



Managing Climate information to serve the NAP Process

Dr. Hrin Nei Thiam
Director General

Department of Meteorology and Hydrology
Permanent Representative of Myanmar with WMO



**First International
Meteorological
Congress
(Vienna, 1873)**

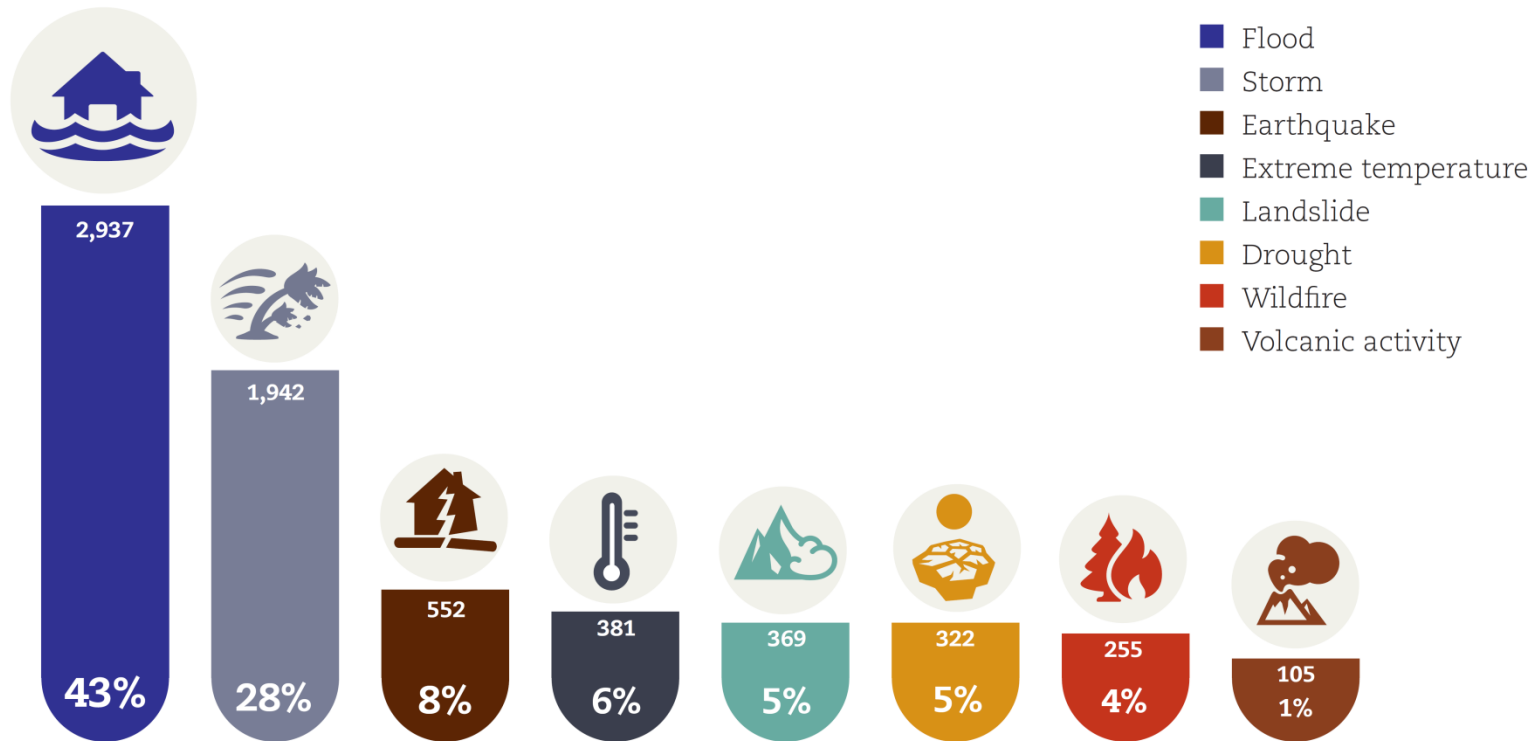
The 1947 Convention: from IMO to WMO...

**Conference
of IMO Directors
(Washington D.C., 1947)**



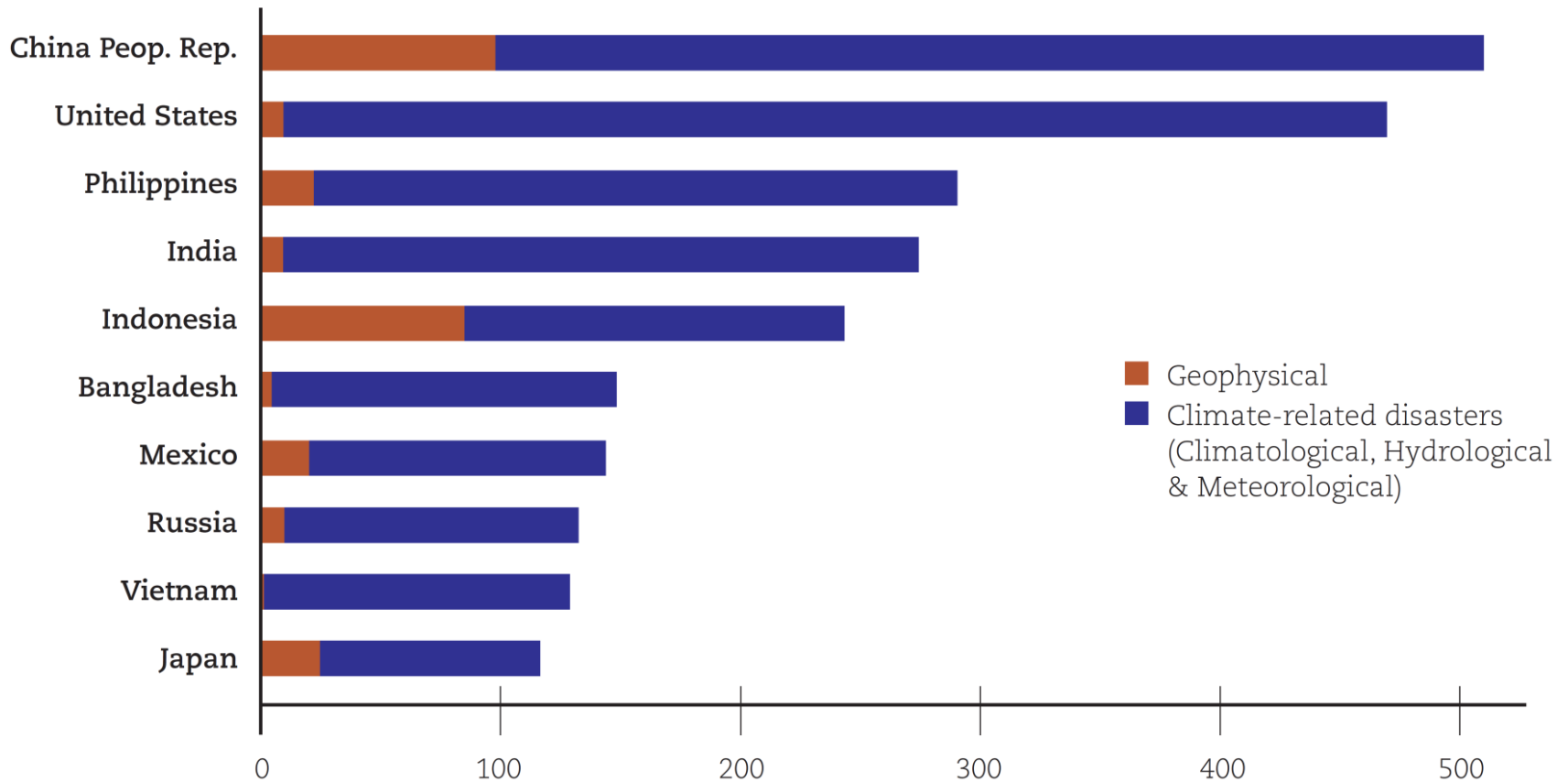
What is the global share of climate related disasters?

