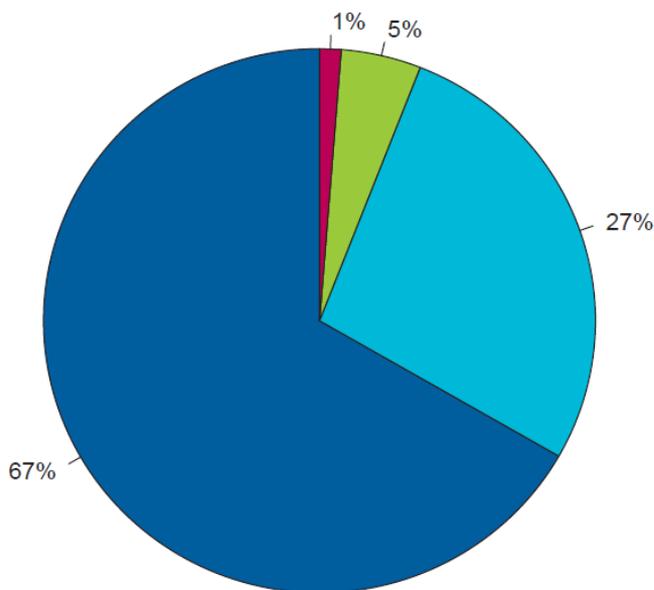
Total = 75 disasters



Deaths

Global Distribution of Deaths per Hazard Type (1970-2012)

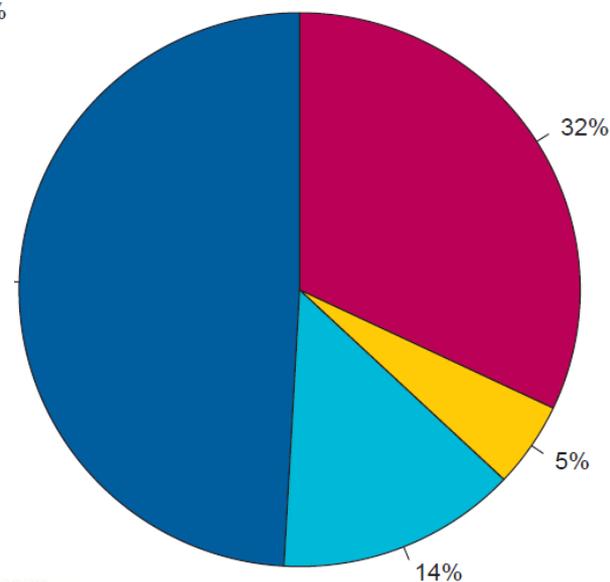
Total = 2 472 deaths



Economic Losses

Global Distribution of Economic Losses per Hazard Type (1970-2012)

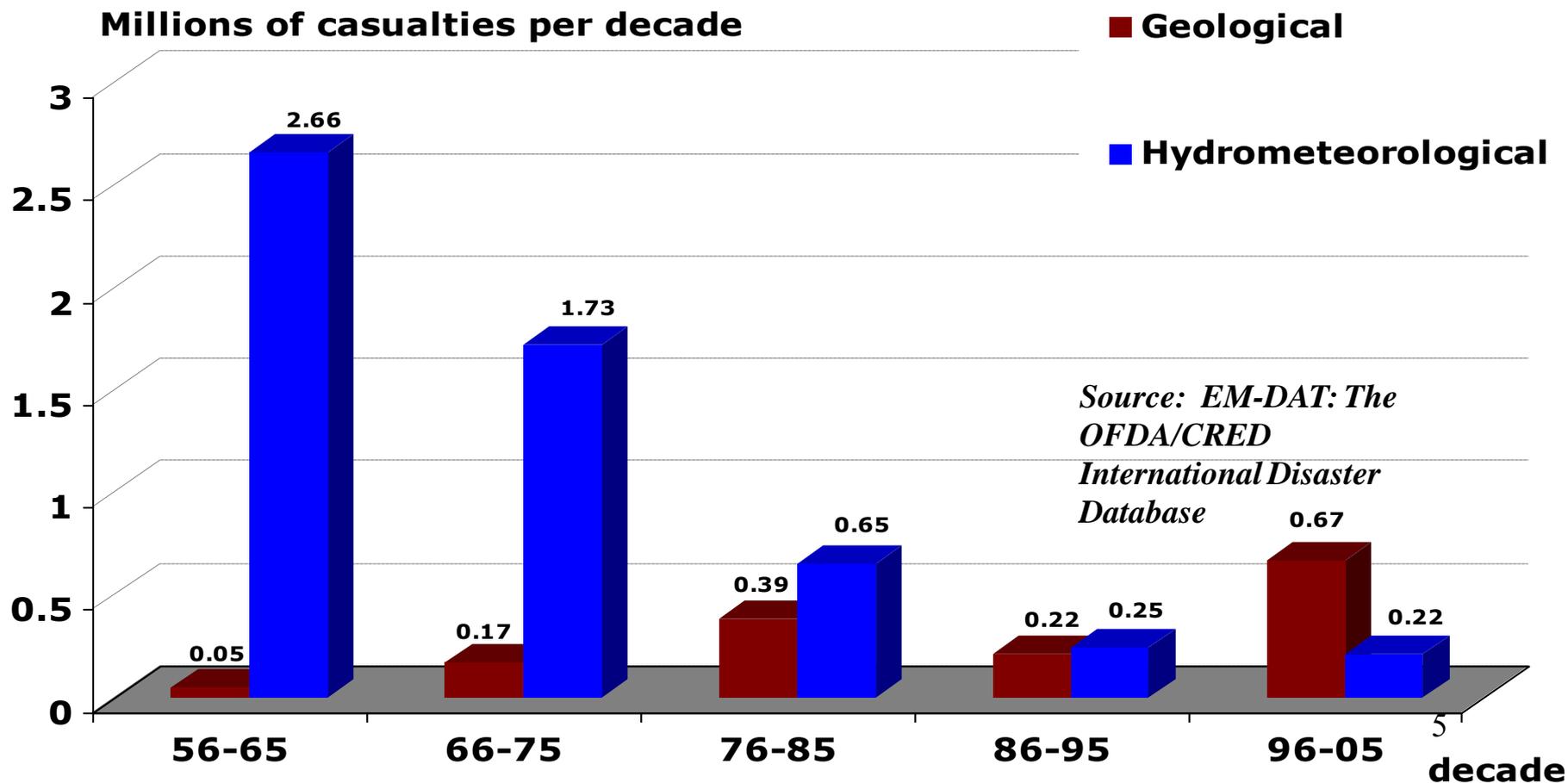
Total = US\$ 2.8 billion (adjusted to 2012)



Floods
 Mass Movement Wet
 Storms
 Droughts
 Extreme Temperature
 Wildfires

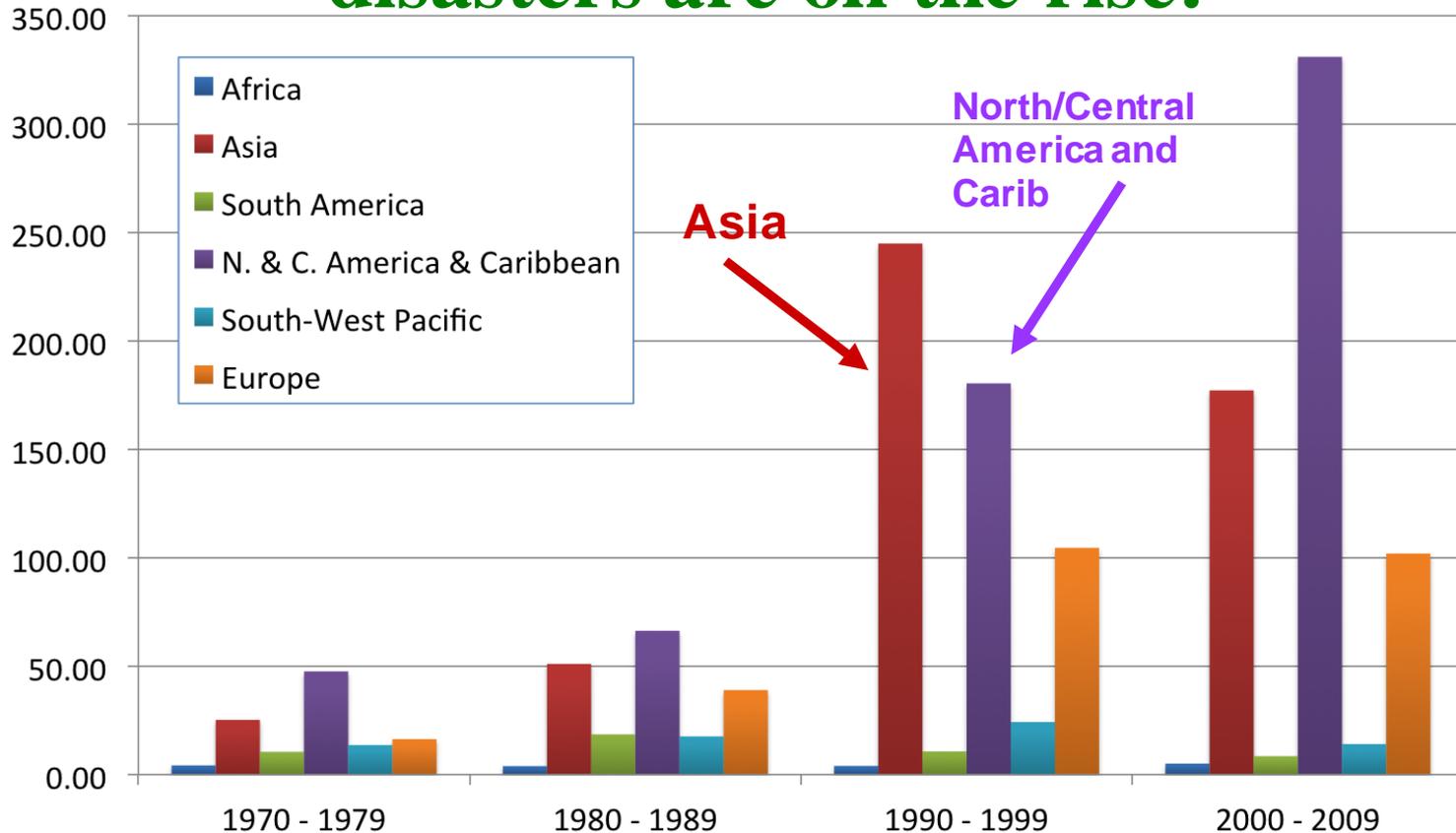
First the good news.....

Loss of life related to hydro-meteorological hazards generally falling!



Concerns...

