



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**



Building climate-resilient agriculture in South Asia
Colombo, November 2018

Capacitating farmers and fishers to manage climate risks in Bangladesh

Carlo Montes

CIMMYT - Bangladesh

A. Whitbread
ICRISAT

M. Phillips
WorldFish

T. J. Krupnik
CIMMYT



Climate variability has a strong impact on agriculture and fisheries in South Asia

	Climate variables	Effects
Crops	<ul style="list-style-type: none"> High temperature Air humidity Strong rainfall Seasonality 	<ul style="list-style-type: none"> Grain quality Crop pest and diseases Foliage damage Sowing/planting date
Fisheries	<ul style="list-style-type: none"> Inland flooding Cyclones and tidal surges Water temperature Strong rainfall 	<ul style="list-style-type: none"> Farm damages Disolved oxygen Fish growth Turbidity

Management decisions



Risk factors

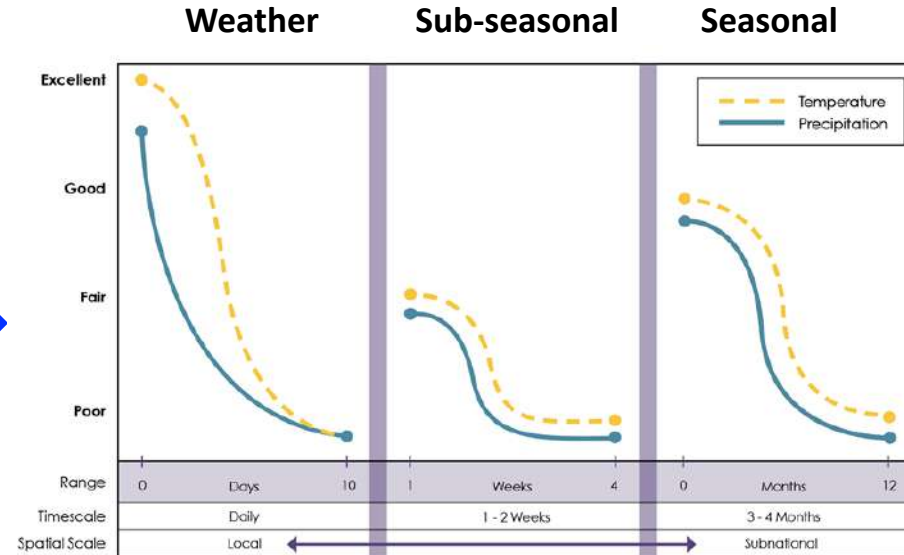


Varying space and time scales

- Weather (daily)
- Sub-seasonal (1-2 weeks)
- Seasonal (3-4 months)
- Local (farms)
- Regional



Predictability associated with different scales, variables and mechanisms



Climate variability has a strong impact on agriculture and fisheries in South Asia

	Climate variables	Effects
Crops	High temperature Air humidity Strong rainfall Seasonality	Grain quality Crop pest and diseases Foliage damage Sowing/planting date
Fisheries	Inland flooding Cyclones and tidal surges Water temperature Strong rainfall	Farm damages Dissolved oxygen Fish growth Turbidity

