Data systems for adaptation planning and implementation
Outline

• Background
• Data requirements for adaptation
• Data providers and resources
• Challenges
• Solutions
• Recommendations
Background
Methodologies for assessing adaptation needs with a view to assisting developing countries without placing undue burden on them (paragraphs 17-20)

19. Also invites the World Meteorological Organization, through its Global Framework for Climate Services [...] to regularly inform SBSTA about its activities aimed at improving the availability and accessibility of comprehensive climate information, including observational data, and about how it facilitates the provision and dissemination of the most up-to-date climate model predictions and projections
Overview of the GFCS

- Established during the third World Climate Conference in 2009
  - Endorsed by 13 heads state or government, 81 ministers and 2,500 scientists
- Seeks to guide the development and application of science-based climate information and services in support of decision-making in climate sensitive sectors
Overview of the GFCS

- Member-state governance
- Partners Advisory Committee of international organizations
  - FAO, WHO, WFP, UNISDR, UNDP, UNEP, IFRC, World Bank, European Commission
- 10-year initial implementation plan designed over four years by dozens of experts, backed by initial financing
- Mid-term review and re-design of governance, management and financing just completed
Priority areas

- Water
- Disaster risk reduction
- Health
- Agriculture/food security
- Energy

Supported by a climate services Information system, research, a user interface platform and capacity development
Climate information system

Processing & data management

Observations  Modelling  Forecasting  Service delivery

Research & development

Service delivery value chain

Communication processes

Weather Climate Water

Value adding processes

Weather Climate Water

Value Benefits & costs
Climate information system

Service delivery value chain

COMMUNICATION PROCESSES

SERVICE PRODUCTION

Basic & specialized services
NMHS & commercial providers
User decisions & actions
Outcomes

VALUE-ADDING PROCESSES

Weather Climate Water

VALUE Benefits & costs
Data requirements for adaptation
Adaptation planning: WMO-GCF partnership for enhancing the climate science basis of the climate rationale for GCF-funded activities

Indicators (past/present & future)

- **Headline indicators** to assess state of climate
  - example: temperature

- Weather and climate related indices of relevance to GCF results areas
  - example: soil moisture

- **High impact events**
  - example: heat wave

Data sets

Methods and tools
Adaptation implementation: Climate services for adaptation priorities in NDCs
Data providers and resources
Global operational infrastructure

- Global Producing Centres of Long Range Forecasts
- Regional Climate Centres
- National Meteorological and Hydrological Services
Current status of availability and access to data and products from CSIS entities

Availability of data and products (Non-exhaustive list)

**Climate change projections**
- CMIP5
  - 61 models
  - ~20-200 km
  - historical run: 1850-2005
  - nominal timescale: ~20-30 years
  - time period: 2100 and beyond

**CORDEX**
- Several global/regional models
- 14 domains
- ~12-50 km
- nominal timescale: until 2100
- time resolution: daily

**Present**
- Paleoclimatology proxies
  - CRU, NOAA
- Reconstructed variables
  - CRU, NOAA

**In situ data**
- Global
  - GHCN-Daily: ~90,000 stations
- National
  - BOM CDO: ~16,000 stations

**Climate extreme indices**
- ETCCDI: 27 indices for more than 100 countries
- ICA&D: >50 indices for more than 15,000 stations

**Regional**
- CRU: 0.5° x 0.5°
- EUMETSAT: satellite-based data
- WDC-RSAT: data ~few km
- NOAA NCEI: radar data ~few km

**Atmospheric measurements**
- 6 GAW WDCs: >1,400 stations

**Reanalysis**
- more than 10 global reanalysis: >100 km
- ERA-Interim, ERA-15, ERA-40, NCEP-NCAR, JRA-55, ...
- dynamical downscaling
- of global reanalysis: CORDEX, CaRD10
- regional reanalysis: NARR, ASR

**Graphical tools**
- ENACTS: maps
- data: >30 years, 4-5 km grid
- ClimatView: station monthly T2m, RR
- station norms T2m, RR
- 1982-present, >2,500 stations
- WMO WWIS
- IRI Map Room: maps, graphics, animations, data
- ClimatView: station monthly T2m, RR
- station normals T2m, RR
- 1982-present, >2,500 stations