Share of occurrence of natural disasters by disaster type (1994-2013)



Where are they happening?

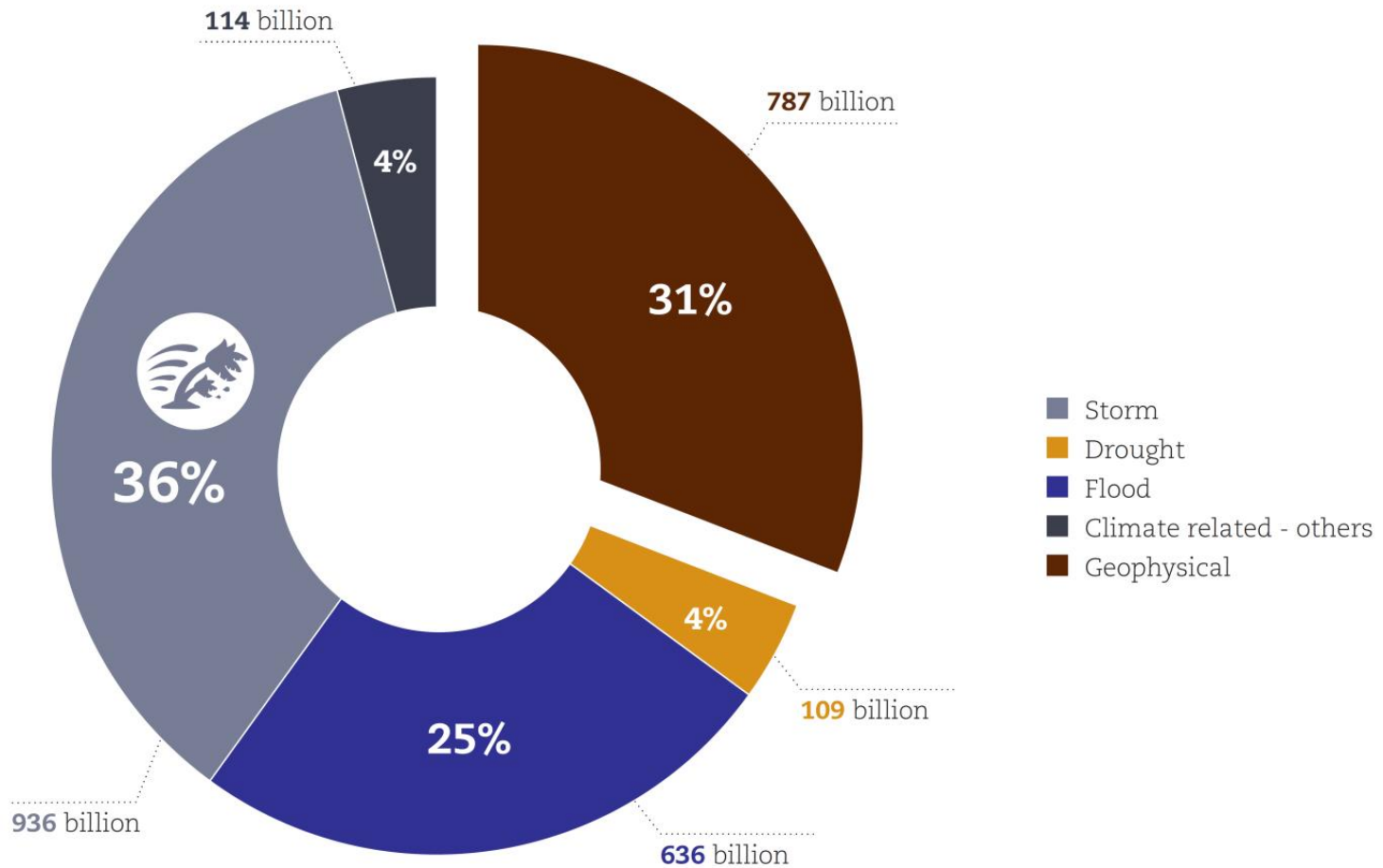
Climate-related vs. geophysical disasters: number of events by sub-group :
10 most disaster-affected countries (1994-2013)



Storms cause most economic losses

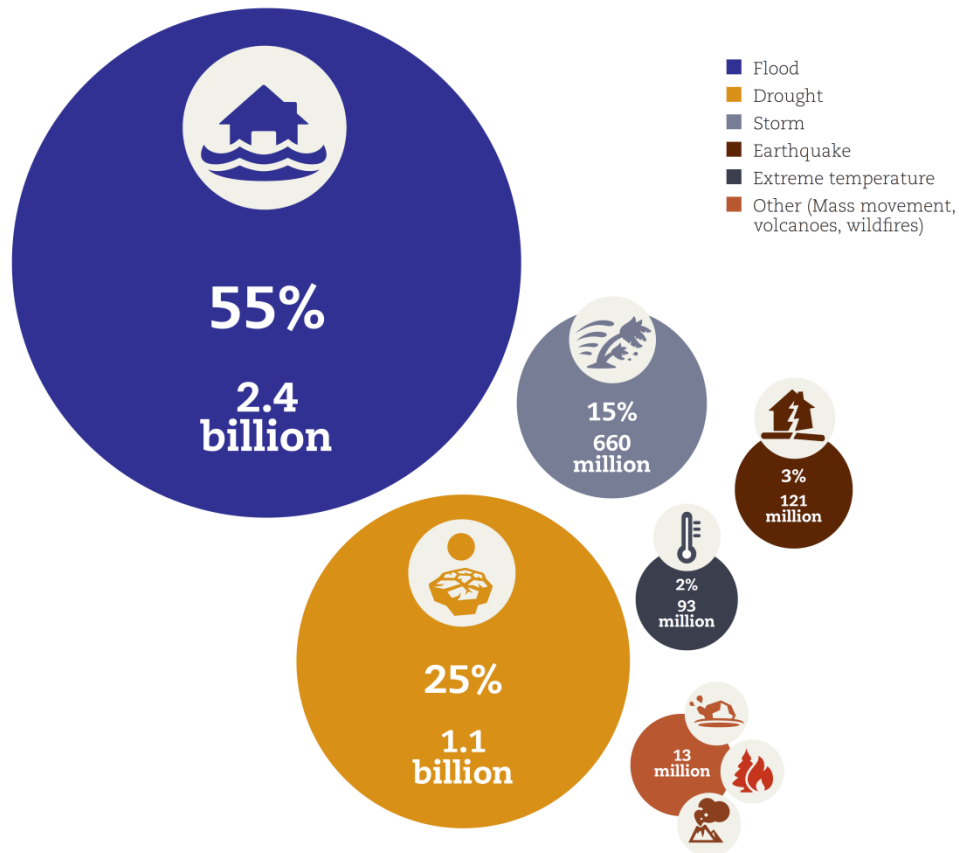
Figure 24

Breakdown of recorded economic damage (US\$) by disaster type (1994-2013)



