Weather, Water, Climate and Sustainable Development: The Role of WMO

by

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Region II (Asia)

- 35 WMO Members
- 9 LDCs (out of 50)
- Extremely diverse ecosystems
- Some of the world’s most populated countries
- World's fastest growing economic region
Major Issues Facing the NMHSs

• A single authoritative voice to issue warnings
• Assistance in informed decision making
• A risk management infrastructure in DPM
• Leadership
• Visibility
• Partnerships & cooperation
• Economic and social value
• Capacity building
• Modernization
• Resource mobilization
Key Social & Economic Drivers for the NMHSs

- Population dynamics
- Water security
- Food security
- Poverty alleviation
- Contribution to public health
- UN Millennium Development Goals (MDGs)
WMO Contributions to the MDGs

1- Eradicate extreme poverty & hunger  
2- Achieve universal primary education  
3- Promote gender equality & empower women  
4- Reduce child mortality  
5- Improve maternal health  
6- Combat HIV/AIDS, malaria & other diseases  
7- Ensure environmental sustainability  
8- Develop a global partnership for development
Observations

- Establishment of a WMO Integrated Global Observing System (WIGOS)
- GEO implementation & GEOSS integration
- WHYCOS
- GCOS, GTOS & GOOS
- Global Atmosphere Watch (GAW) & O$_3$
- Observations in support of the needs of UNFCCC, UNCCD, IPCC, GEOSS, …
From the WMO GTS to WIS

- World Radiation Centre
- Regional Instrument Centres
- IRI and other climate research institutes
- Universities
- Regional Climate Centres
- National Meteorological Centres
- World Meteorological Centres
- Regional/Specialized Meteorological Centres
- Meteorological and R&D Satellite Operator Centres
- WWW GTS
- Real-time “push” from the WMO GTS to WIS
- International Organizations (IAEA, CTBTO, UNEP, FAO..)
- 5 GAW World Data Centres
- GCOS Data Centres
- Global Run-off Data Centre
- Commercial Service Providers
- WMO World Data Centres
DPM Programme was created by Cg-XIV (2003) & launched in 2004, just before Indian Ocean tsunami

Hyogo Framework for Action (HFA)

Partnership with IOC/UNESCO in Tsunami Warning System (TWS)

Role of WMO's GTS

Multi-Hazard Early Warning Systems (EWS)

Preparedness & risk reduction
Most disasters are related to hydrometeorological hazards

Distribution of events, 1980-2005:

Weather Outlook for Earthquake-Affected Areas Weather during last Fortnight 03-17 Nov, 2005

Scattered Rain/Shower occurred in earthquake affected areas of Pakistan during last week. Snowfall also reported over the highest mountains above 8000 ft. This wet spell was followed by a Cold Wave and now all the affected areas are under cold wave conditions since last 3 days (Tuesday) with high wind chill at evenings/nights.

Due to prevailing cold wave, the night temperatures are close to freezing point in the plain areas located in south of epicentre, slightly below freezing night temperatures (1 to 3°C) over/around epicentre; and abnormally below (2 to 4°C) in north of epicentre. The night temperatures are largely below normal (2 to 6°C) over highest villages/elevated locations.

The day temperatures also remained below normal (2 to 8°C) during last week due to persistent cloud cover.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Area</th>
<th>Observed Night Temps</th>
<th>Observed Lowest Day Temps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>North of Epicenter</td>
<td>-03 to -06°C</td>
<td>08 to 12°C</td>
</tr>
<tr>
<td>2</td>
<td>Around Epicenter</td>
<td>-01 to -03°C</td>
<td>10 to 14°C</td>
</tr>
<tr>
<td>3</td>
<td>South of Epicenter</td>
<td>01 to 03°C</td>
<td>14 to 18°C</td>
</tr>
</tbody>
</table>

Weather Outlook for Earthquake-affected Area of Pakistan during Fortnight 18Nov-02 Dec, 2005

Prevailing cold wave is likely to persist for another 2 to 3 days (till weekend) over the earthquake affected areas causing high wind chill.

A fresh westerly wave presently located over Iran is expected to approach on Sunday leading to scattered rain/showers with snow over high mountains above 7,000 ft first 2 to 3 days of coming week, which is again followed by another cold wave. During the last week or towards the end of the fortnight (27Nov – 02 Dec), another western disturbance is expected to produce light to moderate rainfall and snowfall.

Dry weather/Clear Days will be associated with freezing night temperatures and high wind-chill during the fortnight.