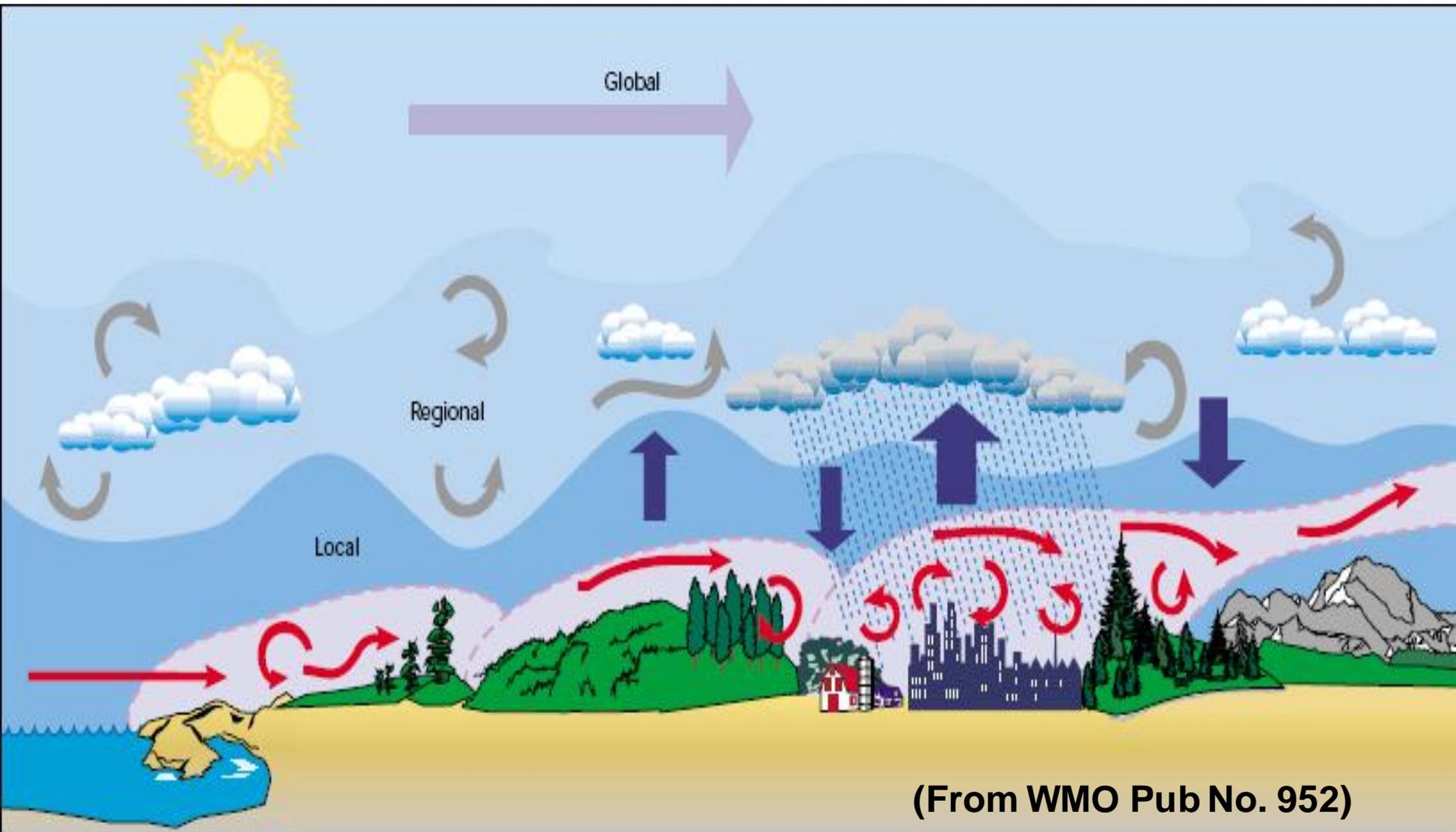
Economic losses related to hydro-meteorological disasters are on the rise!



Economic losses by decade and region (in billions of US \$ adjusted to 2000 values)

Concerns...

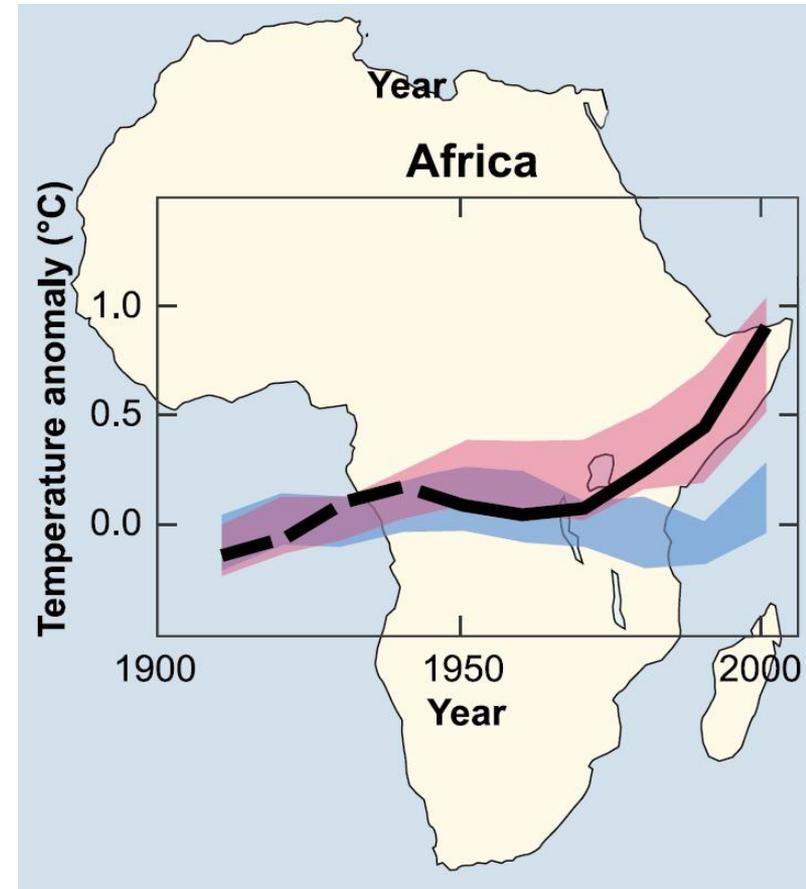
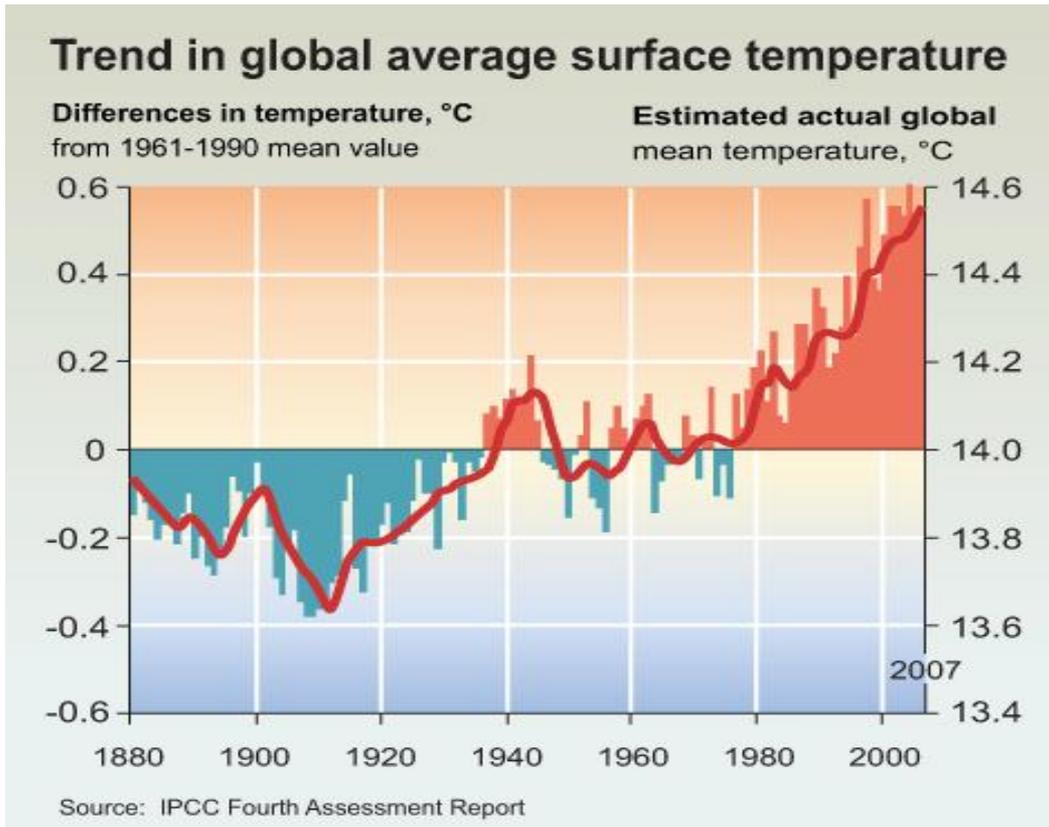
Multi-Scale Issue: Global, regional & local effects of climate affect different societies in different ways!



(From WMO Pub No. 952)

Concerns...