Number of people affected

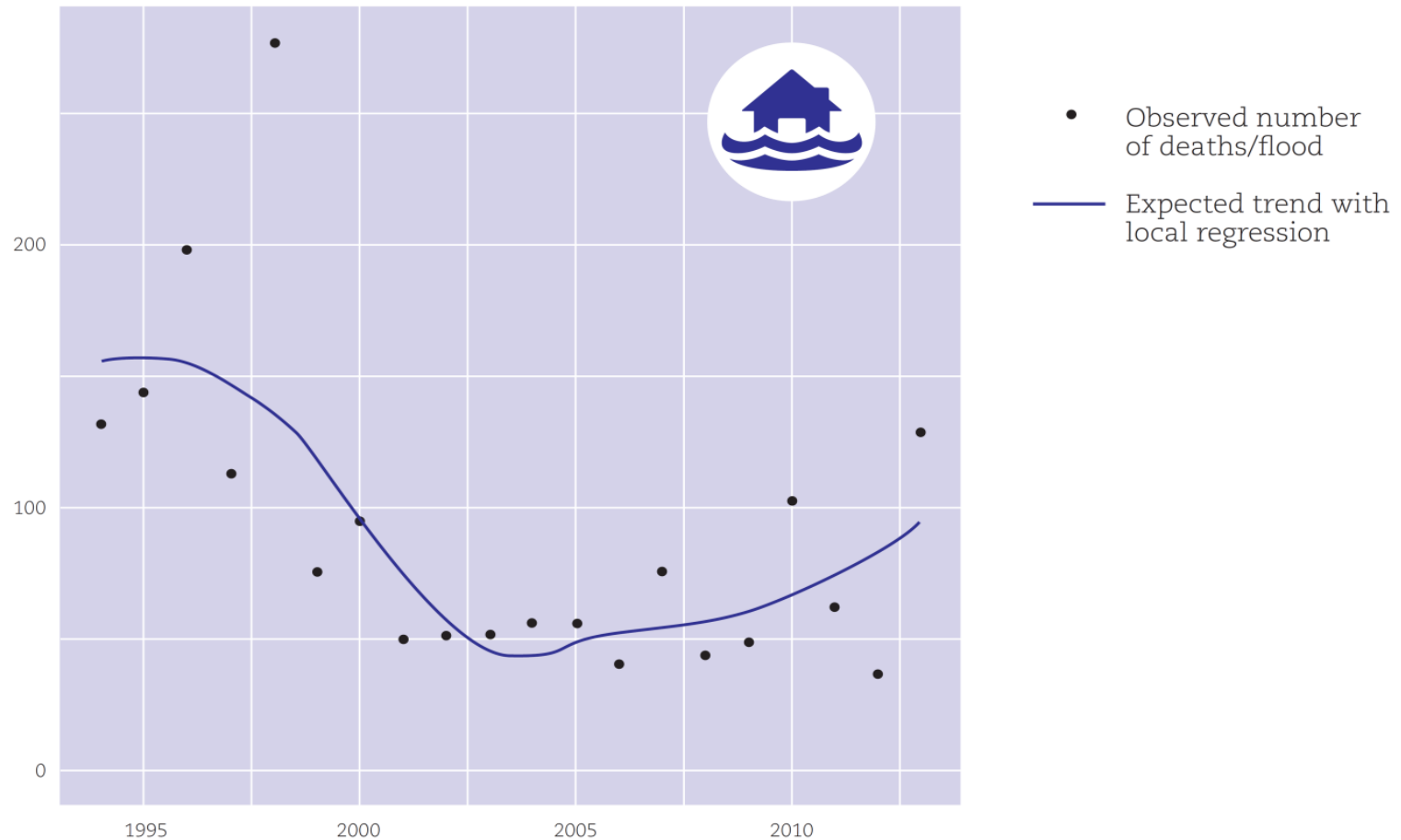
Number of people affected by disaster type (1994-2013)
(NB: deaths are excluded from the total affected)



Floods are becoming killer events

Figure 9

Number of deaths per flood (1994-2013) in Asia





World Meteorological Organization

Weather • Climate • Water

Top Rated Disaster Deaths (Myanmar)

Year	Disaster type	Date	Total deaths
2008	Storm	2/5/2008	138366
1926	Storm	19/05/1926	2700
1968	Storm	10/5/1968	1070
1936	Storm	21/04/1936	1000
1902	Storm	4/5/1902	600
1930	Earthquake	5/5/1930	500
2004	Storm	19/5/2004	236
1975	Storm	0/5/1975	200
1967	Storm	23/10/1967	178
2011	Flood	19/10/2011	151

courtesy of EM-DAT



World Meteorological Organization

Weather • Climate • Water

Top Rated Disaster Affected (Myanmar)

Year	Disaster type	Date	Total affected
2008	Storm	2/5/2008	2420000
1974	Flood	15/07/1974	1400000
1965	Storm	23/10/1965	500000
1991	Flood	13/07/1991	359976
2010	Storm	22/10/2010	260049
1976	Flood	0/6/1976	200000
1936	Storm	21/04/1936	150000
2010	Landslide	17/06/2010	145000
1997	Flood	21/08/1997	137418
1978	Storm	17/05/1978	132000

courtesy of EM-DAT



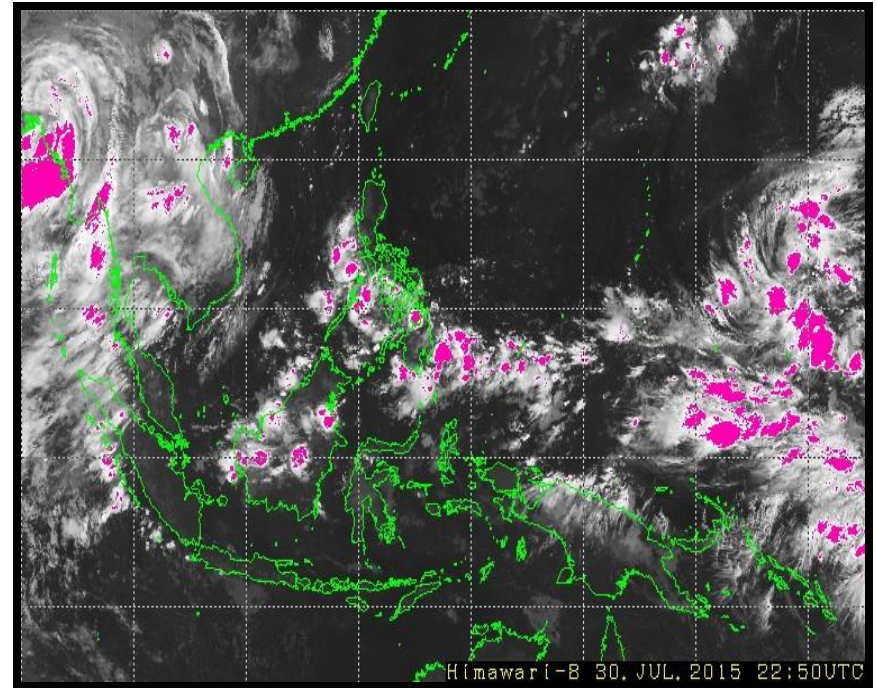
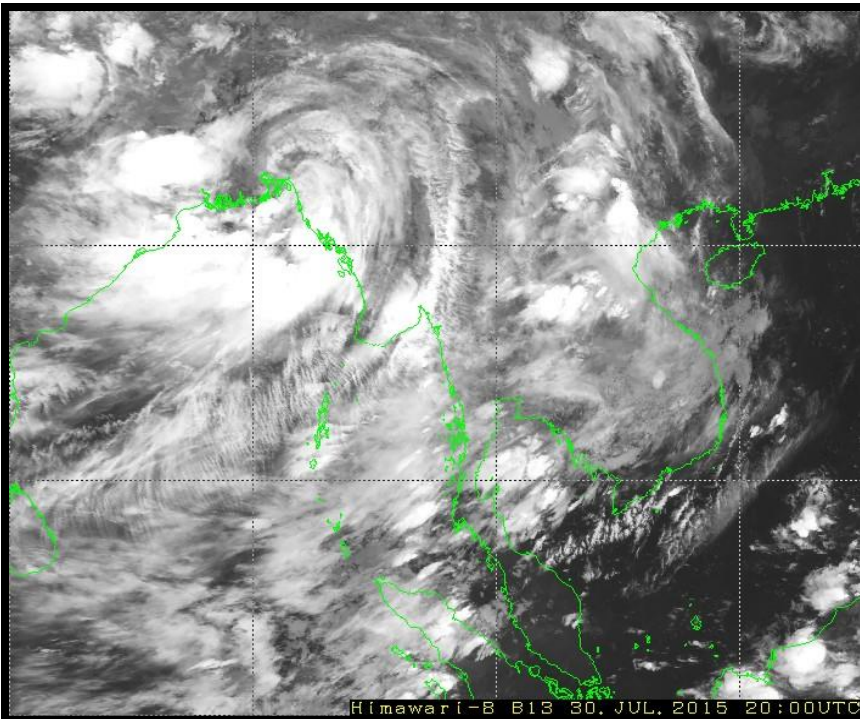
World Meteorological Organization