Management decisions



Risk factors

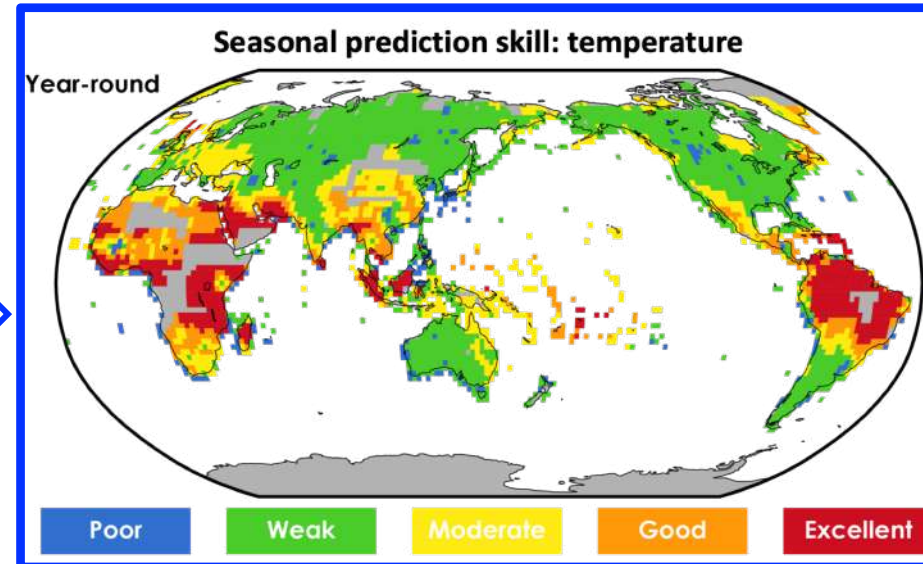


Varying space and time scales

- Weather (daily)
- Sub-seasonal (1-2 weeks)
- Seasonal (3-4 months)
- Local (farms)
- Regional



Predictability associated with different scales, variables and mechanisms



Climate variability has a strong impact on agriculture and fisheries in South Asia

	Climate variables	Effects
Crops	High temperature Air humidity Strong rainfall Seasonality	Grain quality Crop pest and diseases Foliage damage
Fisheries	Coastal flooding Cyclones and tidal surges Water temperature Strong rainfall	

Management decisions



Risk factors



Main objective of CaFFSA:

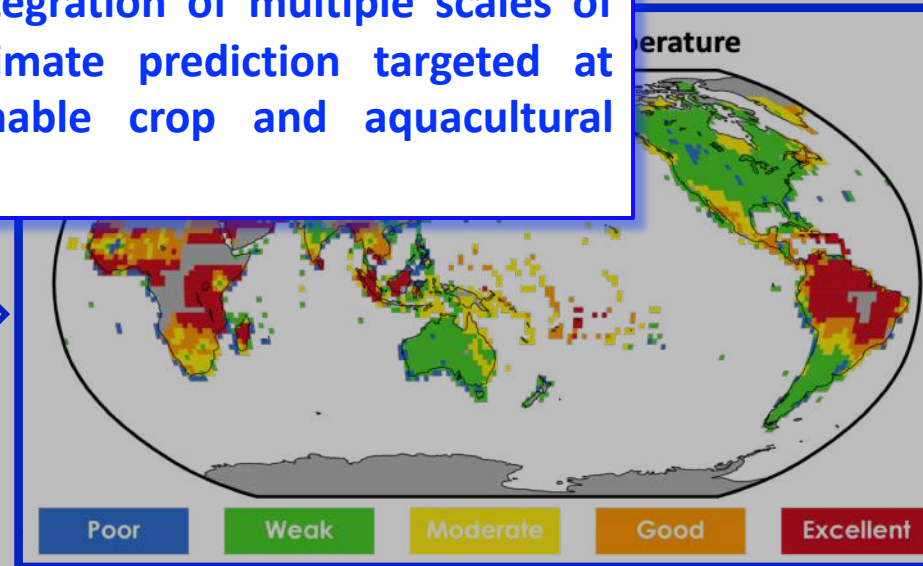
To design and implement climate services for weather-related risk management in agriculture and aquaculture in Bangladesh based on the integration of multiple scales of weather forecasting and climate prediction targeted at climate-sensitive and actionable crop and aquacultural management practices

Varying space and time scales

- Weather (daily)
- Sub-seasonal (1-2 weeks)
- Seasonal (3-4 months)