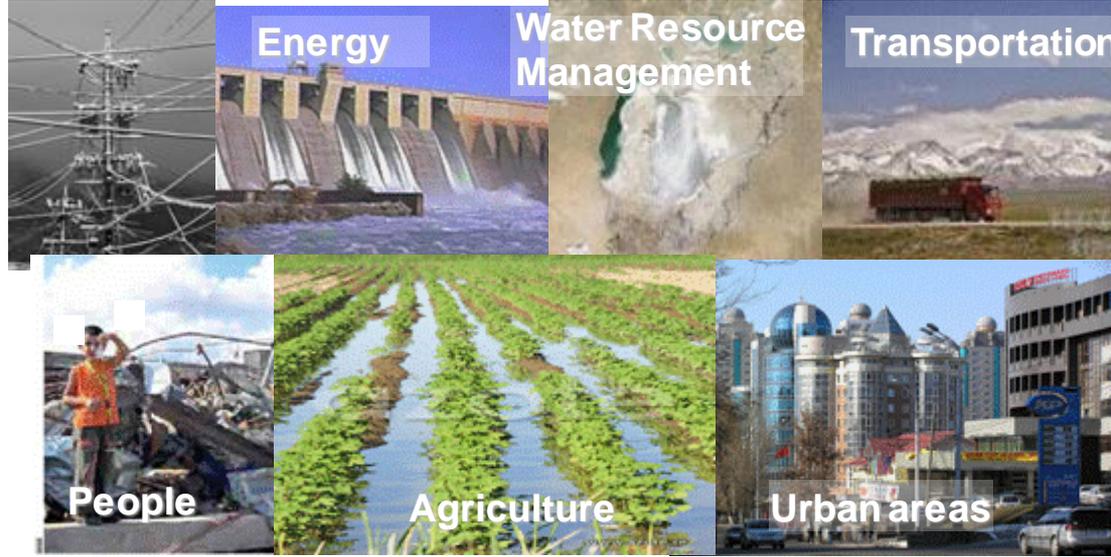
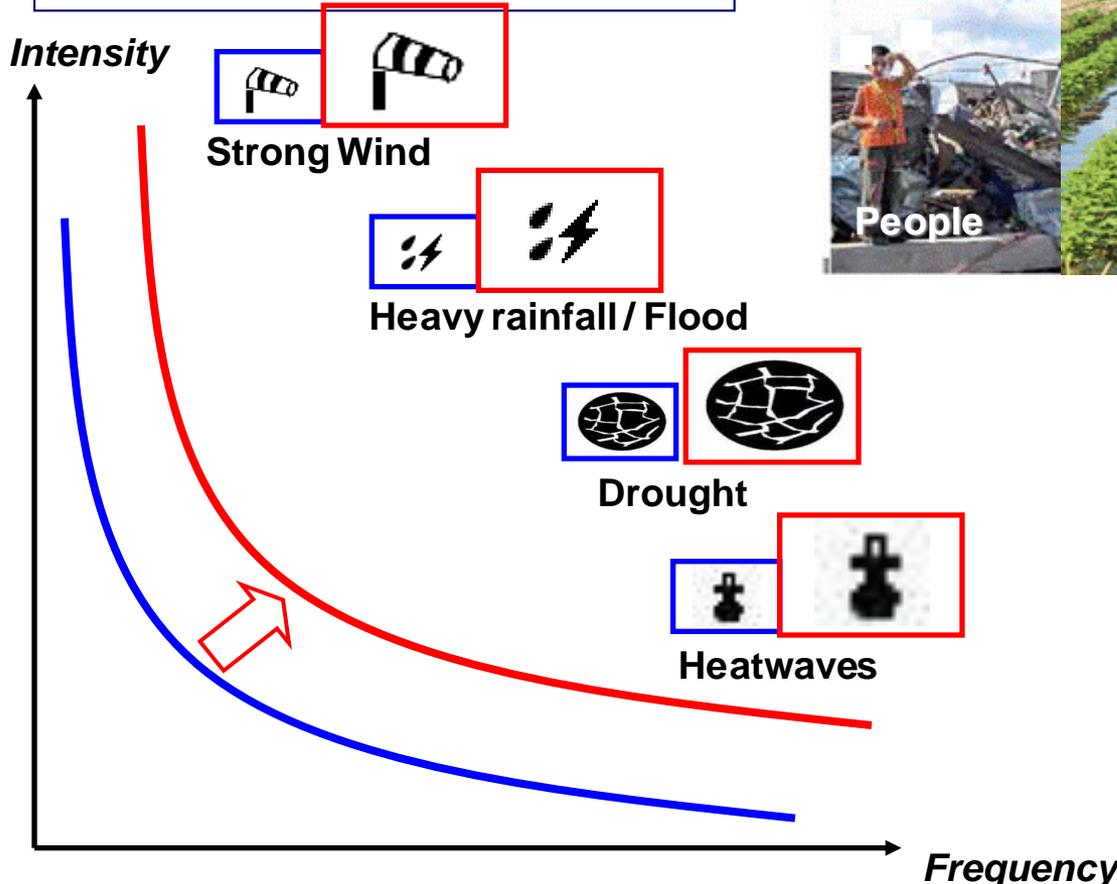
The past is no longer a trustworthy indicator of the future.....changes in location, severity and frequency of weather extremes!



Concerns...

Exposure and vulnerability on the rise across sectors ..a major development Issue...

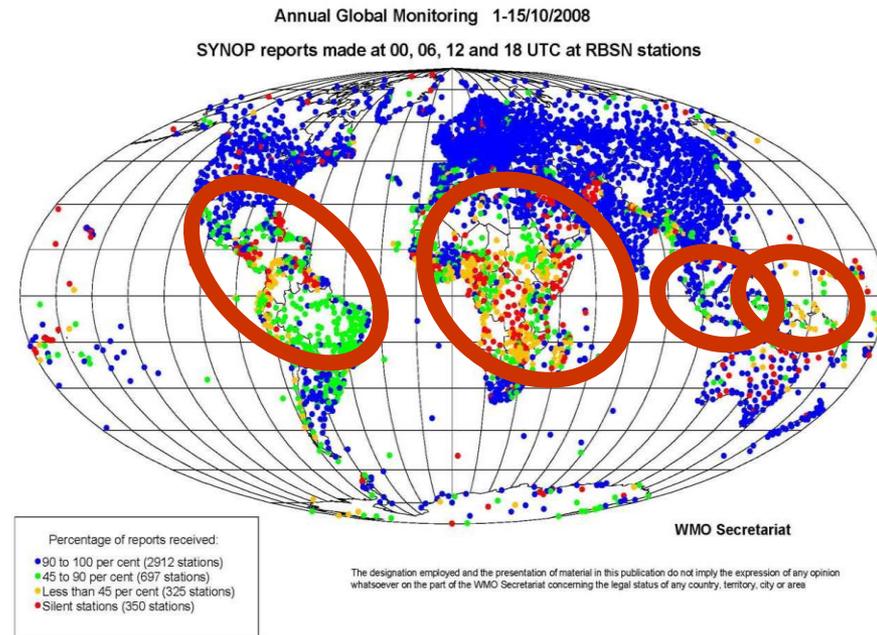
Hazard intensity and frequency increasing linked to climate variability and change!



...need for informed risk management!

Challenges...

- Many countries lack the basic meteorological infrastructure, institutional, technical capacities!
- Institutional capacities in meteorology, hydrology climate services are highly varied across countries!!
- Need for service oriented culture!!!
- Sustainability!!!!



Challenges

Source: 2006 WMO Country-level DRR survey http://www.wmo.int/pages/prog/drr/natRegCap_en.html

- 70% of NMHS need amendments of national policies and legislation
- 65% of NMHS need modernization of meteorological infrastructure (e.g., observation networks, forecasting, telecommunication, data rescue,...)
- 80% of NMHS need technical and management training
- 80% of NMHS need multi-sectoral institutional partnerships, coordination

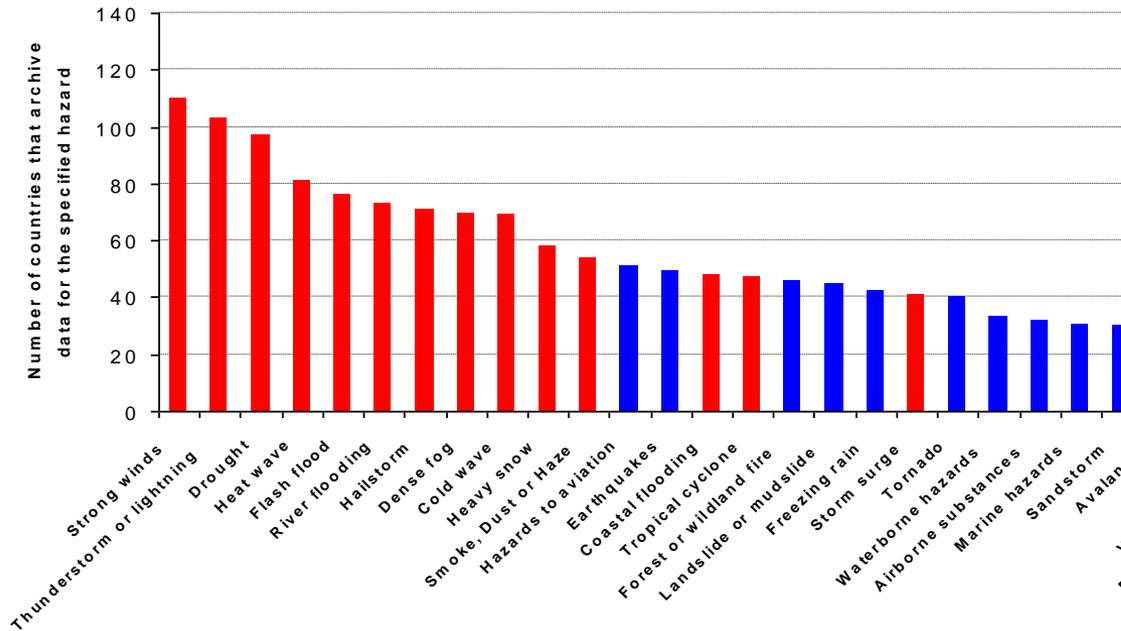


Meteorological infrastructure/systems... high return on investment!

Source: "Natural Hazard, UnNatural Disaster, Economics of Effective Prevention," World Bank and United Nation's Report (2010)

Challenges

Over 80 % of National Meteorological Services....



Source: 2006 WMO Country-level DRR survey

http://www.wmo.int/pages/prog/drr/natRegCap_en.html

- Not maintaining hazard data systematically
- Need data rescue & Data Management Systems
- Need Standards for:
 - Monitoring
 - Hazard database and metadata
 - Analysis tools
 - ✓ Statistical analysis
 - ✓ Climate modelling
 - Human expertise

Challenges...