Weather • Climate • Water

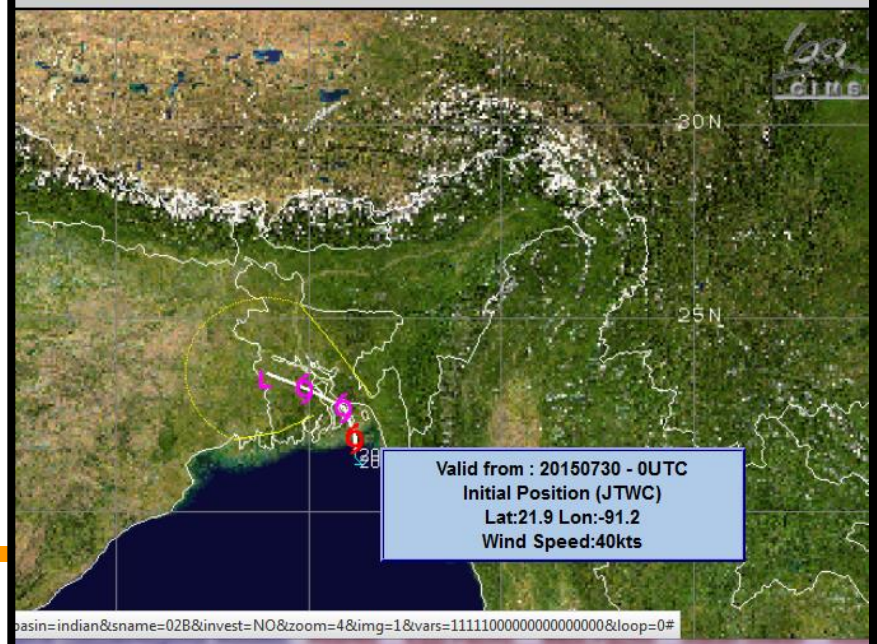
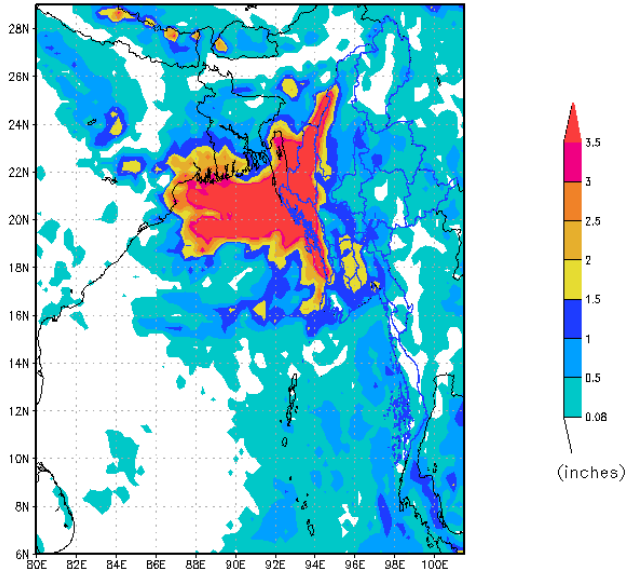
Top Rated Disaster Damages- (Myanmar)

Year	Disaster type	Date	Total affected
2008	Storm	2/5/2008	4000000
2004	Earthquake	26/12/2004	500000
1991	Flood	13/07/1991	79840
2010	Storm	22/10/2010	57000
1992	Flood	0/5/1992	55115
1979	Wildfire	0/2/1979	11000
1994	Storm	2/5/1994	10000
1967	Storm	16/5/1967	5000
2011	Earthquake	24/3/2011	3600
1967	Storm	23/10/1967	3200

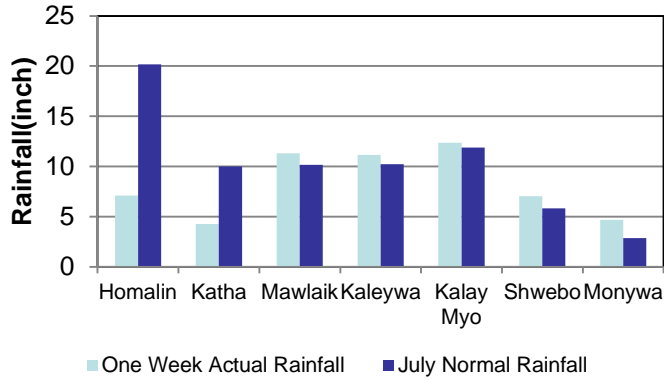
courtesy of EM-DAT



DMH MYANMAR WRF(30 km) RAINFALL (inches) FORECAST(24 hr)
 Based on GFS 06:30 MST of (30-07-2015) Valid for 06:30 MST of (31-07-2015)

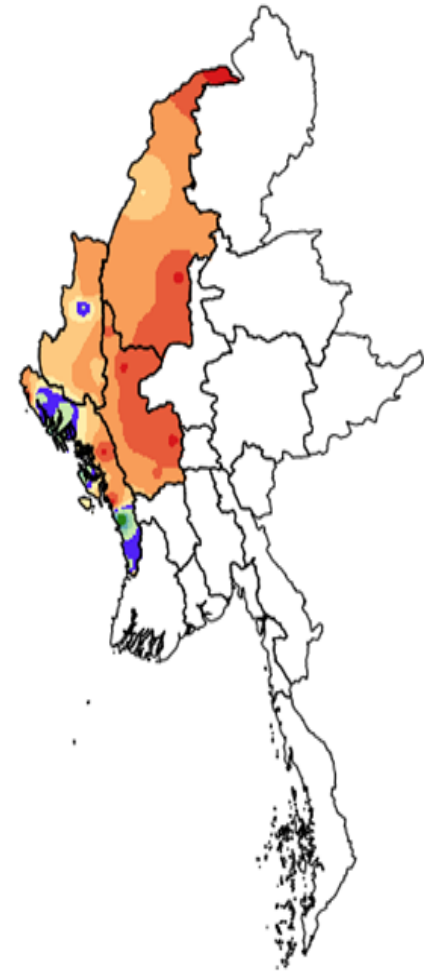
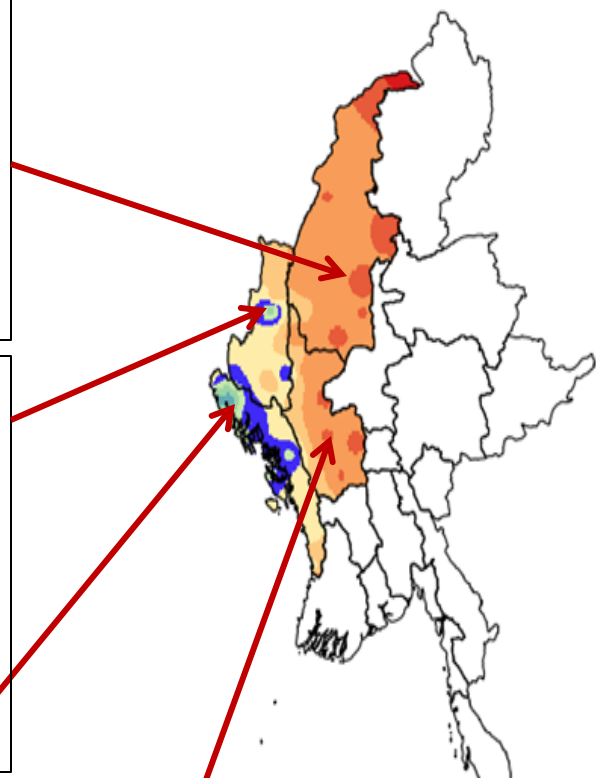