Predictability associated with different scales, variables and mechanisms



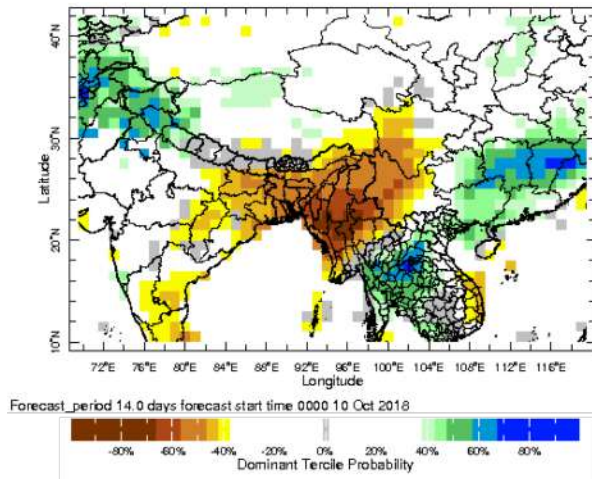
Forecasts available from multiple institutions

Multimodel probabilistic forecasting generated from dynamical models

Global forecasts

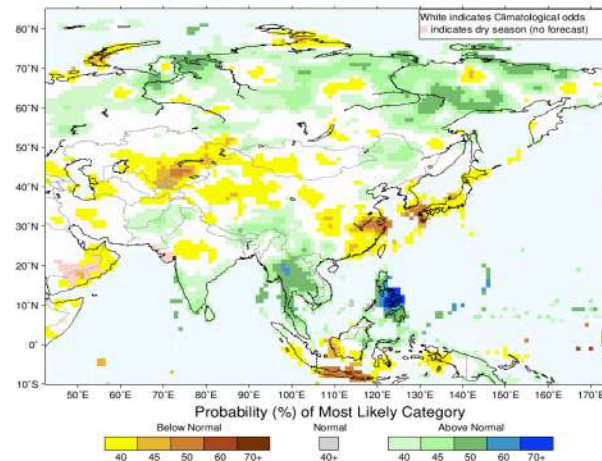


Sub-seasonal



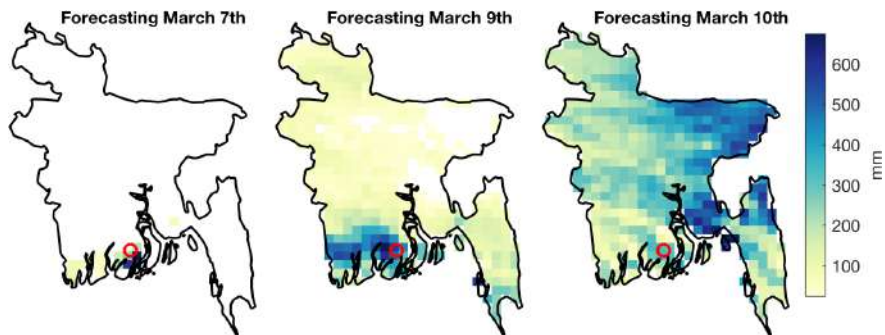
Seasonal

IRI Multi-Model Probability Forecast for Precipitation for March-April-May 2018, Issued February 2018



WRF deterministic forecasting generated by BMD

Local forecast



Strategy

Identification and characterization of weather-related risk factors for agriculture and aquaculture

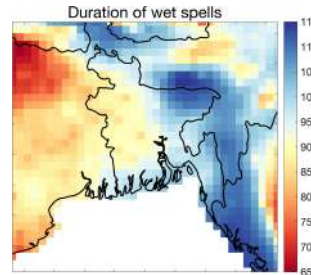
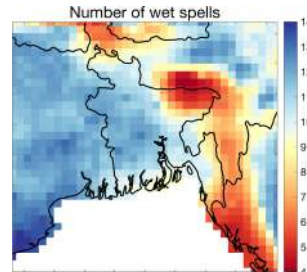
Sub-seasonal metrics

Years of above/below normal rainfall

Possible to be inferred from seasonal forecasting

Number and duration of wet spells

Climatology JJAS

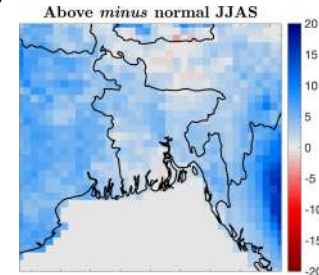
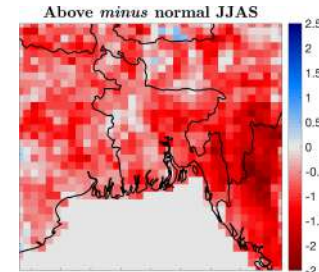