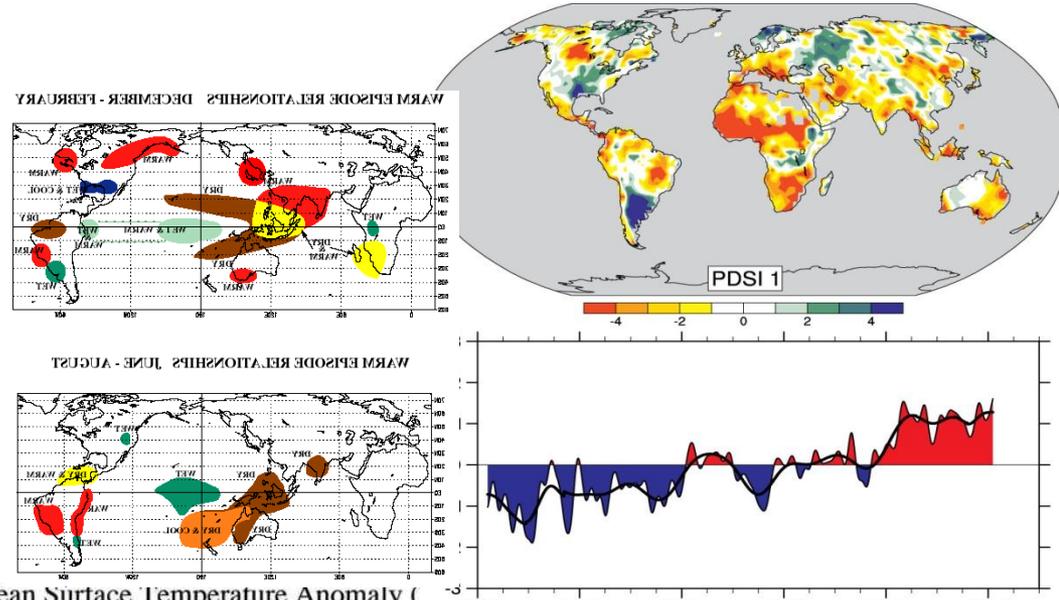
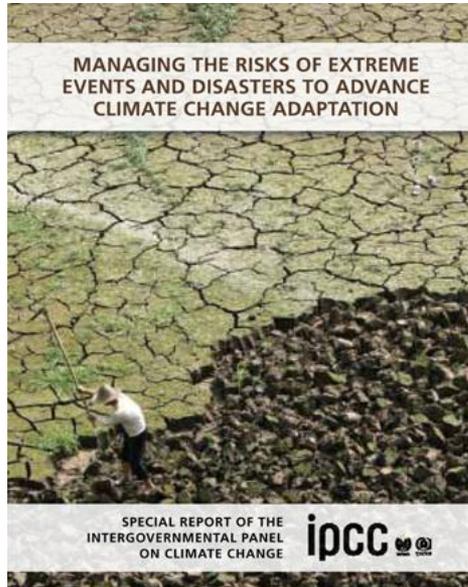
Data exchange within and across national boundaries

- International data sharing policies facilitated by WMO
 - **Resolution 40** “WMO Policy and Practice for the Exchange of Meteorological and Related Data ...” was adopted by 12th WMO Congress in 1995.
 - **Resolution 25** “Exchange of Hydrological Data and Products” was adopted by the 13th WMO Congress in 1999
- Challenges:
 - **National security**
 - **Commercial to subsidize core infrastructure**
 - **Not available or need for data rescue**
 - **Institutional turfs and silos**
- Need for high-level policy discussion within and across governments on the mutual values for open exchange of data

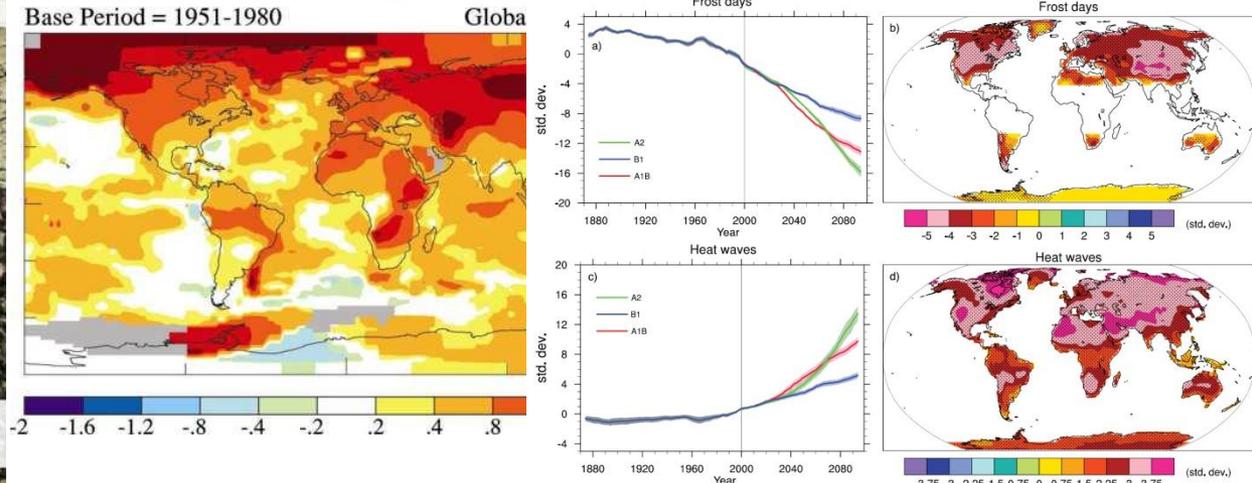
Opportunities....

Continuous progress in understanding limits of predictability and forecasting...

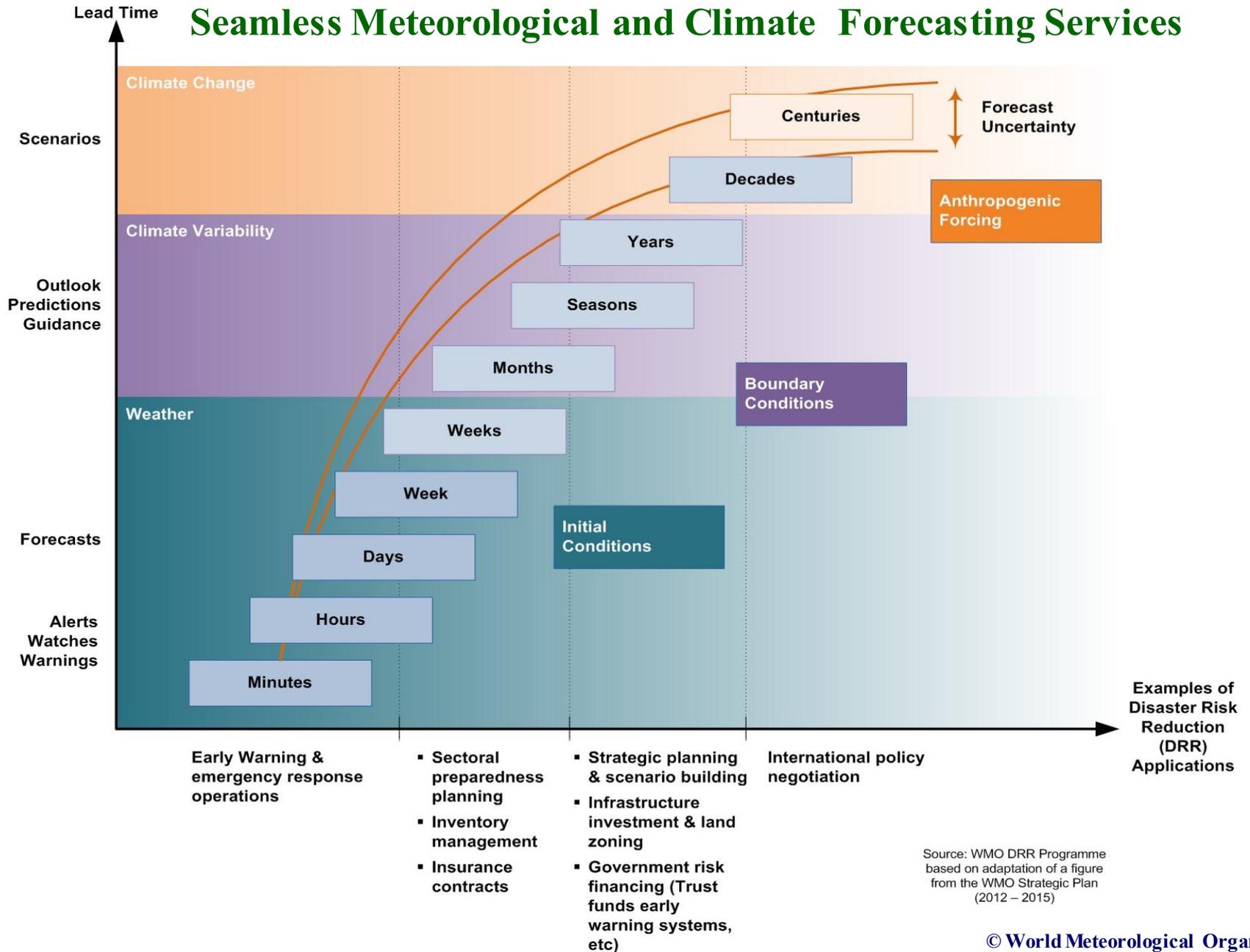
Need for operational production and provision of relevant climate information at different levels!



2001-2005 Mean Surface Temperature Anomaly (Base Period = 1951-1980) Globa

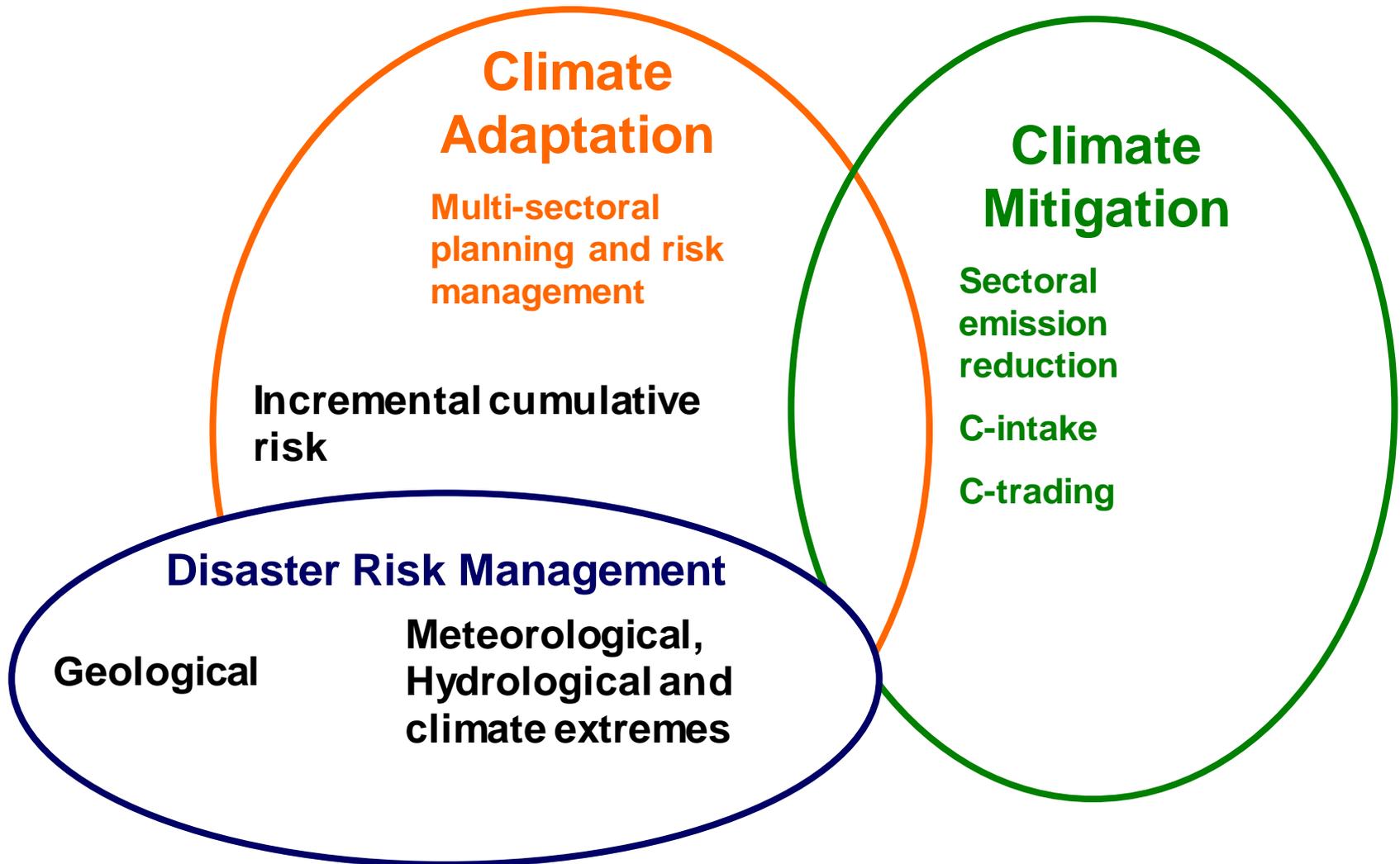


Opportunities....