Comparison between one week(25th to 31st July) Actual Rainfall and July Normal Rainfall for Sagaing Region

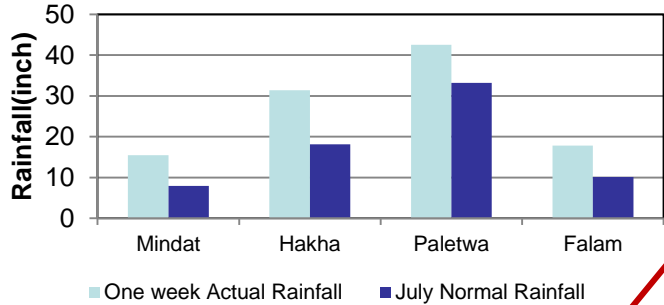


One week (25.7.2015 to 31.7.2015) Actual Rainfall (inch) for Sagaing and Magway Regions, Chin and Rakhine States

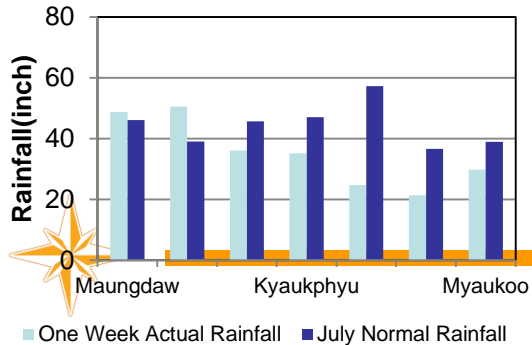
July Normal Rainfall (inch) for Sagaing and Magway Regions, Chin and Rakhine States



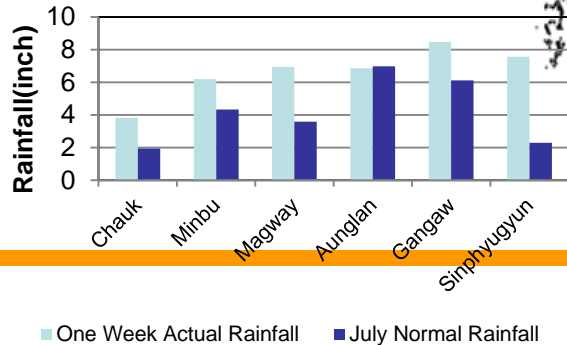
Comparison between one week(25th to 31st July) Actual Rainfall and July Normal Rainfall for Chin State



Comparison between one week(25th to 31st July) Actual Rainfall and July Normal Rainfall for Rakhine State



Comparison between one week(25th to 31st July) Actual Rainfall and July Normal Rainfall for Magway Region



Kaley Township, Sagaing Region

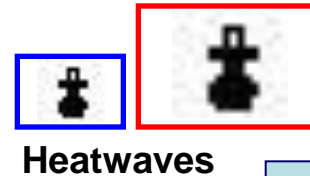
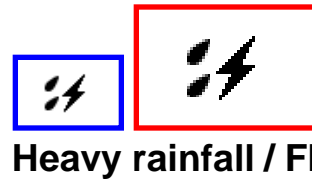
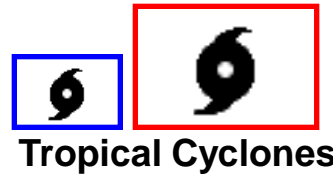
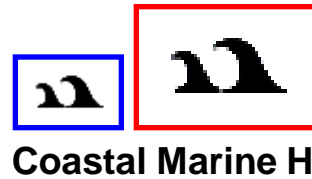
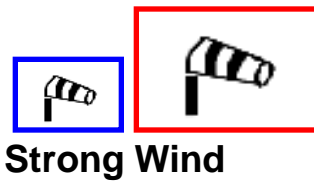


Some issues

Analysing climate risks and assessing climate vulnerabilities

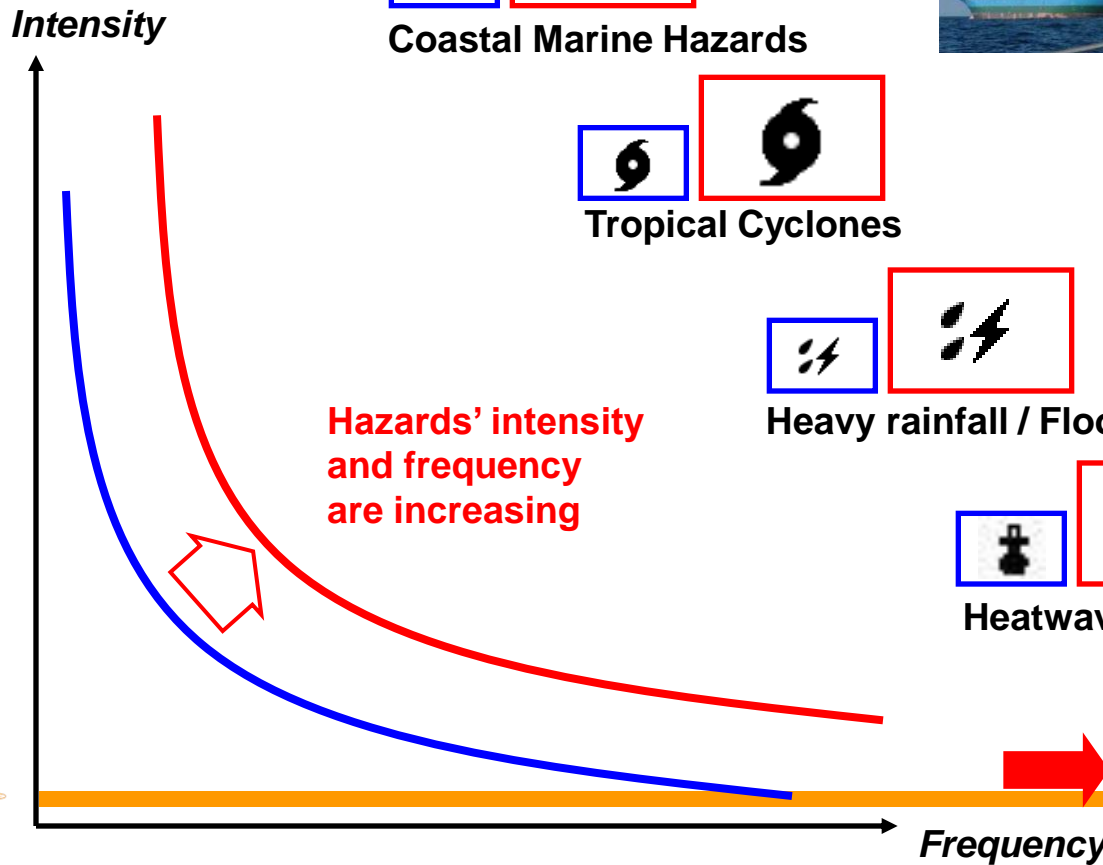
- Are there institutional platforms and mechanisms to facilitate risk, vulnerability and impact assessments?
- Are the capacities available?
- Is the technical, scientific and the data required available?
 - Quality controlled
 - Is there a repository for data? Knowledge management and sharing?
 - Are there protocols/policies for data exchange?
 - Are there procedures for recording and exchange socio-economic data?
- Have the capacity needs for risk, vulnerability and impact assessments been identified?
- Have these capacities been prioritized in the NAP process?