**FORECASTS**
- CLIMATE VARIABILITY TIMESCALE
- WEATHER TIMESCALE
- CONTEMPORARY PAST
- PREHISTORICAL PAST

**Monthly/monthly LRF**
- 13 GPCLRFs maps
- data ~2.5° x 2.5°
- hindcasts ~20-30 yrs

**Regional**
- CRCC: 8 RCCs maps
- data ~30 km

**Frequency: Monthly**

**Frequency: Quarterly**

**Frequency: Once or twice per year**

**Probabilistic outlook and consensus statement**

**PROJECTIONS**
- CLIMATE CHANGE TIMESCALE
- WEATHER TIMESCALE
- CONTEMPORARY PAST
- PREHISTORICAL PAST

**Climal timescale**
- WEATHER TIMESCALE
- CONTEMPORARY PAST
- PREHISTORICAL PAST

**Paleoclimatology proxies**
- CRU, NOAA
- Reconstructed variables
- CRU, NOAA

**Available variables**
- More than 10 types of proxies (corals, insects, pollen, tree rings, ...)
- More than 200 variables available from stations
Structured access to global data and products

- 80 years historical ECV data at 35 km resolution
- Seasonal forecasts
- Climate change projections (initially Europe)
Climate services capacities (109 countries):
Basic Systems
Challenges
Climate services capacities (109 countries): Service Delivery and Overall
### Outcome measurement: Myanmar Post-Disaster Needs Assessment of Floods and Landslides

<table>
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<tr>
<th>State/Region</th>
<th>Damage Total</th>
<th>Damage Public</th>
<th>Damage Private</th>
<th>Losses Total</th>
<th>Losses Public</th>
<th>Losses Private</th>
<th>Disaster Effects Total</th>
<th>Disaster Effects Public</th>
<th>Disaster Effects Private</th>
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<td>335,210.1</td>
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<td>32,371.1</td>
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<td>200.0</td>
<td>542,032.8</td>
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<td>Water and Sanitation</td>
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<td>623.7</td>
<td>250.8</td>
<td>372.9</td>
<td>6,906.0</td>
<td>5,970.5</td>
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<tr>
<td>Transport</td>
<td>34,153.5</td>
<td>200.0</td>
<td>33,953.5</td>
<td>623.7</td>
<td>250.8</td>
<td>372.9</td>
<td>6,906.0</td>
<td>5,970.5</td>
<td>935.4</td>
</tr>
<tr>
<td>Communications</td>
<td>2,146.9</td>
<td>752.9</td>
<td>493.9</td>
<td>1,244.0</td>
<td>286.1</td>
<td>957.9</td>
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<td>1,039.0</td>
<td>1,451.8</td>
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<td>27.2</td>
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<td>23,674.4</td>
<td>23,674.4</td>
<td>n.a.</td>
<td>23,701.6</td>
<td>23,701.6</td>
<td>n.a.</td>
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<tr>
<td>Disaster Risk Management</td>
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<tr>
<td><strong>Total</strong></td>
<td>792,493.0</td>
<td>165,669.8</td>
<td>626,823.2</td>
<td>1,149,521.7</td>
<td>29,267.9</td>
<td>1,120,253.8</td>
<td>1,942,014.8</td>
<td>194,937.7</td>
<td>1,747,077.0</td>
</tr>
</tbody>
</table>

*July-September 2015, Source: World Bank*
Solutions
Global Framework for Climate Services (GFCS)

A National Framework for Climate Services is a GFCS multi-stakeholder mechanism to enable development and delivery of climate services at country level in support of adaptation in agriculture, water resource management, health, energy, disaster risk reduction and other climate-sensitive sectors.
Regional Climate Forums

