



World Meteorological Organization

Working together in weather, climate and water

WMO Activities in Developing Capacities of National Meteorological and Hydrological Services for Hazard Analysis

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Session 13: Role of National Meteorological and Hydrological Services for Hazard Mapping

**Understanding Risk Forum
2-6 July, 2012
Cape Town, South Africa**



Agenda

- About WMO
- WMO DRR Programme (national, regional, and global)
- WMO initiatives to support hazard analysis



WMO Institutional Structure

Technical

WMO Secretariat (Geneva)

Global/ Regional

Programmatic
Supported by 8 Technical Commission

3 World Meteorological Centres (WMC)

6 Regional Association
(platform for consultations and building consensus)

Global & Regional Climate Centers

40 Regional Specialised Meteorological Centres (RSMC)

30 Regional Training Centres (RMTC)

Support technical capacity development to 189 Members
'National Meteorological and Hydrological Services (NMHSs)

Basic Observations (space and in situ), forecasting, telecommunication systems

Climate

Meteorology

Hydrology

Agricultural Meteorology

Transport (Marine, Aeronautical)

Disaster Risk Reduction

Development and regional activities



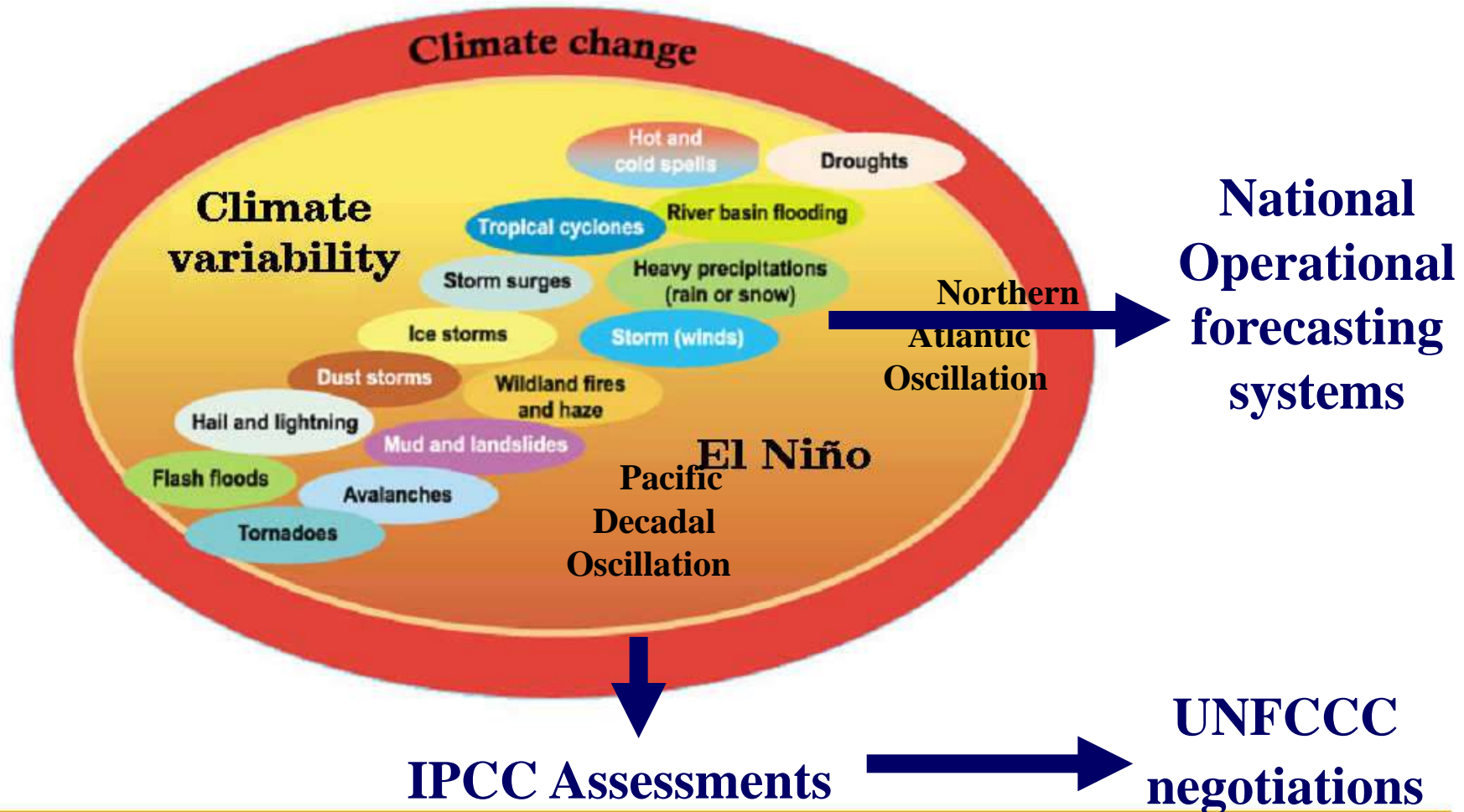
WMO develops standards and technical guidelines ...

- Meteorological, hydrological and climate instrumentation, **observing networks**, monitoring
- Meteorological, hydrological and climate related hazards, databases, metadata
- **Forecasting tools** (Weather, water and climate)
- **Quality assurance** and verification (data, tools, methodologies, etc)
- International **data sharing policies**
 - **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”



WMO Coordinates International Research Programmes in Weather and Climate

World Climate Research Programme, World Weather Research Programme





National Meteorological and Hydrological Services (NMHS)

Mission: Observing and understanding weather, water and climate and in providing services in support of national needs:

- Protection of life and property;
- Safeguarding the environment;
- Contributing to sustainable development;
- Ensuring continuity of the observations of meteorological and related data including climatological data;
- Promotion of endogenous capacity building;
- Meeting international commitments; and
- Contributing to international cooperation.