Concern...

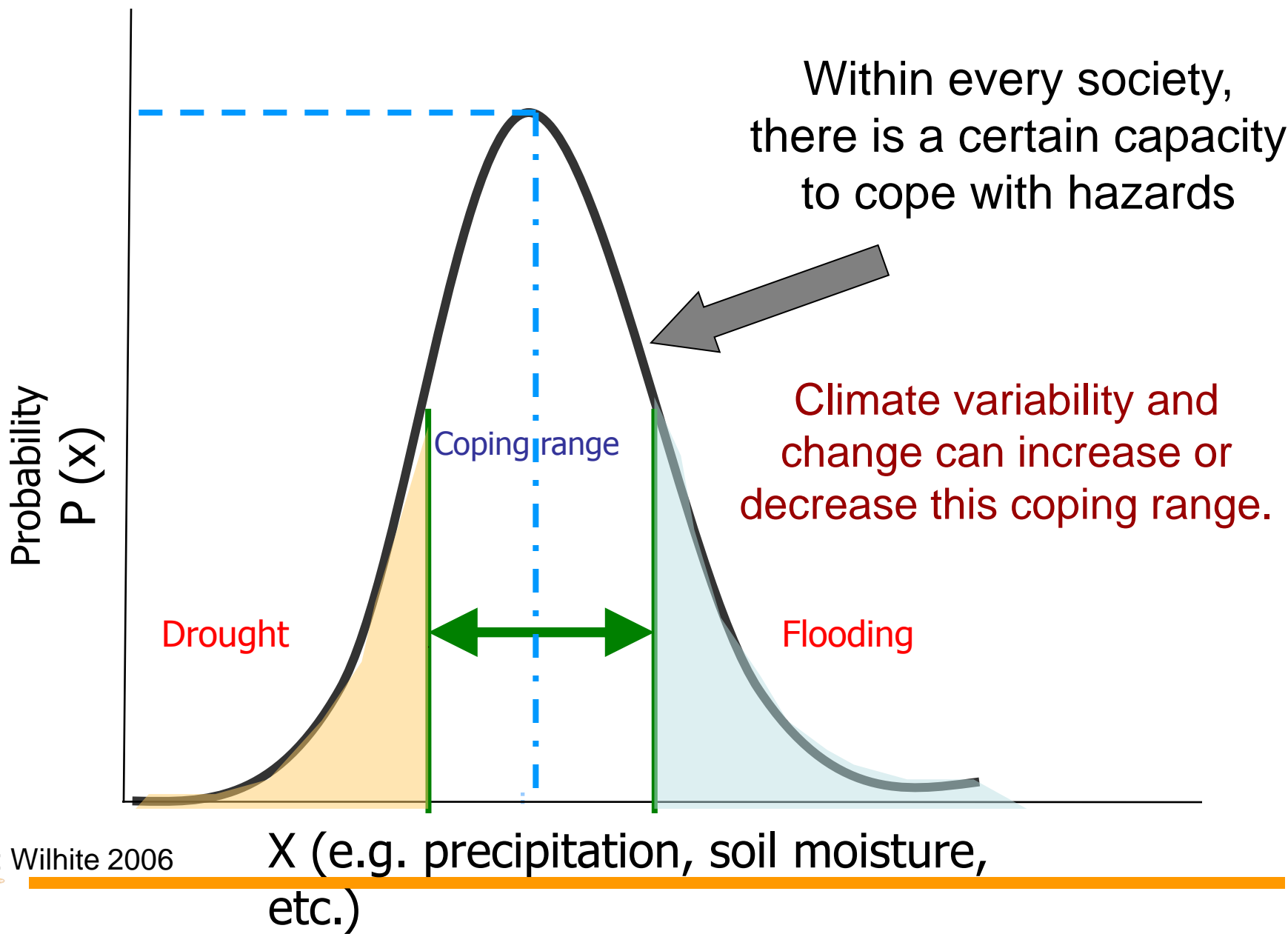


Vulnerability and exposure on the rise !

Information products and services based on climate predictions, key tool to support adaptation