Heat wave health warnings

<table>
<thead>
<tr>
<th>Measures, strategy</th>
<th>Level of implementation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media announcements (radio, television)</td>
<td>+++</td>
<td>Provide general advice on heat stress avoidance to general public.</td>
</tr>
<tr>
<td>Bulletin or web page</td>
<td>+++</td>
<td>May be restricted access to relevant professionals or accessible by everybody.</td>
</tr>
<tr>
<td>Leaflet</td>
<td>++</td>
<td>General advice and advice for nursing-home managers: often distributed at beginning of the summer via health centres, and places where vulnerable people may be.</td>
</tr>
<tr>
<td>Telephone helpline</td>
<td>++</td>
<td>Either a dedicated telephone service is opened (Heatline in Portugal) or people are encouraged to phone a pre-existing general health advice line (NHS Direct in the United Kingdom).</td>
</tr>
<tr>
<td>Opening of cooling centres</td>
<td>++</td>
<td>There is some evidence that cooling centres are not used by high-risk individuals but by low-risk individuals.</td>
</tr>
<tr>
<td>Alert to hospital emergency rooms, ambulance services</td>
<td>+</td>
<td>Used to improve operational efficiency (need to deploy extra staff); needs to be based on local information and carefully evaluated.</td>
</tr>
<tr>
<td>Home outreach visits to vulnerable persons</td>
<td>+</td>
<td>Important but usually expensive: use pre-existing networks of volunteers (buddy system in Philadelphia) or professionals (social workers). Requires a registry of vulnerable people.</td>
</tr>
<tr>
<td>Evacuation of vulnerable persons from their homes to cooling centres</td>
<td>+</td>
<td>Using a registry of vulnerable people who are visited at home and evacuated, if necessary.</td>
</tr>
<tr>
<td>Outreach to homeless</td>
<td>+</td>
<td>High-risk group in southern USA (11 homeless people died in heatwave in Phoenix, July 2005).</td>
</tr>
<tr>
<td>Electricity companies cease disconnection for non-payment</td>
<td>+++</td>
<td>Utility companies have initiated and financially supported HHWSs in the USA. Most important where population relies heavily on air-conditioning (as is the case in the USA).</td>
</tr>
<tr>
<td>Water companies cease disconnection for non-payment</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Fan distribution</td>
<td>++</td>
<td>Fans are effective when they circulate cooler air, but not above temperatures ~ 37°C.</td>
</tr>
</tbody>
</table>

+ rarely implemented, ++ often implemented, +++ implemented very often

Source: adapted from Kovats and Ebi, 2006
Seasonal inflow forecasts for hydropower resilience: Waitaki reservoir, New Zealand

• Reservoir inflow highly variable: 200 – 750 million m³/year
• Forecast model run every 3 months to predict inflow over the next 3 months
• Forecasts inputs: El Nino, global pressure and wind patterns, local rainfall
• Forecasted inflow (gray bars) closely matches actual inflow (white bars)

• Reservoir operators can adjust water allocations to balance meeting hydropower generation targets with other priorities e.g. water supply, flood control

Source: L. Dubus, EDF, from J. Purdie, Meridian Energy Ltd
Agmet services in West Africa

- Historical Climate Data
- Crop Information
- Basic Soil Information

Simple Crop Model

Crop Advice for Rural Farmers
Based on 2003-04 study in Mali

Full value-chain service delivery

2008-2015
428 SEMINARS
WERE ORGANIZED IN 17 COUNTRIES

Funded by Spain and Norway
18 400 FARMERS
WERE TRAINED IN 4500 VILLAGES

RAIN GAUGES 8 125

Socio-economic benefits

- + 17% EAR LENGTH INCREASE (MAIZE)
- + 20% FINAL YIELD INCREASE (MILLET)
- 95% FILLED GRAINS (MAIZE)
- 45$/ha SAVING BY NOT WEEDING
Recommendations
For strengthening climate information systems and associated services

• Article 7 country stakeholder engagement
  (country-driven, gender-responsive, participatory and fully transparent; takes consideration of vulnerable groups, communities and ecosystems; and is based on and guided by the best available science)
  – Strengthen scientific rationale for adaptation action
  – Improving and documenting the effectiveness of adaptation measures -> operationalization
  – More systematic assessment of adaptation outcomes and socio-economic benefits
For strengthening climate information systems and associated services

• Targeted research
  – Underlying observations and data
  – Prediction and projections

• More coherent financing for complete systems
  – Fully operational exchange of GFCS-relevant climate data and products among national, regional and global centres supporting country-level service delivery addressing adaptation priorities
Thank you