The night temperatures around/north of epicentre are expected to remain below freezing point during most of the coming nights. Highest villages/Elevated locations may experience abnormally minimum temperatures during the period.
WMO’s Global Tropical Cyclone Early Warning System
Climate

- WMO & UNCCD collaborating in climate & land degradation
- IPCC - 4th Assessment Report
- GCOS
- WCRP
- WCP
Global climate in 2006

- Mean surface temperature about 0.42 °C above the 1961-1990 annual average
- Since the start of the 20th Century, the global average surface temperature has risen by approximately +0.7 °C
- Heavy rains and flooding reported in many parts of the world
- Below average Atlantic hurricane season
- 2006 Antarctic ozone depletion similar to the 2000 record
- A “moderate” El Niño event is now established
2006: the 6th warmest year on record
Research

- IPY 2007-2008
- THORPEX
- WCRP

- More active participation of the developing countries
Applications

- Public weather services
- Tropical cyclone monitoring & warnings
- Agriculture & food
- Drought & desertification
- Tourism
- Climate & health
- Public information and community awareness
- Marine & aviation services
Water

✓ WHYCOS - World Hydrologic Cycle Observation System
✓ WMO Flood Forecasting Initiative: Increasing the collaboration among meteorologists & hydrologists
✓ Integrated Flood Management
Capacity Building

- Sustainable development
- NMHSs human resources renewal
- Fellowships
- Programme for LDCs & review of Brussels Programme of Action
- Resource Mobilization
- Women in meteorology and hydrology
Cooperation with UN System & partner organizations

- IPCC: WMO & UNEP
- WCRP: WMO, ICSU & IOC
- GCOS: WMO, ICSU, IOC & UNEP
- JCOMM: WMO & IOC
- UN System Chief Executives Board for Coordination (CEB)
- UN Development Group (UNDG)
- UN Environment Management Group (EMG)
- UN Water chaired by WMO
Upcoming WMO events

✓ XIV-RA I, Ouagadougou, 14-23 Feb 2007
✓ IPCC WGs I, II & III
✓ International Conference on Social and Economic Benefits of NMHSs, Madrid, 19-22 March 2007
✓ Expert Meeting on Gender Mainstreaming, Geneva, 26-29 March 2007
✓ Cg-XV, Geneva, 7-25 May 2007
International conference on Secure & Sustainable Living (Madrid 19-22 March 2007)

• The Social and Economic Benefits of Weather, Climate & Water Services
• To assist providers, users and policy makers in maximizing the social and economic benefits of meteorological and hydrological information, products and services
• To highlight the role & contribution of WMO and NMHSs
XVth Congress (May 2007)

✓ Strategic Plan
✓ Programme and Budget 2008-2011
✓ WMO Secretariat Operating Plan
✓ WMO Convention & Governance
✓ WMO Crosscutting Programmes in response to the evolving role of WMO
✓ EC-LIX
The WMO Strategic Plan (2008-2011)

✓ Based on contributions to societal outcomes

✓ 3 top-level long-term objectives
  - Improve forecasts
  - Enhance services and their delivery
  - Continue WMO’s critical international role as an authoritative scientific voice

✓ 5 strategic thrusts:
  - Science/technology development/ implementation
  - Service delivery
  - Capacity building
  - Partnership
  - Efficient management and good governance
The WMO Strategic Plan (2008-2011) objectives are measured in terms of a set of 11 Expected Results and associated performance measures, as a basis for development of the WMO Secretariat Operating Plan & the WMO budget 2008-2011.

**WMO Secretariat Operating Plan**

- Programme activities and services
- Initiatives and Projects
- Key Performance Targets
- Mechanisms for monitoring and evaluating
Conclusion: There is need for cooperation...

1- At national and regional levels
   ✓ Role of National Meteorological and Hydrological Services
   ✓ Cooperation across disciplines and agencies
   ✓ Links with academic community

2- At international level
   ✓ Between IGOs and NGOs concerned
   ✓ Capacity building and transfer of technology activities
3- Within multiple domains
   ✓ observations
   ✓ communications
   ✓ data processing (including NWP)
   ✓ ........