Opportunities

Decisions in Climate Mitigation, Adaptation and DRR are interlinked



WMO Disaster Risk Reduction Programme (established in 2004)

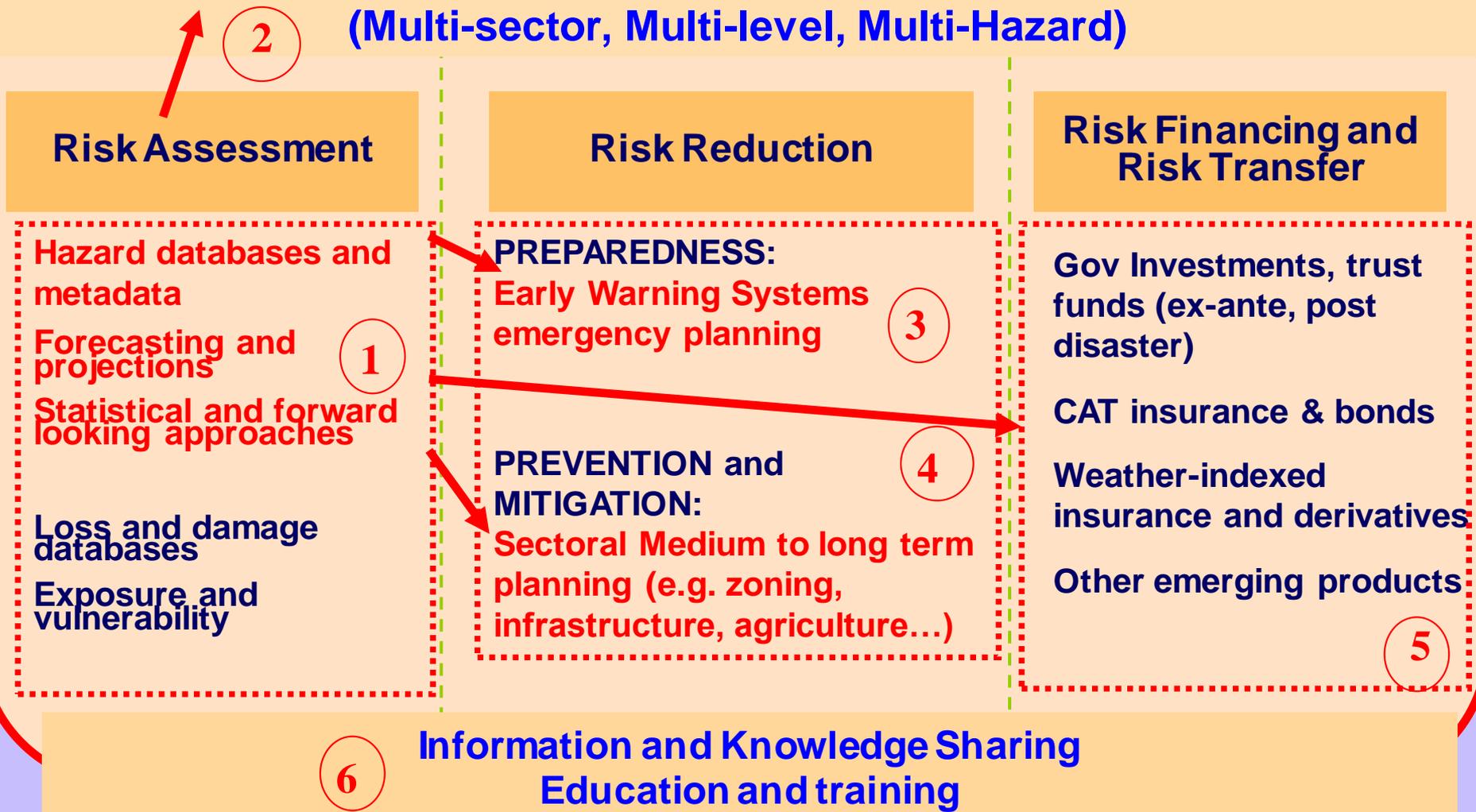
Harnessing WMO Sponsored research, expertise and operational capacities in meteorology, hydrology and climate

for improving early warning systems and preparedness, sectoral disaster risk reduction, risk financing and transfer decisions...

Hyogo Framework for Action 2005-2015

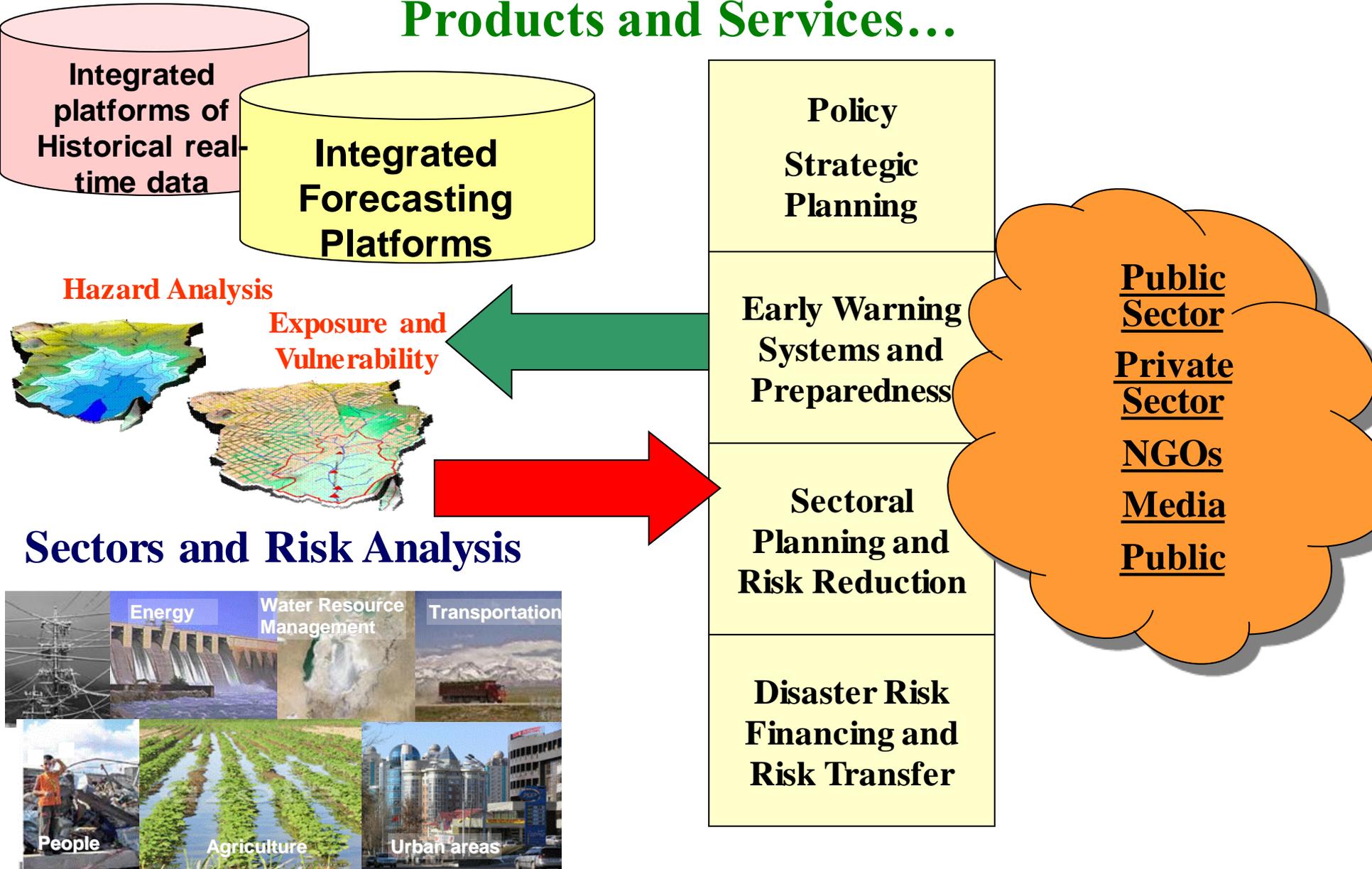
Meteorological, Hydrological and Climate Services to support

Governance and Institutional Framework (Multi-sector, Multi-level, Multi-Hazard)

