Translating Climate Information into Climate Services: RIMES initiatives

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Regional Stakeholder Consultation on Climate Services for the Third Pole Region
Holiday Inn Jaipur City Centre, Rajasthan, India
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Regional Stakeholder Consultation on Climate Services for the Third Pole Region, Jaipur, Rajasthan, India, 9-11 March, 2016
Consensus Statement on the Forecast for the 2015 Northeast Monsoon Season (October – December) Rainfall and Temperature over South Asia

Summary

Normal to above normal rainfall is likely during the 2015 Northeast monsoon season (October – December) over southern parts of South Asia including southeast peninsular India, Sri Lanka and Maldives. Above normal rainfall is likely over northern most parts of the region. Other areas of the region that generally receive below normal or normal rainfall are expected to experience below normal rainfall.
Forecast Outlook for 2015 NE Monsoon Season (October–December)

Rainfall over South Peninsula

The summary of forecasts for 2015 North-East monsoon season's Rainfall is given below:

1. **Season's rainfall for South Peninsula (Tamil Nadu, Coastal Andhra Pradesh, Rayalaseema, Kerala and south interior Karnataka), is most likely to be above normal (>111% of Long Period Average).** The Long Period Average (LPA) of the North-East monsoon season rainfall for the south Peninsula for the base period 1951-2000 is 332.1mm.

2. **Season's rainfall for Tamil Nadu is most likely to be above normal (>112% of LPA).** The LPA of the North-East monsoon season rainfall for the Tamil Nadu for the base period 1951-2000 is 438.2mm.
Interaction of forecast providers and users

Providers of Forecasts

Current

Potential

Users and key stakeholders
The Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)

Enhance the use of Climate Information for Risk Management
About RIMES

✧ Established on 30 April 2009
✧ **Intergovernmental**, owned and managed by Member States
✧ Registered with the United Nations under Article 102 of UN Charter
✧ UN ESCAP support for RIMES institutional development
About RIMES

**Regional:** 32 Member and Collaborating States in Asia and Africa

**Integrated:** links science with generators and users of early warning information

**Multi-hazard:** started with tsunami and earthquake, and expanded to include hydro-meteorological hazards

**Early warning:** with mandate to provide early warning services for enhanced preparedness for, responses to, and mitigation of natural hazards

**System:** consists of regional technical support unit, connected to national and local systems
Key Support to Members – risk management

Earthquake and tsunami services

Improving data availability

Capacity building

Monsoon Forum

Weather and climate services

NMHS generates forecast

Users monitor progress of the season and report actions taken during the forum

Users report back to home agencies and finalize and implement impact management plan

Forecast users analyze potential impacts and implement mitigation options

Vulnerable locations of Coral Bleaching

2030s 2050s 2080s

Low Medium High 200 km
Provide Climate information and Services on a continuum of time-scales

Iterative Climate risk management and adaptation actions

Past Climate

Historical Climate Data

Current Climate Variability

Impacts/Risks/Adaptation

Future Climate Change

Weather scale

Seasonal

Inter-annual

Decadal 20 – 30 yrs

2100

Source: Andy Robertson, IRI

FORECAST SKILL

Weather forecasts: predictability comes from initial atmospheric conditions

Sub-seasonal forecasts: predictability comes from monitoring the Madden-Julian Oscillation, land surface data, and other sources

Seasonal forecasts: predictability comes primarily from sea-surface temperature data; accuracy dependent on ENSO state

FORECAST LEAD TIME (days)
Sector Departments that use climate information
In selected countries of the Greater Mekong Sub-region – Cambodia, Lao PDR and Myanmar

FAO-RAP, Bangkok/RIMES implemented the Climate Component – “Enhancing Utility of Seasonal Climate Forecasts and Managing Climate Change Risks”

**Activity 1:** Monsoon Forum: enhancing the utility of seasonal climate forecasts

**Activity 2:** Managing climate change risks

Phase I: Started August 2010 to September 2011
Final evaluation completed by September 2012
Food Security

**AVAILABILITY**
- Increasing agricultural production
- Reducing post-harvest losses
- Storage/transportation
- Import / Export of food

**STABILITY**
- Disaster Preparedness

**UTILIZATION**
- Anticipation / preparedness for disease outbreaks
- Ensuring proper sanitation
- Nutrition status – food preferences/culture

**ACCESS**
- Food prices
- Securing livelihoods through diversification of income sources
- Risk sharing mechanism like insurance
Monsoon Forum Countries in South Asia

Bangladesh

Myanmar

Pakistan

Maldives

Nepal

Sri Lanka

Slides contributed by Ms. Ruby Rose, RIMES
Features of the Monsoon Forum meetings