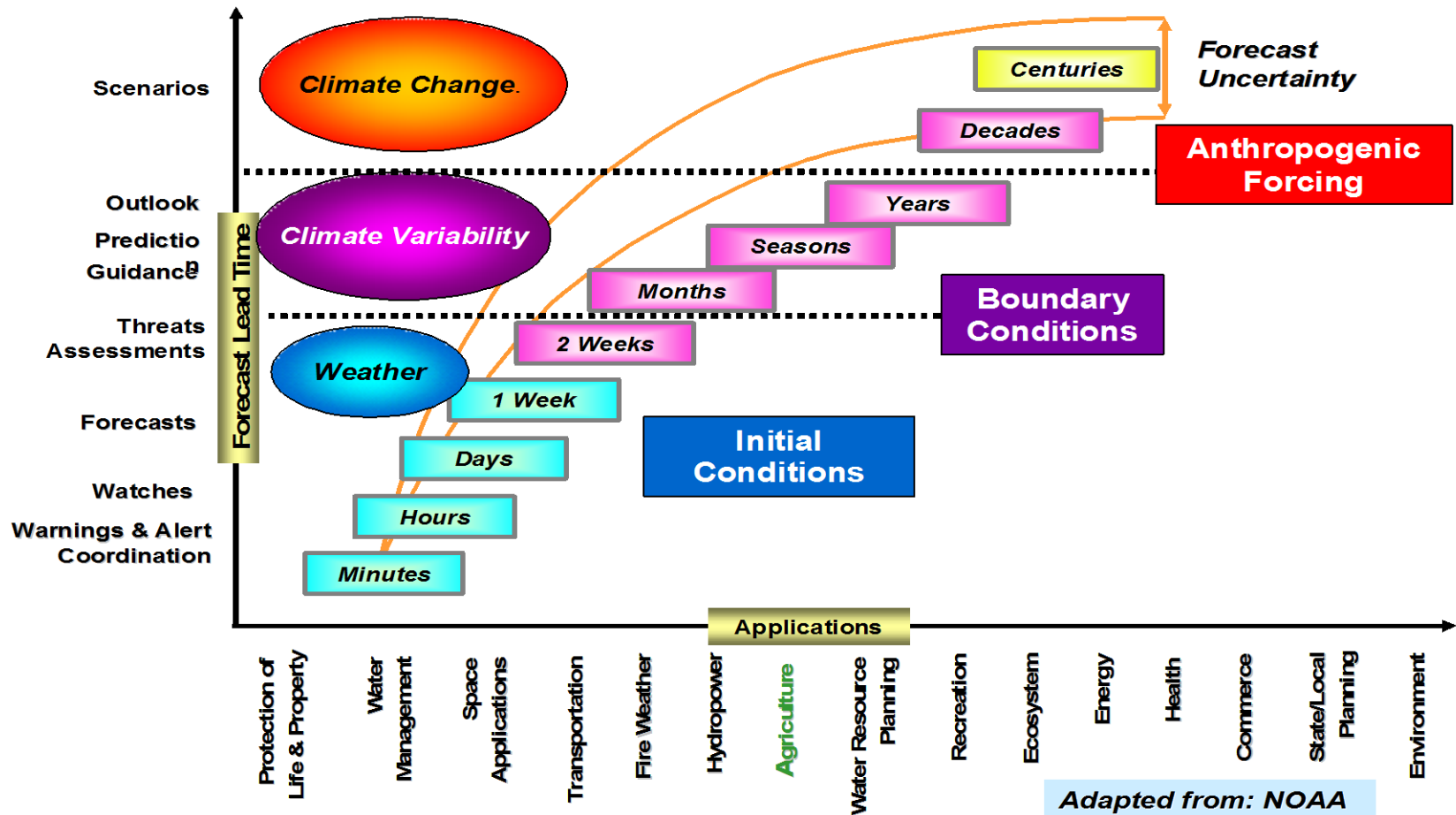


What it used to be...

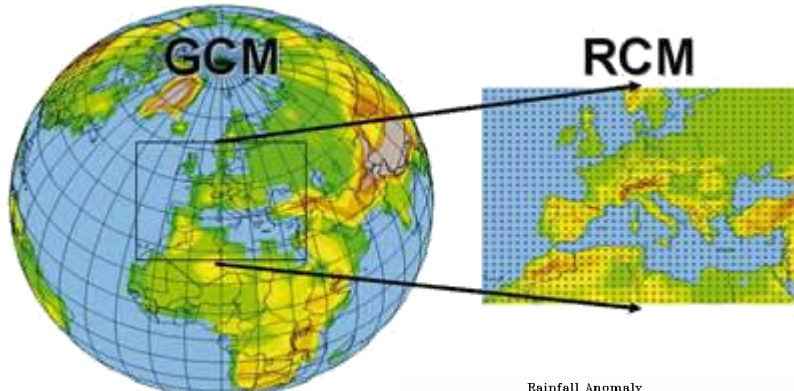
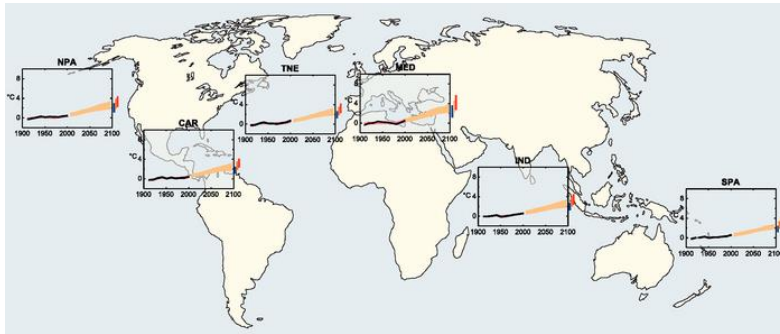


Seamless hydrometeorological and climate services

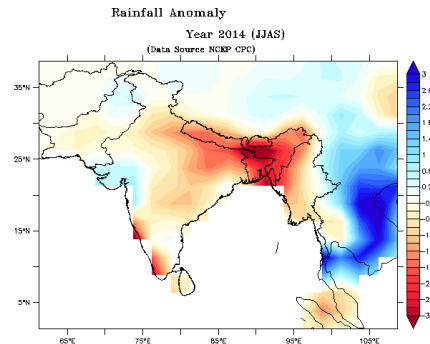
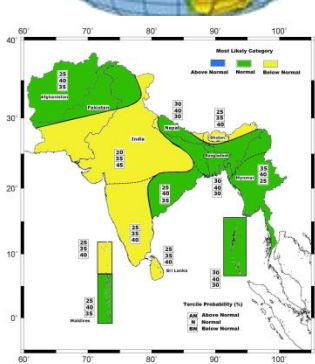
Climate Prediction Framework



Examples of climate services



- Expected future temperature
- Precipitation scenarios
- Sea level changes
- Snow, glacier and sea ice coverage
- Seasonal tropical cyclone activity
- Growing seasons
- Potential impacts of climate change on the natural environment and major business and public sectors

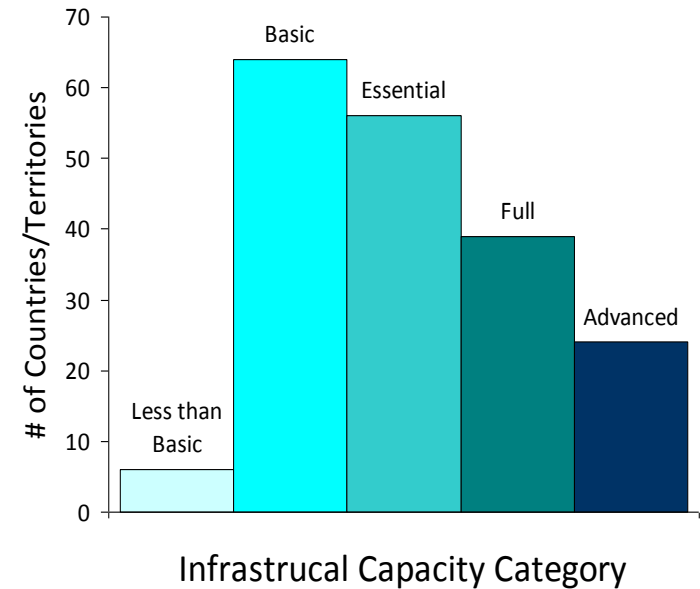
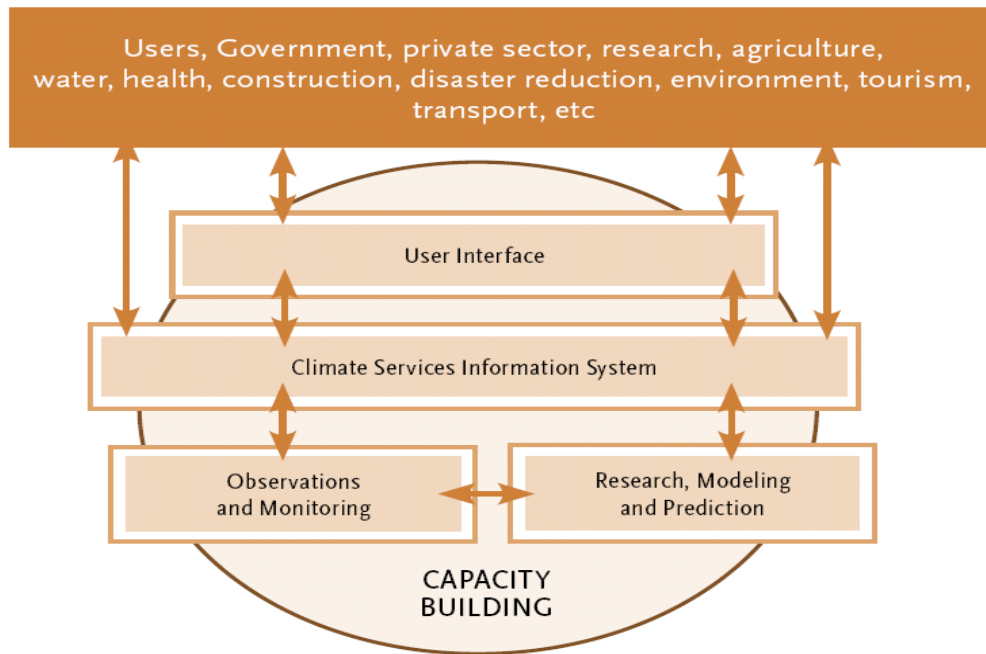