WMO Coordinates a Global Operational Network



National Meteorological and Hydrological Services

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

Meteorological, hydrological and climate observations

189 Members



Global Telecommunication System



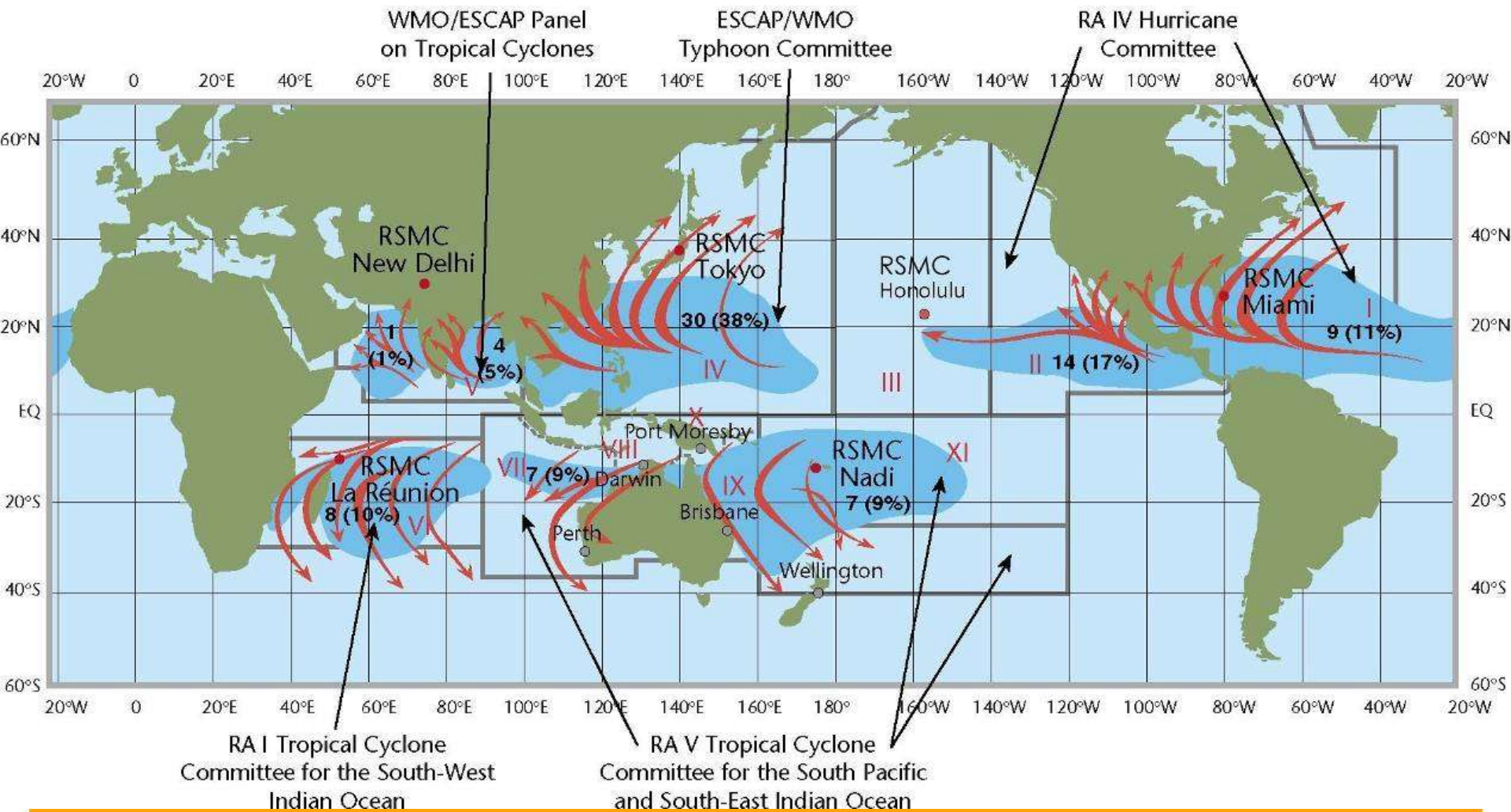
- Regional Meteorological Training Centres
- Drought Monitoring Centres
- Medium Range Forecasting Centre
- Tropical Cyclone Forecasting Centres
- Environment Emergence Response Centres
- Regional Meteorological and Hydrological Specialist Centres
- World Meteorological Centres