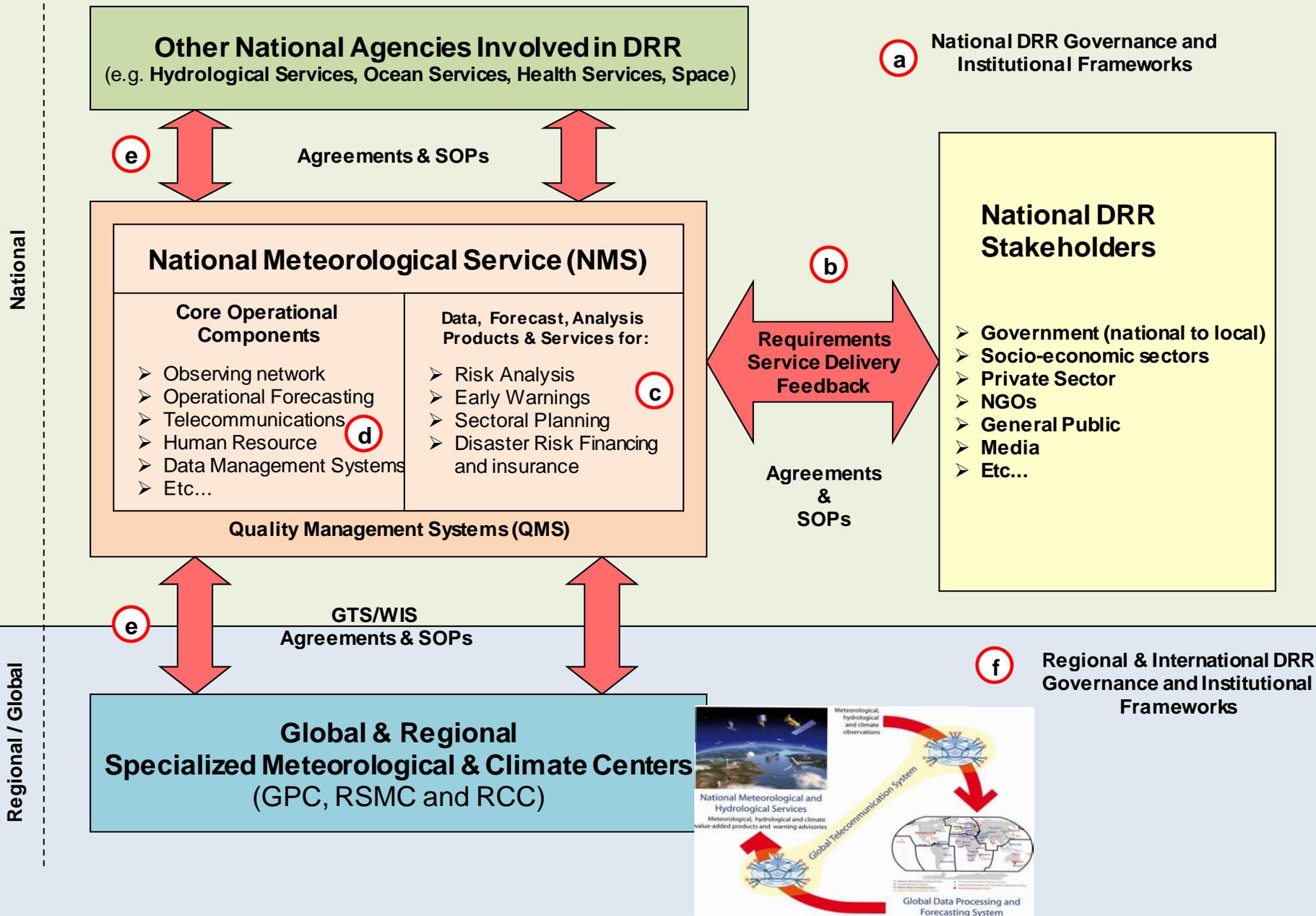


WMO Actions

Improving Meteorological, Hydrological and Climate Products and Services...



Weather, Climate and Hydrological Services to support DRR Decision-Making



Integrated Data, Forecasting and Service Delivery Platforms

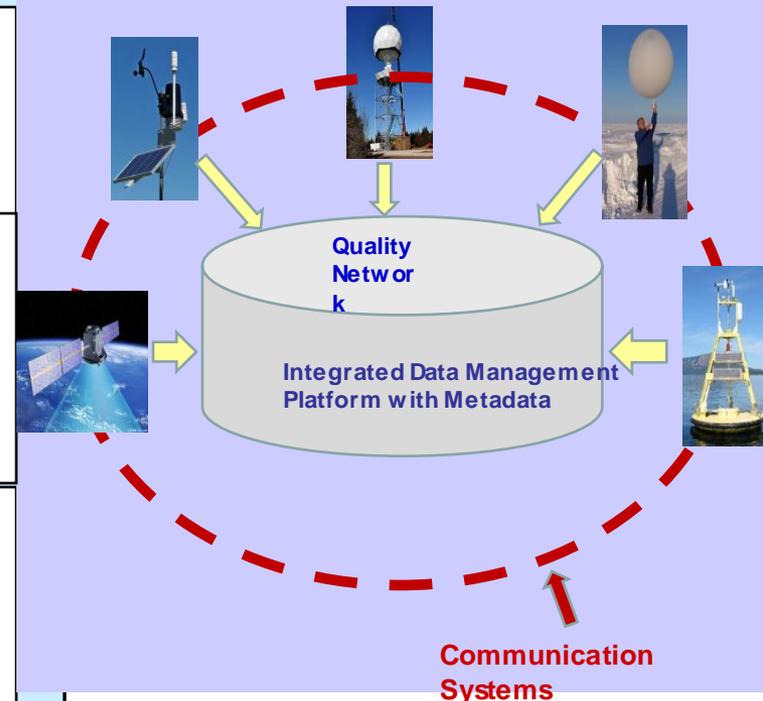
<p>Government Services National to local Disaster Risk Management, Various</p>	<p>Public & Media</p>	<p>Commercial & Industry Services •Transport, Agriculture, Water, insurance</p>
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Product and Service Delivery Platforms and Service Delivery Models

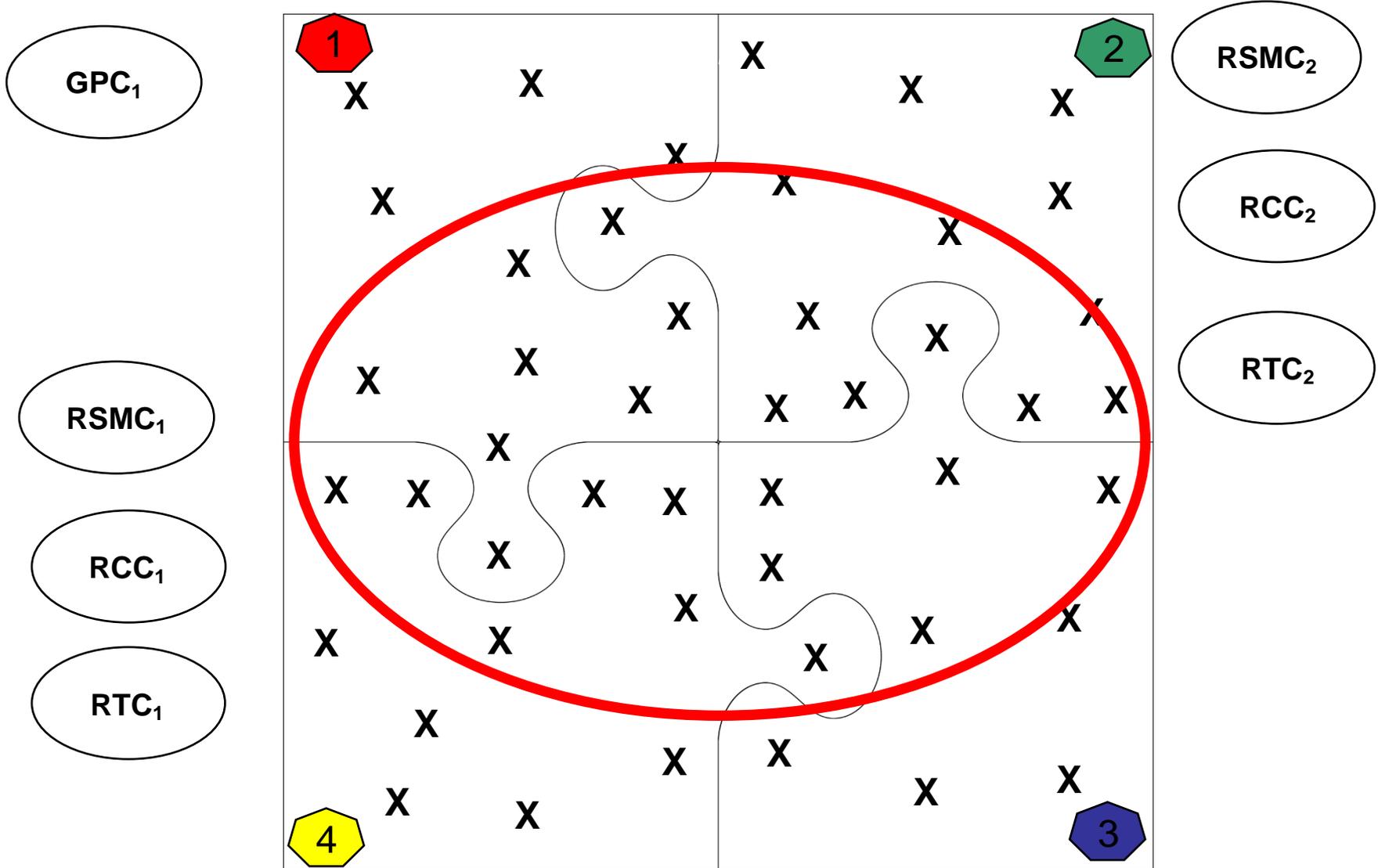
Integrated Forecasting Platforms

<p><u>Marine & Costal</u> •Tropical Cyclone, Storm Surges, High Waves, storms,</p>	<p><u>Severe Weather</u> •Heavy precipitation (Rain& Snow), Severe Storms, Etc.</p>
<p><u>Environmental</u> •Air Pollution / Air Quality , Heat Waves / Health, Etc.</p>	<p><u>Hydrological forecasting</u></p>
<p><u>(Sub)Seasonal Forecasting</u> •Drought, heat wave forecast</p>	<p><u>Emergency Response</u> •Nuclear, Biological, Volcanic Ash, Etc.</p>

Integrated Data platform



Concept: Integrated Observing & Monitoring Networks with Regional Cooperation Framework



WMO is ISO Accredited Agency to set international standards....