• Articulation of community concerns and demands by government and non-government organization
• Collective effort for understanding and using climate information for applications
• Identify opportunities for anticipatory actions
• Acceptance of probabilistic information for utilization in decision-making
WMO-RIMES GFCS project “Capacities and mechanisms for climate services production and delivery are in place in South Asia” – recently formalized under the Canadian Government
Enhancing Capacities at community level

- CRM field schools
- At pilot sites to introduce farmers to the use of science-based information for decision-making – Myanmar, India: Tamil Nadu
- Partnering with local NGOs and township level agriculture extension workers
Seasonal Forecasts

- capacity building

- ECMWF primary data source (1.5 x 1.5, 41 members, seven monthly)

- Monthly and Seasonal Forecast tool (ensemble) climate zone wise

- Other GCMs are included for multi model ensemble forecast (NCEP, GFDL)

- Updated monthly
Seasonal climate information into hydrological models

- Seasonal flow outlooks were derived from ECMWF’s 7 months forecasts of 41 ensemble members.
- The seasonal ensemble forecasts of precipitation and temperature were extracted for Ganges and Brahmaputra basins.
- At each grid point, mean ensemble precipitation and temperature values were computed. Then mean basin precipitation and temperature values were computed taking the grid average covering the Ganges and Brahmaputra basins.
- This basin average precipitation and temperature forecasts were then used in the hydrological model to generate seasonal flow outlook for Ganges and Brahmaputra Rivers for three month lead time.
Seasonal Forecasts – capacity building

• Working mainly in Sri Lanka.
• 2 weeks training on the components at RIMES – Sri Lanka, Myanmar, Bangladesh
• Customized tools have been transferred to DoM and back up support is being provided regularly.
• Detailed operational manual for the tool is developed for ease-of-use
Strengthening Capacities for Risk Information Application to Reduce Disaster Risks
Project funded by UN ESCAP

a) Support National meteorological and hydrological services (NMHSs) in customizing regional climate projections;
b) Assist Sectoral users on interpretation and application of customized climate projections for risk analysis;

Our experience: user agencies need support with interpretations of scenarios; guidance and help in relating such information (along with its uncertainties/confidence levels) to their specific decision making contexts

*Clarify limitations and encourage “best use”*
• Involve planning departments for integrating risk-informed adaptation into the development planning process,
• pilots in Myanmar, Pakistan, and Sri Lanka, countries with robust Monsoon Forums;
• where users have demanded for these products and capacity building services and where NMHSs have requested RIMES to assist in responding to these demands.

• Work on collaborative project in countries and the region to bring in the best science knowledge for climate risk management
• Help transform regionally down scaled CC projects into more user friendly products and encourage proper use and interpretation of CORDEX data in the region
• R2O (Research to Operations)
Figure 1: Risk Map based on Day 1 WRF forecast data of 29th July 2015

Figure 2: Map of flood affected areas of Myanmar during Komen cyclone, Map: OCHA
Problem Statement

- CC impact & vulnerable sectors are
  - Water resources
  - Forests
  - Health
  - Agriculture & livelihood

- Deficit in (reported by DoNER)
  - Infrastructure
  - Basic needs
  - Resources
  - Governance

Government of Manipur
Directorate of Environment

vulnerable Himalayan Ecosystem
high natural resource dependency
unique ecology and rich biodiversity
FOCUS Humanitarian – Aga Khan Development Network is working on community based disaster risk management/EWS systems
In Conclusion

- Identify distinctive aspects of climate services requirements of the Third Pole Region (3PR) – Agriculture, biodiversity, ecosystem services..
- Disaster risks – focus
- Network of institutions that can support context specific interventions to enhance climate services in the 3PR
- Supporting observations, monitoring, science to enhance relevance and quality for iterative Climate risk management to enable sustainable progress
- RIMES: willingness to collaborate and support – already started working on a WMO GFCS project for South Asia
Categories of Infrastructural Capacities

Climate Observations
Climate Data Management
Interaction with users
Seasonal Climate Outlooks
Climate Monitoring
Specialised climate products
Decadal Climate Prediction
Long-term Climate Projections
Customized climate products
Climate Application Tools

Basic Climate Services Cat 1
Essential Climate Services Cat 2
Full Climate Services Cat 3
Advanced Climate Service Cat 4

SASCOF 6, Dhaka, Bangladesh 21 April 2015
Model Setup

- **Multi model Ensemble forecasting**
- The MME forecasting consists of four modules in which various techniques are used to generate the monthly/seasonal forecast.
  - MME1 (Simple mean forecast)
  - MME2 (Weighted average Forecast)
  - PCR (Principal Component Regression Analysis)
- Final Probabilistic Forecast for each zones
- A “predictand” and “Predictor” based model
# SELECTED GCMS

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<th>Resolution</th>
<th>Ensemble Members</th>
<th>Extent/Lead</th>
<th>Reference</th>
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