Global Data Processing and Forecasting System



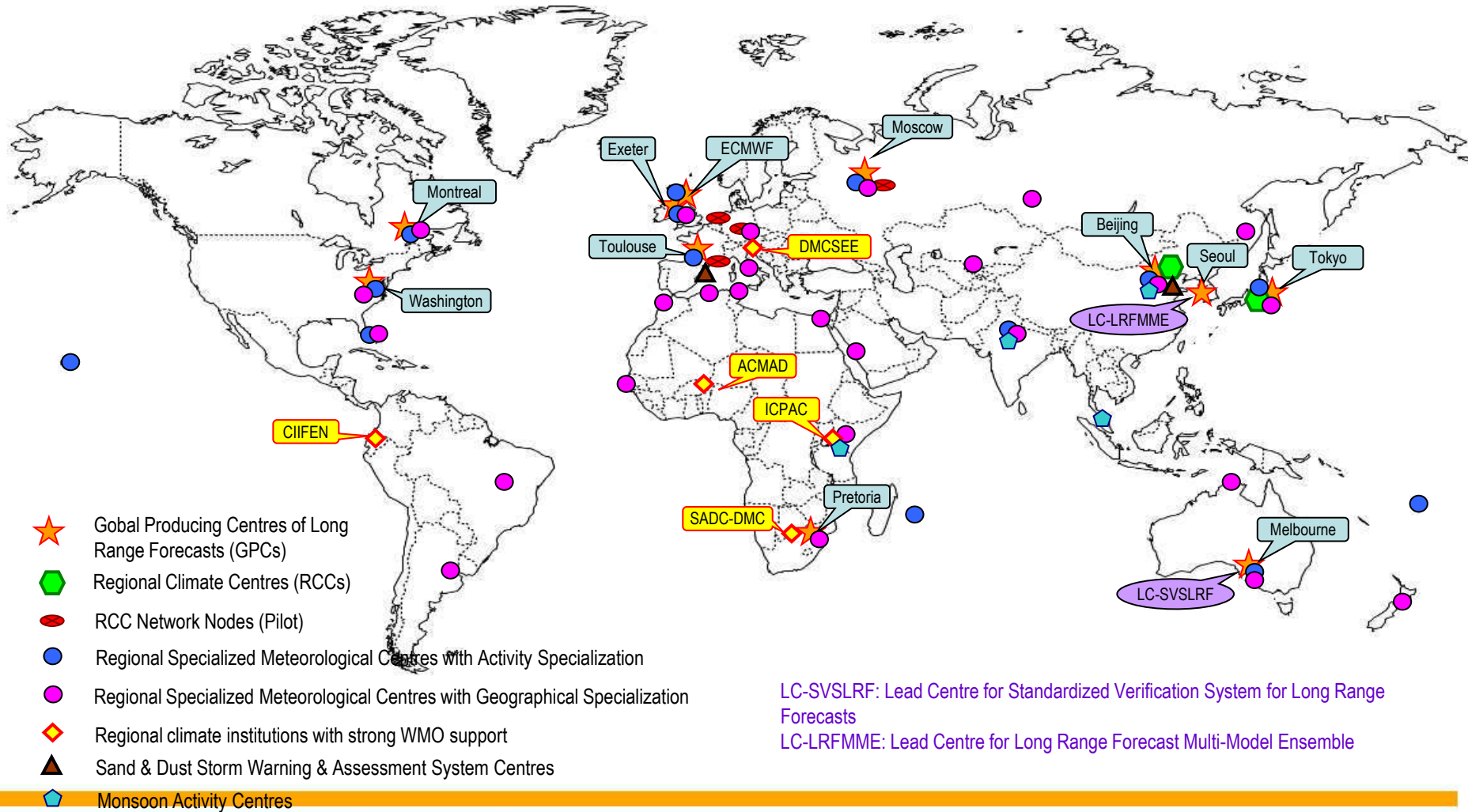
Tropical Cyclone Programme

(6 Regional Centers & 5 Regional Coordination Committees)