- **WMO is a recognized by ISO as an international standardization body:**
 - through ISO Council Resolution 43/2007 - (http://en.wikipedia.org/wiki/List_of_technical_standard_organisations)

On issues including:

- **Observing networks**, instrumentation and data management systems
- **Forecasting** tools (Cascading from developed to developing countries)
- International **data sharing policies** and exchange mechanisms
- **WMO Information System**: Globally coordinated exchange of weather, water, climate and ocean observations

60 Years of National, Regional and Global Coordination

Systematic Global Data Collection, Analysis and Forecasting



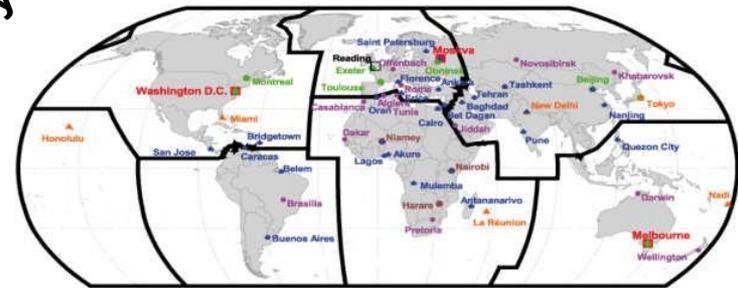
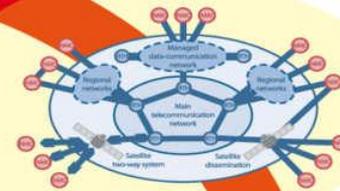
National Meteorological and Hydrological Services

Meteorological, hydrological and climate value-added products and warning advisories

Meteorological, hydrological and climate observations

191 Member States

Global Telecommunication System / WMO Information System (WIS)

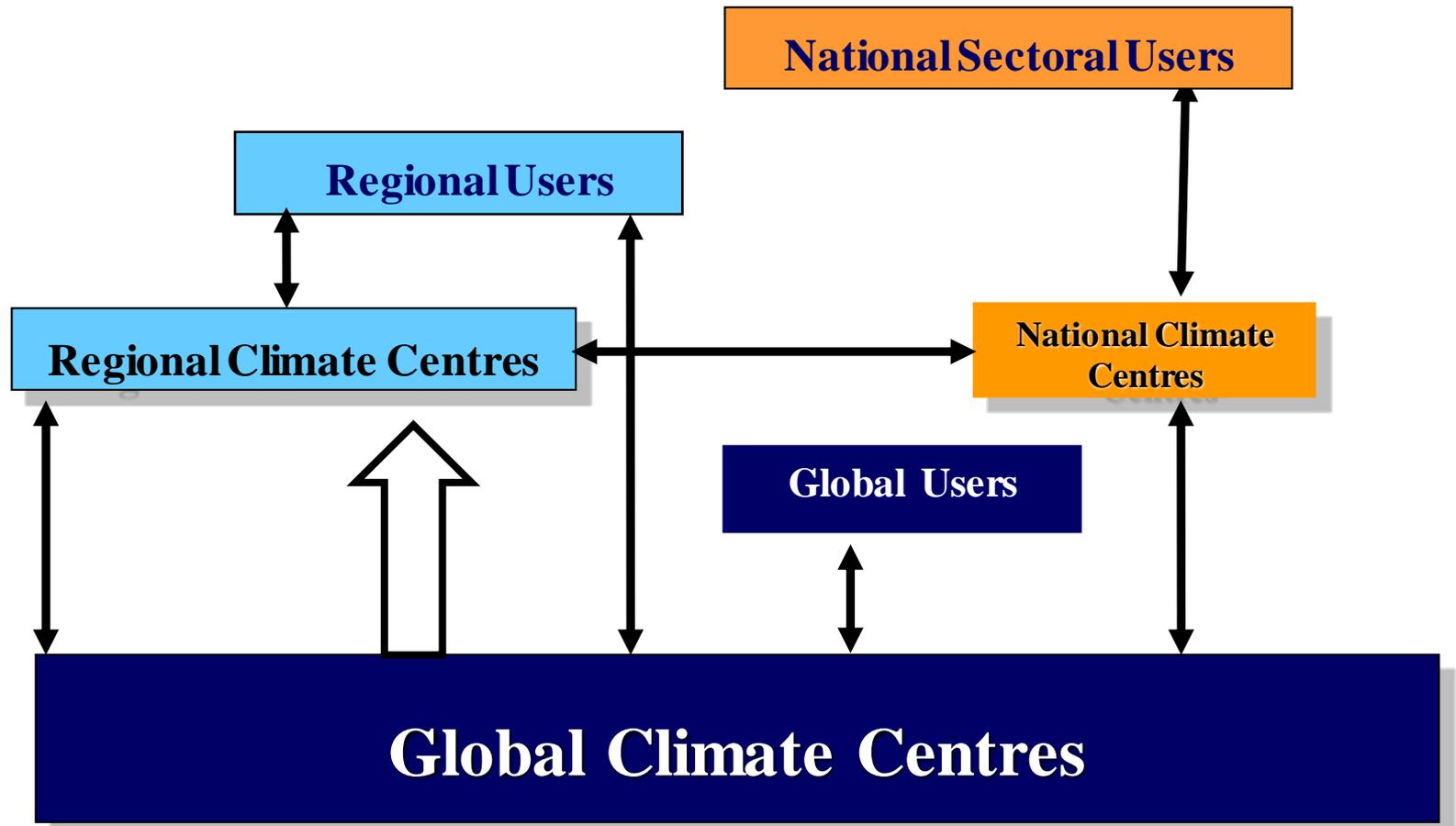


- Regional Meteorological Training Centres
- Drought Monitoring Centres
- Medium Range Forecasting Centre
- ▲ Tropical Cyclone Forecasting Centres
- Environment Emergency Response Centres
- Regional Meteorological and Hydrological Specialised Centres
- World Meteorological Centres

