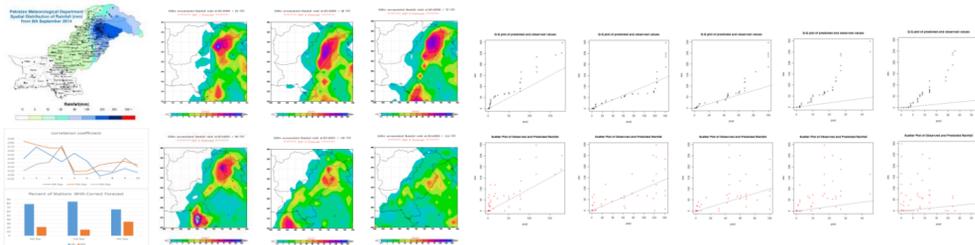


## Forecast Customization and Verification

- ❖ Customized 10-day deterministic forecast to RIMES Member and Collaborating States on demand
- ❖ Forecasts at different lead times verified with observation data; model skill evaluated

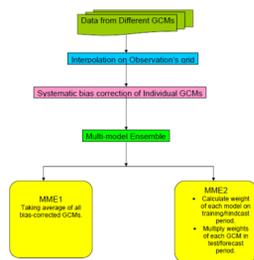


Forecast for 5 September 2014 at different lead times; forecast performance

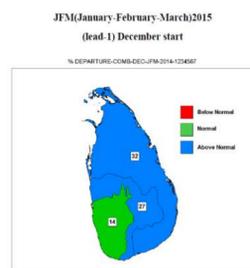
Scatter & Quantile plots September 2014 for all stations

## Extended range forecast customization

- ❖ GCMs, with coarse resolution forecast data bias-corrected against observed climatology, set for a region
- ❖ Observed climatology derived from long-term station observation datasets
- ❖ Bias-corrected forecast further downscaled statistically based on supervised principal component regression
- ❖ Outlook provided based on country's climate zones



Flow diagram

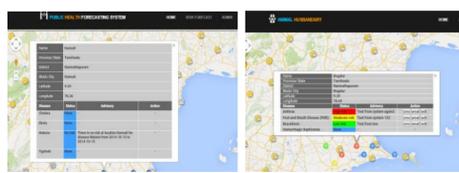


Sample seasonal product

## Advisory Systems for Sectoral Application

10-day ECMWF deterministic forecast used in:

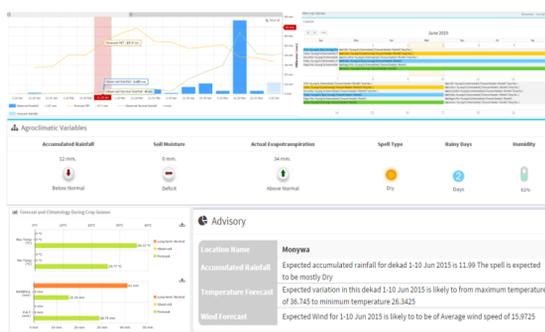
- ❖ Agro-advisory expert system to support decision-making in agriculture sector, piloted in Myanmar (Monywa and Nyaung Oo)
- ❖ Public health and animal health advisory systems, with pilot in Tamil Nadu, India
- ❖ Energy demand and supply management system, with pilot in Tamil Nadu, India



Public health advisory system (L); animal health risk information system (R)



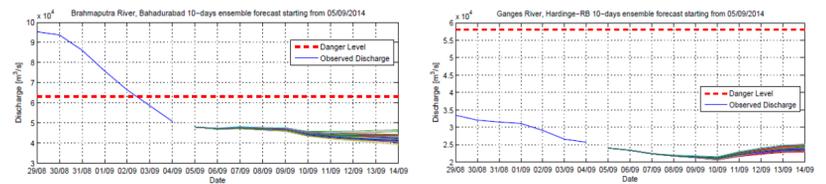
Wind forecast and energy demand and supply management system



Agro-advisory expert system

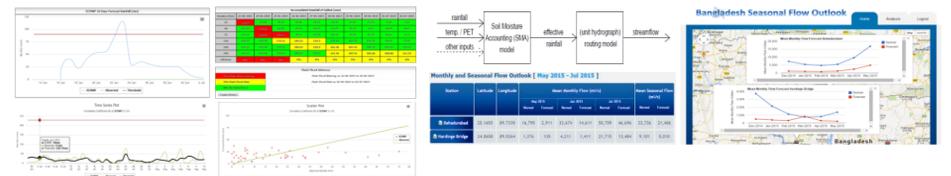
## Hydrological Applications

- ❖ 15-day precipitation forecast from ECMWF 51-member Ensemble Prediction System as input to hydrological modeling
- ❖ 10-day flow forecast at upstream boundary locations of Ganges and Brahmaputra Rivers



Flow forecast at Hardinge Bridge (Brahmaputra) and Bahadurabad (Ganges) stations

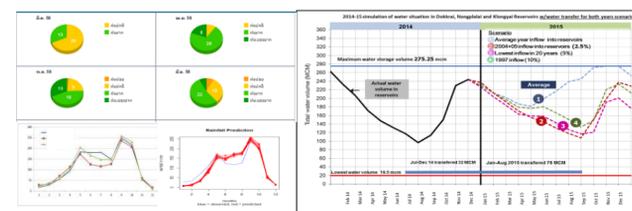
## Flash flood and seasonal flow outlook



Flash flood guidance and real-time verification system (L) and web-based seasonal flow outlook (R) for Sylhet and Cox's Bazar, Bangladesh

## Reservoir management

- ❖ Development of precipitation forecast-based seasonal runoff and reservoir inflow forecasting system
- ❖ Basin hydrological model uses soil and water assessment tool (SWAT)
- ❖ Major rain category from 41-member ensemble guides reading of hydrological response table for estimation of possible reservoir inflow range



Ensemble predictive values and reservoir scenario with basin and model climatology

- ❖ **Enormous potential applications of forecast information at different timescales**
- ❖ **RIMES sustained engagement with Member States in providing value addition to products received from ECMWF**
- ❖ **Piloting of expert systems involves validation and user feedback, with potential for scaling up and replication**
- ❖ **Higher spatial resolution input data would tremendously improve accuracy of expert systems and hydrological models**

## About RIMES

- Builds capacity of its Member States in the generation and application of user-relevant early warning information
- Bridges gap between global centers of excellence and national and local level institutions to bring the best of science and practices for enhanced performance of early warning systems
- Acts as test-bed for identifying promising new and emerging technologies and research products, and pilot testing and making these operational through demonstration of tangible benefits

- Collaborates with ECMWF on data exchange and use of medium- and long-range forecast products for sectoral applications
- 12 Member States: Bangladesh, Cambodia, Comoros, India, Lao PDR, Maldives, Mongolia, Papua New Guinea, Philippines, Seychelles, Sri Lanka, and Timor-Leste
- 19 Collaborating Countries: Afghanistan, Armenia, Bhutan, China, Indonesia, Kenya, Kyrgyzstan, Madagascar, Mauritius, Mozambique, Myanmar, Nepal, Pakistan, Russian Federation, Somalia, Tanzania, Thailand, Uzbekistan, Vietnam, and Yemen

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*Building capacities for providing actionable warning information towards forearmed, forewarned, and resilient communities*