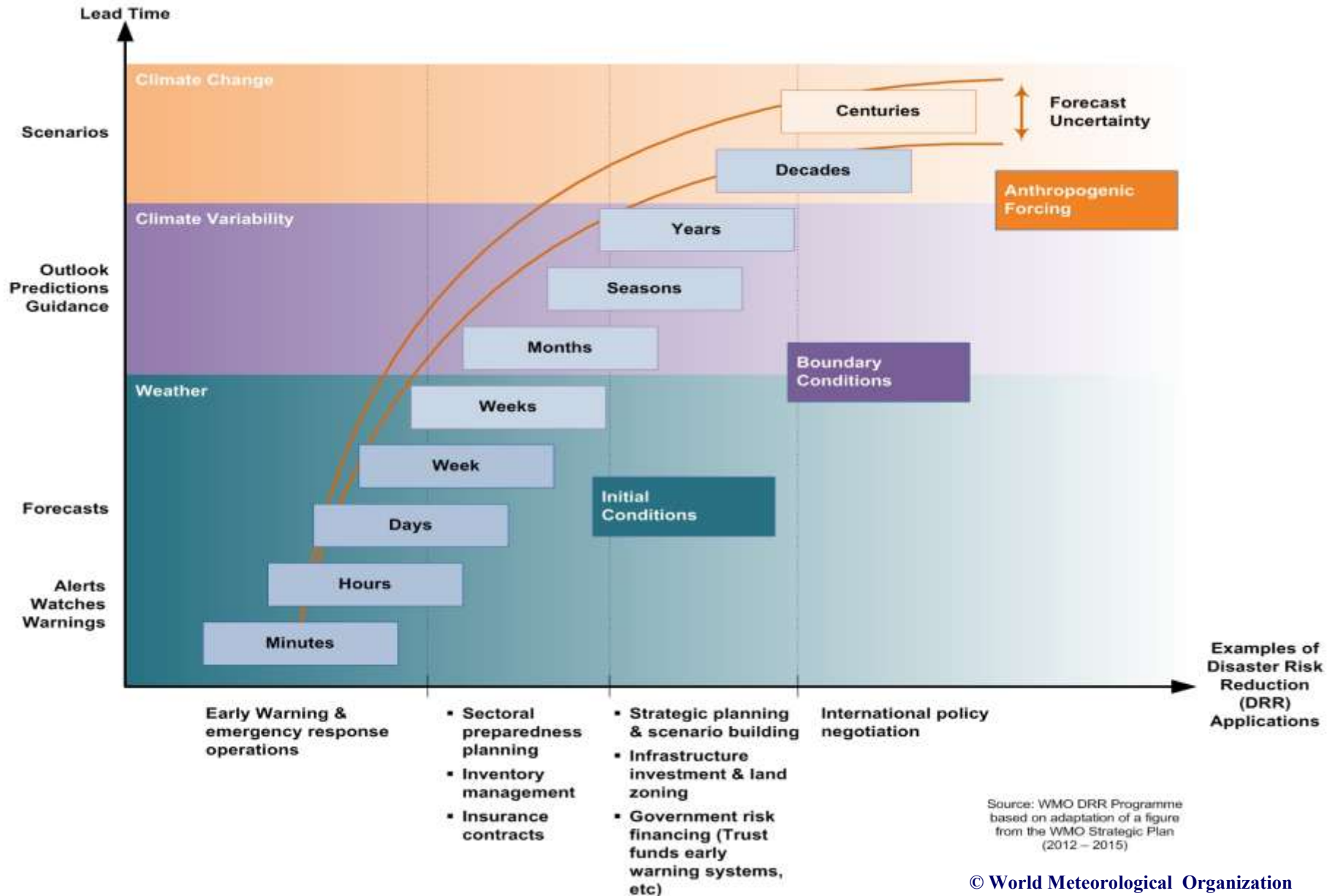


Network of WMO Global and Regional Meteorological and Climate Centres





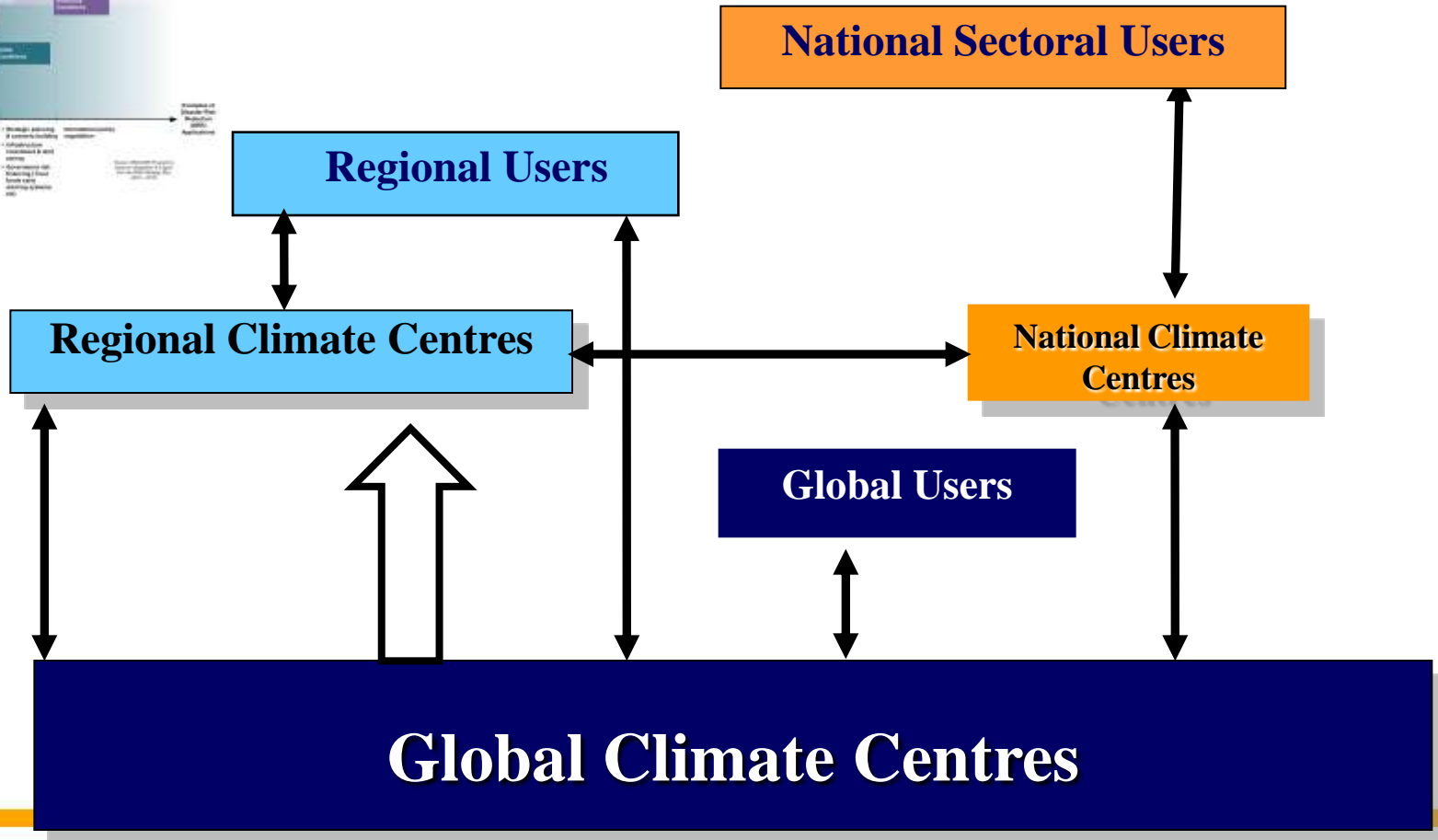
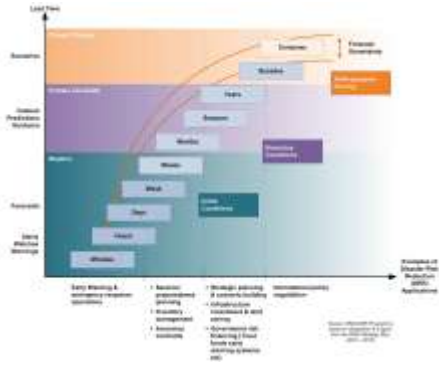
Seamless Meteorological and Climate Services to support risk analysis and management





Global Framework for Climate Services

To Operational science-based climate information and prediction building on the WMO globally coordinated operational framework





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Meteorological, Hydrological and Climate Services are critical to risk assessment and DRR decision-making

Hyogo-Framework for Action 2005-2015

Governance and Institutional Framework (Policy, Legislation, legal framework, institutional coordination)
(Multi-sector, Multi-level, Multi-Hazard)

2

Risk Assessment

Risk Reduction

Risk Financing and Transfer

QUANTITATIVE MULTI-HAZARD-MULTI-LEVEL, MULTI-SECTOR RISK ANALYSIS

1

Hazard, exposure and vulnerability databases

Statistical and forward looking approaches

PREPAREDNESS:
early warning systems
emergency planning

3

PREVENTION and MITIGATION:
Sectoral Medium to long term planning (e.g. zoning, infrastructure, agriculture...)