Benefits

- **Better water resources management**
 - as inputs to hydrological characterisation (e.g. precipitation, evaporation, etc)
 - in planning, design, development and operation of water supplies
 - in flood and floodplain management and control
 - design and operation of irrigation and drainage systems;
 - for studies associated with power generation, fisheries an conservation, navigation and recreation.
- **Improved disaster risk management**
 - Planning and emergency preparedness and response to extreme events
 - Sitting of critical infrastructure such as hospitals, schools, etc
- **Improved support to planning and operations in the health sector**
 - Risk Assessment/health system risk management
 - Epidemiological Surveillance & environmental Monitoring
 - Health Services (heat health warning systems, malaria waning system, etc...)
- **Improved agricultural planning and management**
 - Better drought and flood management
 - Improved food security



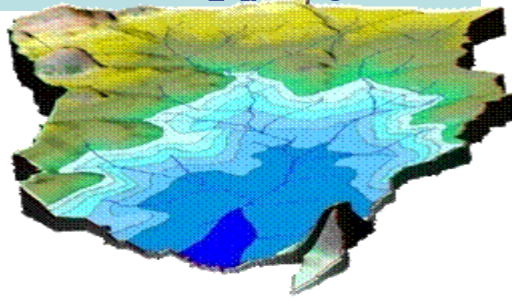
GFCS Pillars



Many countries lack the infrastructural, technical, human and institutional capacities to provide high-quality climate services.

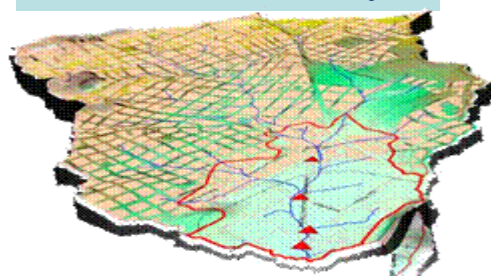
Simplified Schematic: Hazard / Risk Assessment (statistical and forward looking)

Hazard
Analysis and
Mapping



Heavy Precipitation

Exposure
and
Vulnerability



Assets:

✓ population density

Potential
Loss
Estimates

Number of
lives at risk

\$ at risk

- ✓ Destruction of buildings and infrastructure
- ✓ Reduction in crop yields
- ✓ Business interruption
- ✓ etc

Decisions

- ✓ Policy and planning
- ✓ Disaster Risk Financing
- ✓ EWS
- ✓ Sectoral Risk Management



Some issues

Analysing climate risks and assessing climate Vulnerabilities in support of Element B of NAP

- Are there institutional platforms and mechanisms to facilitate risk, vulnerability and impact assessments?
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Summing-up

✓ 3 closely-related issues:

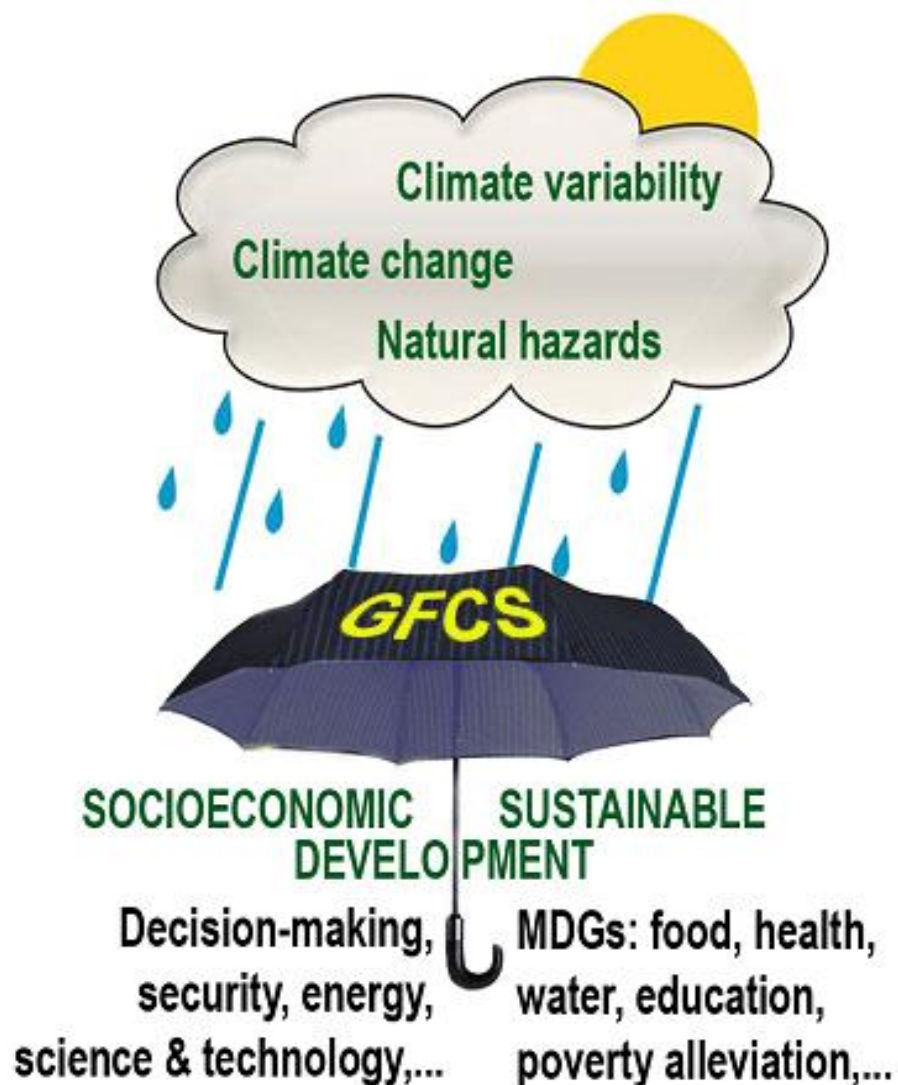
- *Adaptation to climate variability and change*
- *Disaster risk reduction*
- *Sustainable development & societal benefits*

✓ Requirements:

- *Reinforcing developing countries' adaptive capabilities*
- *Multidisciplinary partnerships across all sectors*
- *Capacity building to be seen as an investment, not an expenditure*

A key opportunity:

- **A Global Framework for Climate Services**



Summary and outlook

- Already extensive data sets in various data collections available including information about damage and loss
- Merging different information sources and adding geographical information to allow regional searches
- Fewer data available with extended observation period → systematic collection of events desired



Summary and outlook

- Data access via webclient (NMHSs)
- Export- and statistical functions
- Particular attention to knowledge database within WMO Task Team on Definitions of Extreme Weather and Climate Events (TT-DEWCE)
- Possible spatial extension in future projects (e.g. South-East Asia)



Policy Implications

- Policy on protecting communities from effects of weather/climate disasters will give the highest returns on investment;
- Policies on early warnings need to be reviewed in terms of their effectiveness on the end user;
- Floods and storms should be prioritised since together they account for highest economic and human losses in the south-east Asia.





Thank you for your attention