4- Across disciplines

Conclusion: ...so there is need for a stronger WMO
Thank you!
Additional Slides
GTS technical arrangements to distribute TWS messages to NMHSs

- Use of WMO/GTS links and routing
- Use of WMO/GTS satellite-based data distribution systems, including: RETIM-Africa, EUMETCast (West IO), CMA PCVSAT (N-E IO), ISCS and EMWIN (East IO)
- Adoption of special GTS message headers for watch and warnings, ensuring highest priority routing, and acknowledgment procedures
- Adoption of unified GTS message headers for sea-level data facilitating collection and exchange via the GTS
## Status of GTS Upgrades for the IO-TWS

<table>
<thead>
<tr>
<th>Country</th>
<th>Implemented By</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>France</td>
<td>Completed</td>
</tr>
<tr>
<td>Tanzania</td>
<td>France</td>
<td>Completed</td>
</tr>
<tr>
<td>Madagascar</td>
<td>France</td>
<td>Completed</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>USA/NOAA</td>
<td>Underway</td>
</tr>
<tr>
<td>Maldives</td>
<td>USA/NOAA</td>
<td>Underway</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>ISDR Flash Appeal, managed by WMO Secretariat-WWW</td>
<td>Underway - Completion planned in February 2007</td>
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<td>Pakistan</td>
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GTS/ICT training arranged on a country-by-country basis as part of the implementation
WMO is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.

The WMO Mission is to provide world leadership in expertise and international cooperation in weather, climate, hydrology and water resources, and related environmental issues, and thereby to contribute to the safety and wellbeing of people throughout the world and to the societal and economic benefit of all nations.
GEO Societal Benefits

- **Disasters** - Reducing loss of life and property from natural and human-induced disasters.
- **Health** - Understanding environmental factors affecting human health and well-being.
- **Energy** - Improving management of energy resources.
- **Climate** - Understanding, assessing, predicting, mitigating, and adapting to climate variability and change.
- **Water** - Improving water-resource management through better understanding of the water cycle.
- **Weather** - Improving weather information, forecasting, and warning.
- **Ecosystems** - Improving the management and protection of terrestrial, coastal, and marine ecosystems.
- **Agriculture** - Supporting sustainable agriculture and combating desertification.
- **Biodiversity** - Understanding, monitoring, and conserving biodiversity.
Nearly 90% of disasters are related to hydro-meteorological factors.

Source: EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium

40% of loss of life is related to hydro-meteorological factors

Source: EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium
65% of economic losses are related to hydro-meteorological factors

Source: EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium
Capacity Building: WMO Regional Training Centres

WMO Network of Regional Meteorological Training Centres and Components
Disasters Losses, Total and as Share of GDP, in the Richest and Poorest Nations 1985-1999

(Adapted from MunichRe, 1999)
## LIST OF LDCs

### AFRICA (33 countries):

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>Angola</td>
<td>Mauritania</td>
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<td>Benin</td>
<td>Madagascar</td>
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<td>Burkina Faso</td>
<td>Malawi</td>
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<td>Burundi</td>
<td>Mali</td>
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<td>Central African Republic</td>
<td>Mozambique</td>
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<td>Chad</td>
<td>Niger</td>
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<td>Comoros</td>
<td>Rwanda</td>
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<td>Democratic Republic of Congo</td>
<td>Sao Tome &amp; Principe</td>
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<td>Djibouti</td>
<td>Senegal</td>
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<td>Equatorial Guinea</td>
<td>Sierra Leone</td>
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<td>Eritrea</td>
<td>Somalia</td>
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<td>Ethiopia</td>
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<td>Tanzania</td>
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<td>Guinea</td>
<td>Togo</td>
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<td>Guinea-Bissau</td>
<td>Uganda</td>
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<td>Lesotho</td>
<td>Zambia</td>
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<tr>
<td>Liberia</td>
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</table>
## LIST OF LDCs

<table>
<thead>
<tr>
<th>Asia (9 countries):</th>
<th>North Central America and the Caribbean (1 country):</th>
<th>South-West Pacific (6 countries):</th>
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<tbody>
<tr>
<td>Afghanistan</td>
<td>Haiti</td>
<td>Kiribati</td>
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<td>Bangladesh</td>
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<td>Samoa</td>
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<td>Bhutan</td>
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<td>Solomon Islands</td>
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<td>Cambodia</td>
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<td>Timor Leste</td>
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<td>Lao People’s Dem. Rep</td>
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<td>Tuvalu</td>
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<td>Maldives</td>
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<td>Vanuatu</td>
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<td>Myanmar</td>
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<td>Nepal</td>
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<td>Yemen</td>
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Secretariat Reform

✓ Oversight
  ➢ Strengthening of internal oversight
  ➢ VIth and VIIth Meetings of the Audit Committee
✓ Oracle system implementation
✓ Decentralization & delegation of authority
✓ Code of Ethics promulgated