4

Gov Investments, trust funds (ex-ante, post disaster)

CAT insurance & bonds

Weather-indexed insurance and derivatives

Other emerging products

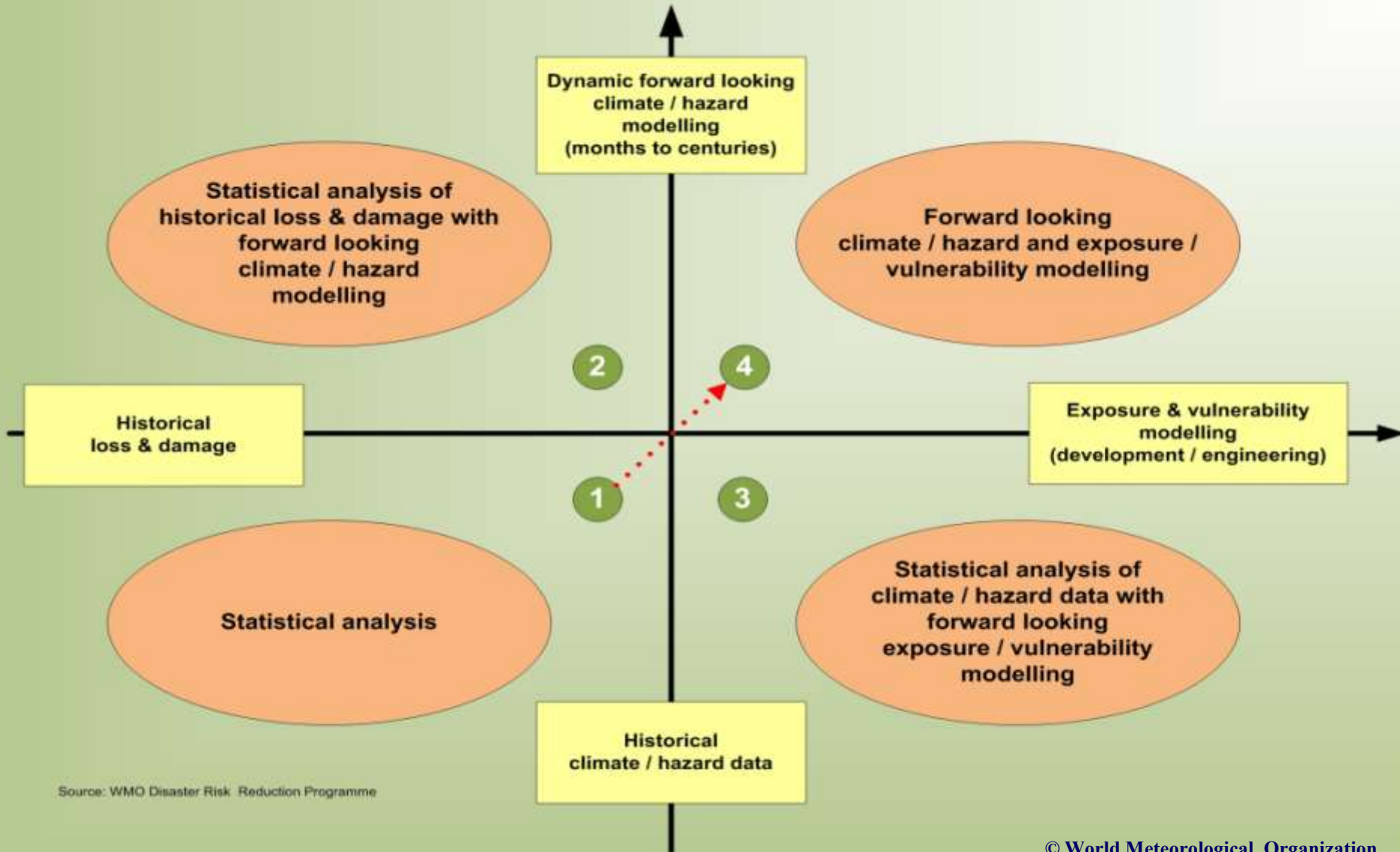
5

6

Information and Knowledge Sharing
Education and training



Critical need for historical and forward looking multi-hazard data and analysis to support risk assessment...





Priority Hazards

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



Droughts, Flash and river floods, forest and wild fires, heat waves and cold spells, land- and mud-slides, marine and aviation hazards, strong winds and severe storms, tropical cyclones and storm surges

Other: volcanic ash transport, air pollution, locust swarms, health epidemics, tsunami, etc...

Capacity Assessment of NMHS

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

- 70% need amendments of national policies and legislation
- 67% need modernization of meteorological infrastructure (e.g., observation networks, forecasting, telecommunication, data rescue,...)
- 80% need technical and management training
- 80% of need multi-sectoral institutional partnerships, coordination



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

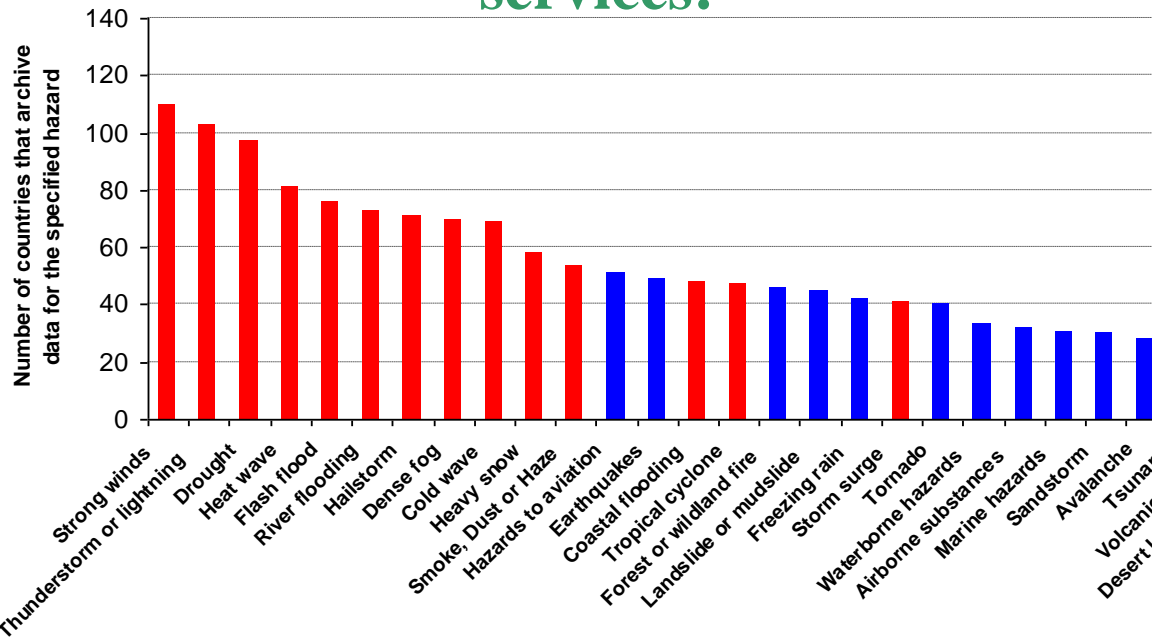
Source: "Natural Hazard, UnNatural Disaster, Economics of Effective Prevention," World Bank and United Nation's Report (2010)