Global Data Processing and Forecasting System

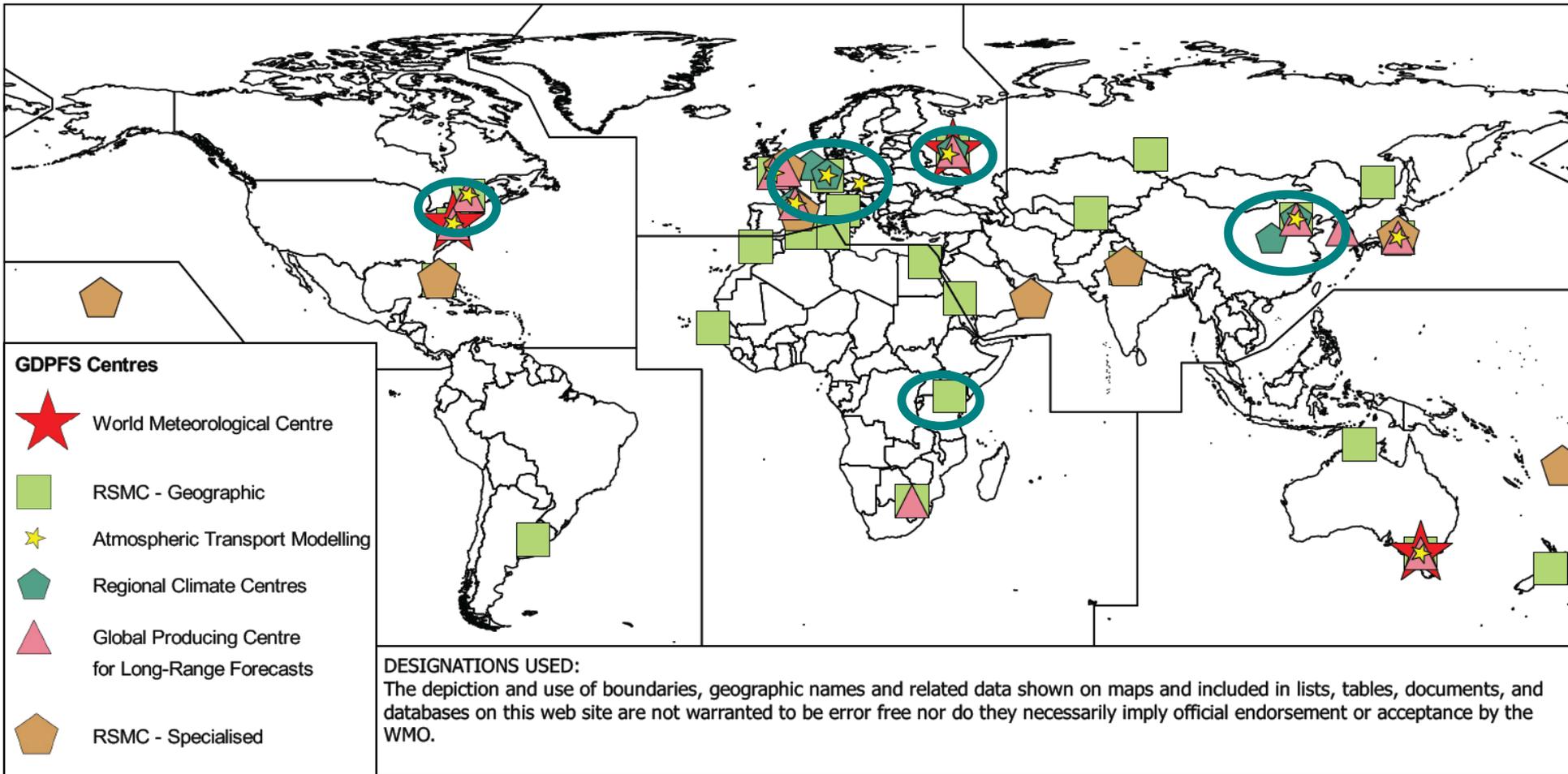
Global Framework for Climate Services

Climate Services Information System

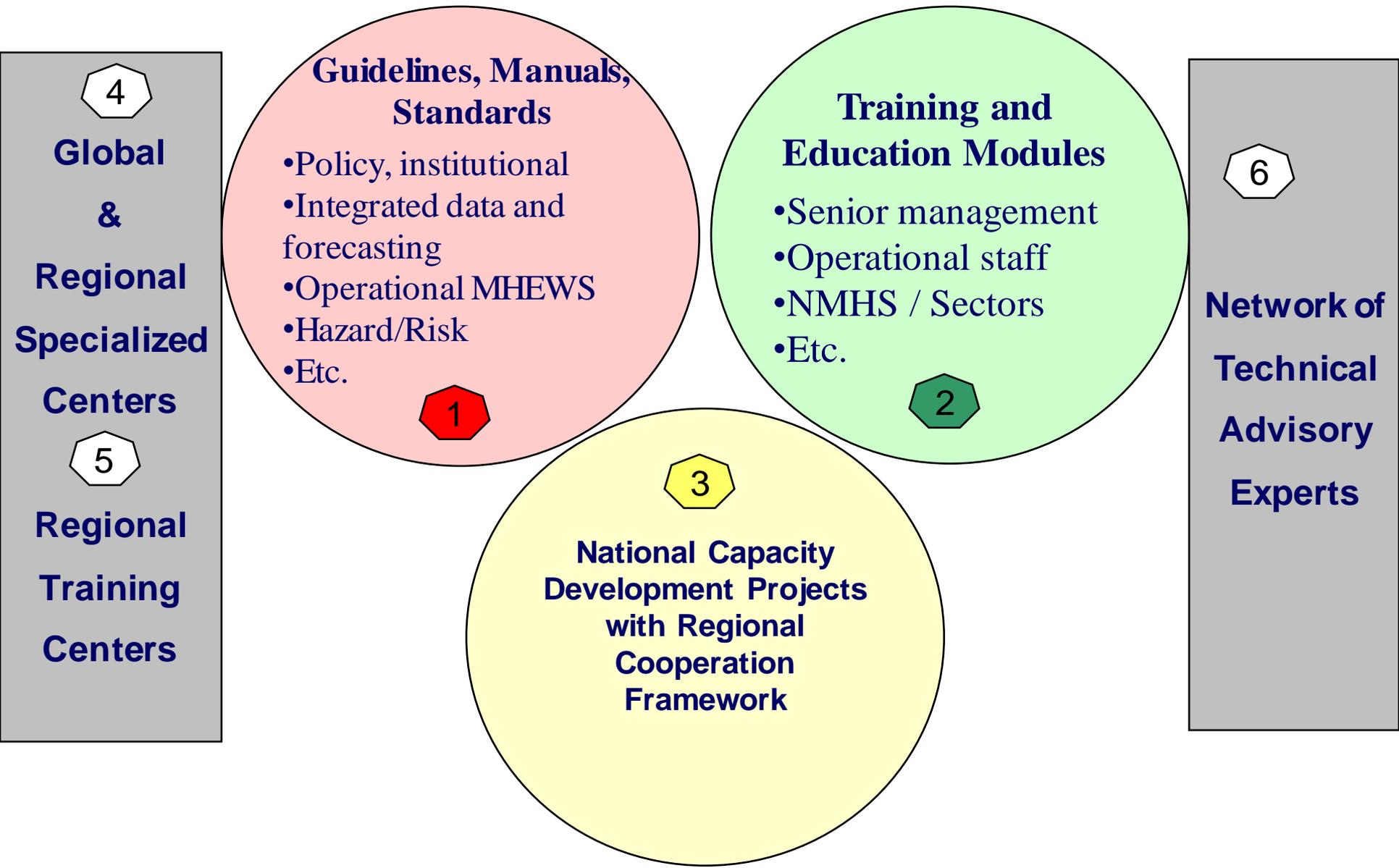


WMO Actions

WMO Regional Climate Centers are being established ...



Building Blocks for Scaling Up



WMO technical standardization process has been activated for DRR

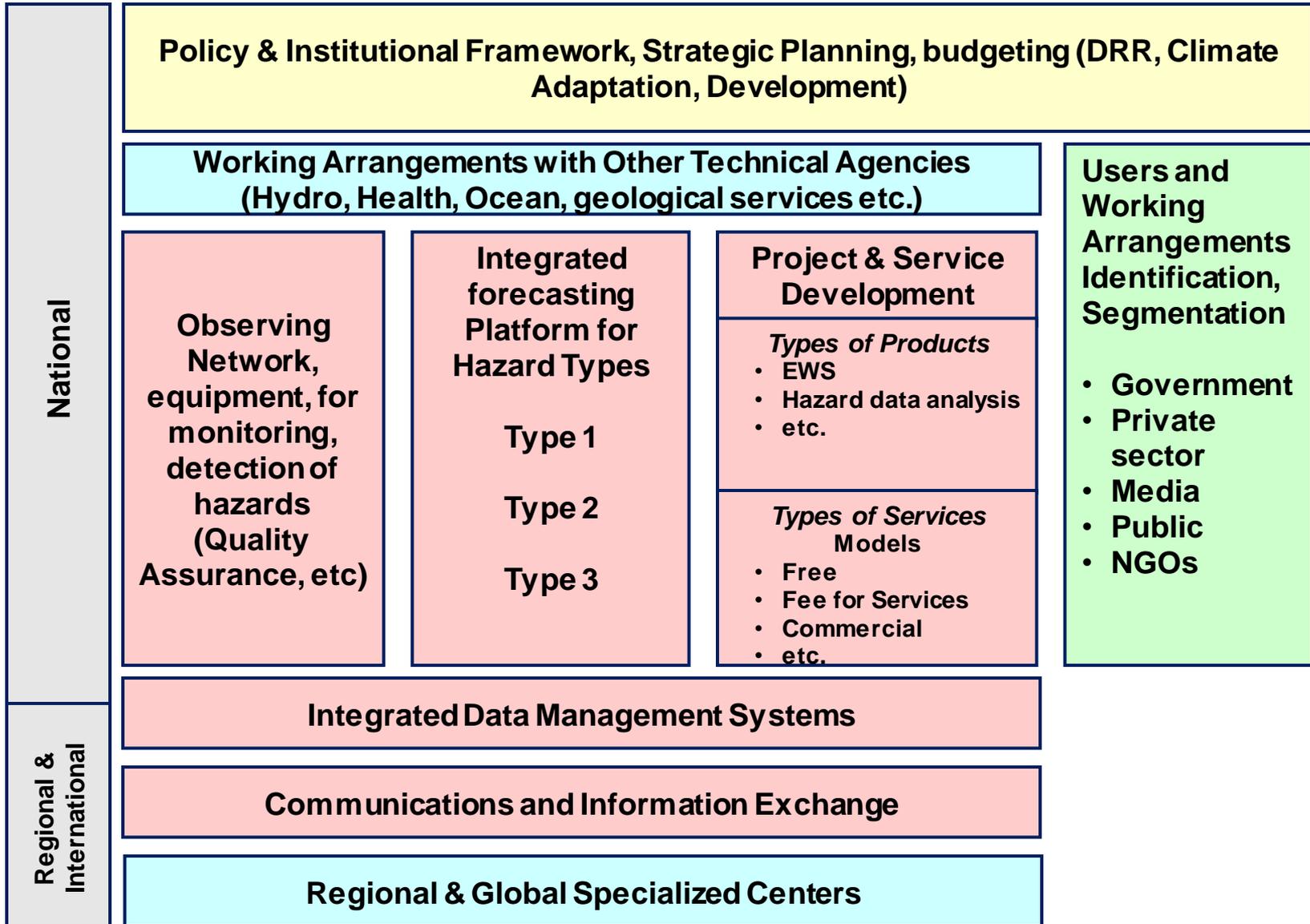


For nearly 20 hazards (cascading effects)

- (1) Guidelines and standards for hazard monitoring, databases, hazard analysis for risk analysis (2013-2015)
- (2) Guidelines and standards for operational multi-hazard early warning systems (2013-2017)
- (3) Requirements for Disaster Risk Financing and Insurance (2013-2014)

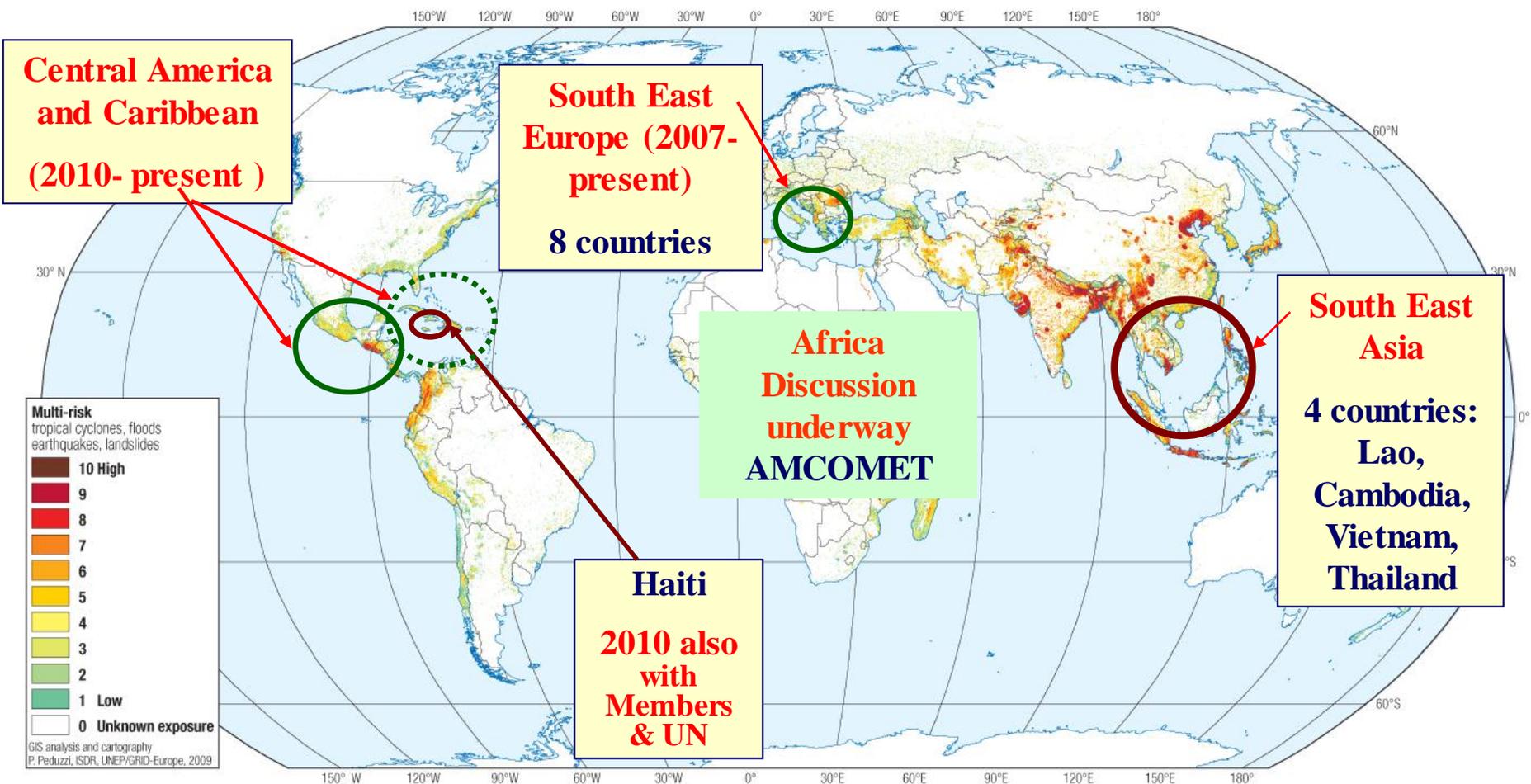
Concept: WMO On-Line Help-Desk

Access to Comprehensive Guidelines, Manuals and Standards



Comprehensive Phased National Capacity Development Projects with regional cooperation Framework

**Partners: WMO, World Bank, UN-ISDR, UNDP, Regional Socio-economic Groupings,
Regional Centers.....**



Conclusions

- Concerns, challenges and opportunities
- Anchor our cooperation in sectoral risk management
- Building a community of practice in risk analysis to underpin risk-based decision-making
- More systematic cooperation at national level to look at leveraging opportunities – DRR/Climate risk management as an integral part of development planning
- Leveraging regional cooperation to address more sustainable national development
- Leveraging the WMO network, expertise, guidelines standards and capacities
- Partnerships

Thank you



Global Framework for Climate Services

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