Status of Hazard Monitoring & databases

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

Over 80 % of meteorological in Africa, are challenged in delivering these services!



Main Challenges:

- Modernisation of observation networks
- Data rescue
- Data management systems
- Need for guidance for:
 - Maintaining standard hazard database and metadata
 - Hazard analysis and mapping tools
 - ✓ Statistical analysis
 - ✓ Climate modelling



Data Policy and Exchange

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

- International data sharing policies
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- Challenges with data policy and exchange
 - National security
 - Commercial
 - Not available or need for data rescue
 - Institutional turfs and silos
- Need for high-level policy discussion within and across governments



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National

Regional

Other National Agencies involved in DRR
 (e.g. Hydrological Services, Ocean Services, Health Services, Space)



(c) Agreements & SOPs

National Meteorological Service

<p>Core Operational Components</p> <ul style="list-style-type: none"> ➤ Observing network ➤ Operational Forecasting ➤ Telecom ➤ Human Resource ➤ Data Management Systems ➤ Etc... 	<p>DRR Products & Services</p>
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Quality Management Systems (QMS)



(c) GTS & WIS Agreements & SOPs

Global & Regional Specialized Meteorological & Climate Centers (GPC, RSMC and RCC)

(a) National DRR Governance and Institutional Frameworks



Requirements Service Delivery Feedback

Agreements & SOPs

(b)

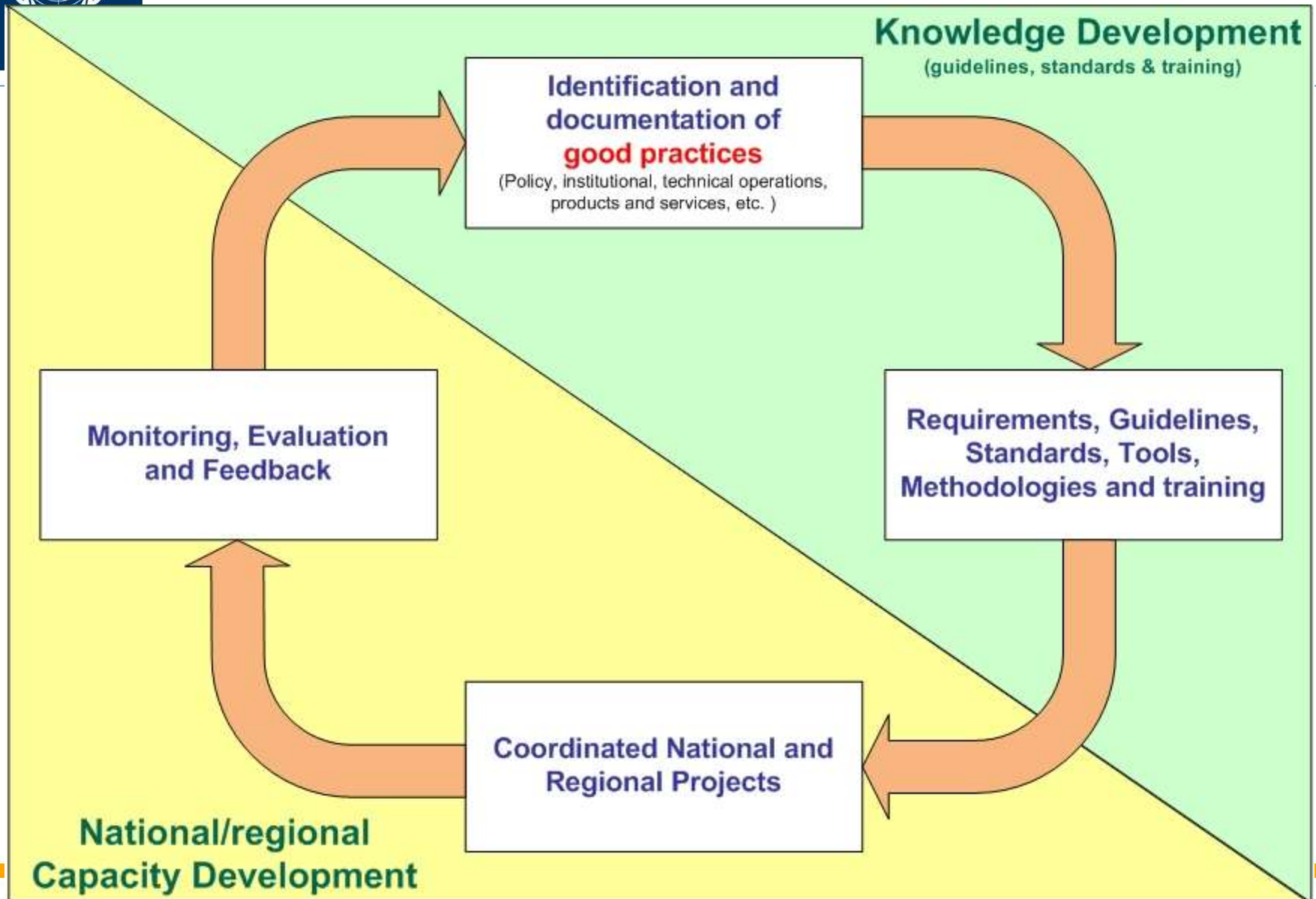
National DRR Stakeholders

- Government
- Public & Private Sectors
- NGOs
- General Public
- Media
- Etc...

(f) Regional DRR Governance and Institutional Frameworks

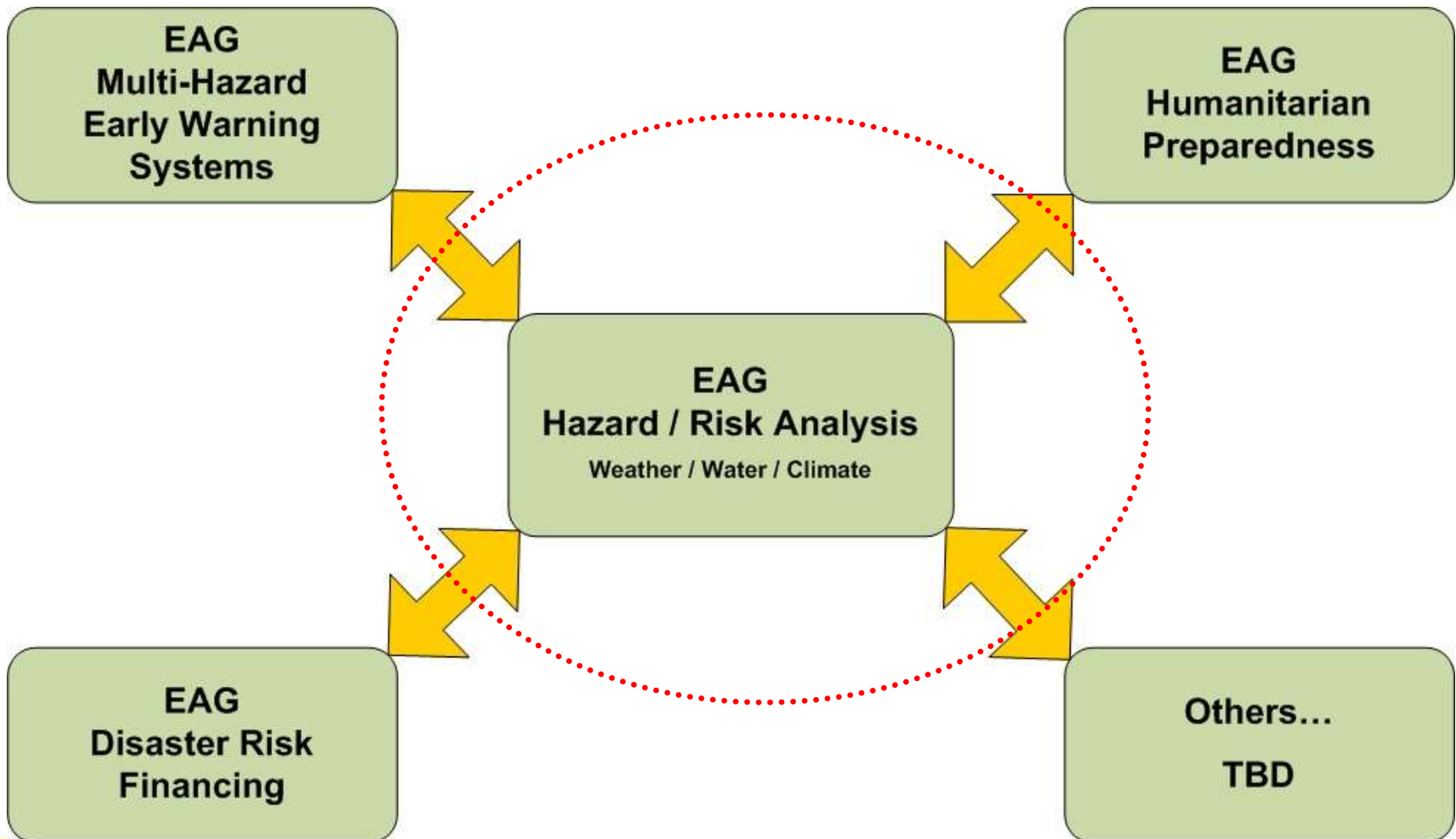


DRR Programme Two-tier Work Plan





User-Driven Expert Advisory Groups (EAG) to guide WMO DRR activities





User-Driven Expert Advisory Groups (EAG) to guide WMO DRR Guidelines and Capacity development projects

User-Driven DRR Expert Advisory Group or Coordination Mechanism	Participating experts from partner agencies
EAG on Climate Services for Hazard/Risk Analysis	World Bank, UNDP-GRIP, WFP, Experts from Risk Modelling Sectors, OECD, GEM, CRED, Munich Re, Swiss Re, WRN, UN-ISDR, UNFCCC, UNEP, UNESCO-IOC, UNITAR/UNOSAT, ESRI, CIMH, NMHS, RCCs.
EAG on Multi-Hazard Early Warning Systems	WHO, UNOCHA, WFP, FAO, UNHCR, UNDP, IFRC, UNESCO-IOC, World Bank, ITU, UNEP, UN-ISDR, UNICEF, NMHS, Disaster Risk Management Agencies.
EAG on Climate Services for Disaster Risk Financing	UNEP-FI, WFP, Willis Research Network, CIMH, CSIRO, ISDR, Munich Re, UNFCCC, World Bank, IFAD, Swiss Re, University of Kentucky, Geneva Association (Insurance), NMHS.
Ad-hoc Task Team on Meteorological, Hydrological and Climate Services for Humanitarian Preparedness	UN-OCHA, UN-HCR, IFRC, UNICEF, UNITAR-UNOSAT, WFP, WHO, UNDP.



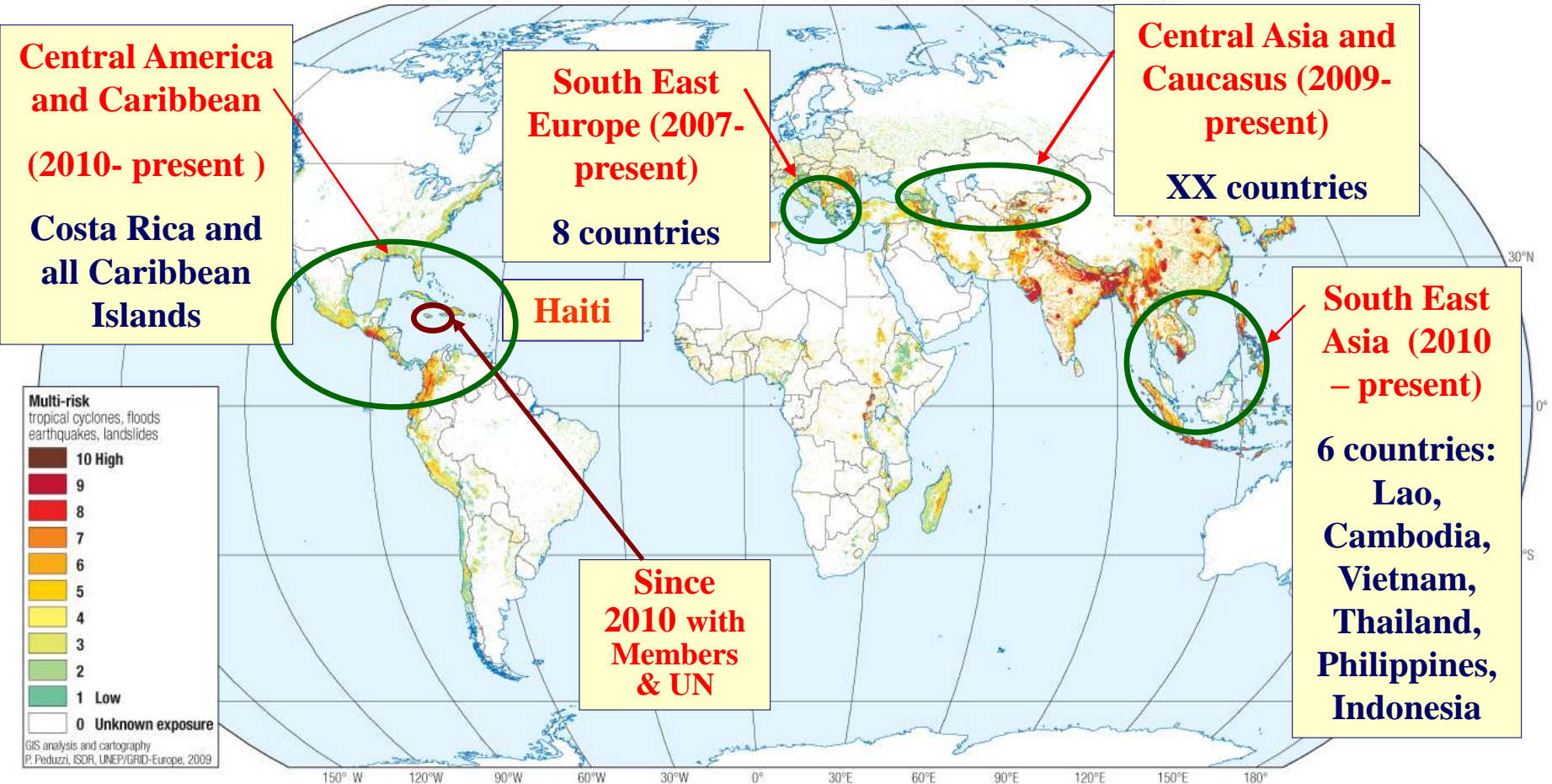
Knowledge Products in DRR: **WMO** **Technical Hazard Guidelines**

- Development of standards for meteorological, hydrological and climate hazards (on 10 primary hazards identified by WMO Members through the WMO DRR Survey 2006)
 - monitoring,
 - Databases and metadata
 - Hazard analysis tools (Statistical and forecasts) – GIS-based
- ISO certification and adoption by Members
- National/regional capacity development projects



Comprehensive Capacity Development DRR and Adaptation Projects Underway

Partners: WMO, World Bank, UN-ISDR, UNDP, **Regional Socio-economic Groupings and regional DRR agencies**, Regional Centers, WMO Regional Association, NMHS, National DRM agencies and economic line ministries





Thank You

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Knowledge Products in DRR: **Good Practices, Guidelines, Standards (2012-2015)**

TITLE	PUBLICATION DATE
Book 1 : partnerships in Multi Hazard Early Warning Systems, a compilation of seven good practices and Lessons Learned	March 2012 Springer Verlag
WMO Guidelines : Requirements of the International Humanitarian Sector for Meteorological, Hydrological and Climate Services to Support Preparedness Planning and Response WMO Guideline : Governance and Institutionnal Partnerships in MHEWS	July 2012 September 2012 (4 languages)
Book 2 : Climate services for Disaster Risk Financing : Documentation of good practices and lessons learned	December 2012
WMO Guideline : Requirements for climate services for Disaster Risk financing	March 2013
WMO / CRED Annual Publication : Socio-economic impacts of meteorological, hydrological and climate hazards	Pilot November 2012
WMO Technical Hazard Guidelines : Standardisation of meteorological, hydrological and climate hazards monitoring, data, metadata and analysis and forecasting tools (on 10 primary hazards identified by WMO Members)	2013-2015
WMO Operational EWS guidelines : Operations and Quality Management Systems for MHEWS	2015



WMO-CRED Atlas: of Mortality and Economic Loss from Meteorological, Hydrological and Climate-Related Hazards

- Statistics:
 - Last 40 year, decadal, annual
 - Global, regional, sub-regional, national
 - By hazard type and aggregates
- Annual comparisons
- National initiative for verification of CRED and geo-referencing the data (NMHS and other agencies nationally)