Analysis

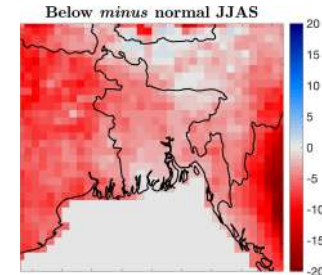
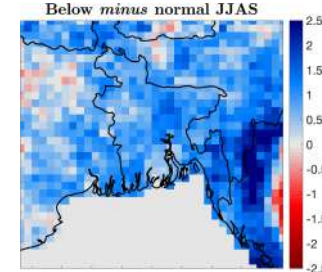


Climate to weather

Rainy years

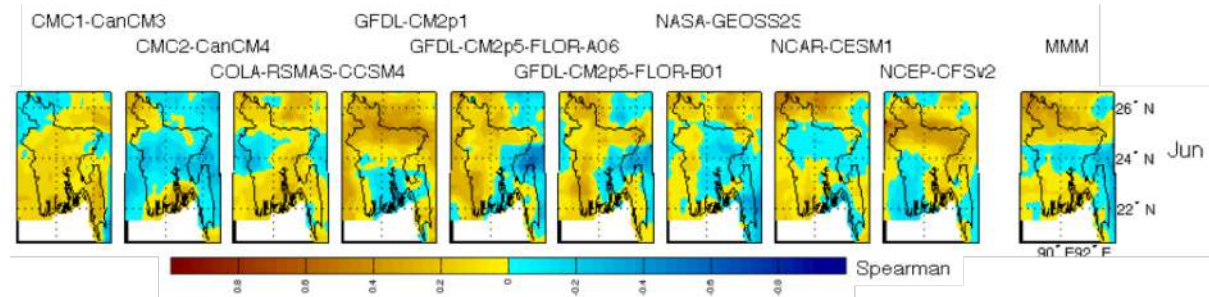


Dry years



NMME models:

JJAS rainfall, 1 month lead time



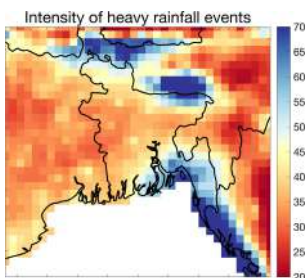
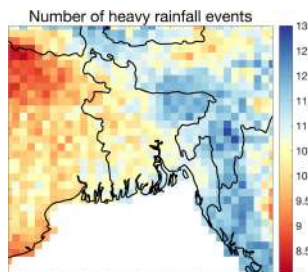
Strategy

Identification and characterization of weather-related risk factors for agriculture and aquaculture

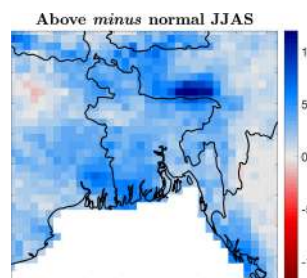
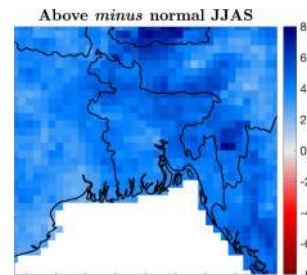
Sub-seasonal metrics

Number and intensity of heavy rainfall events

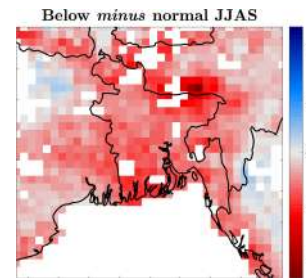
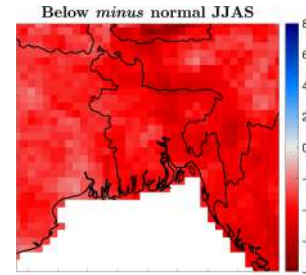
Climatology JJAS



Rainy years



Dry years



Analysis



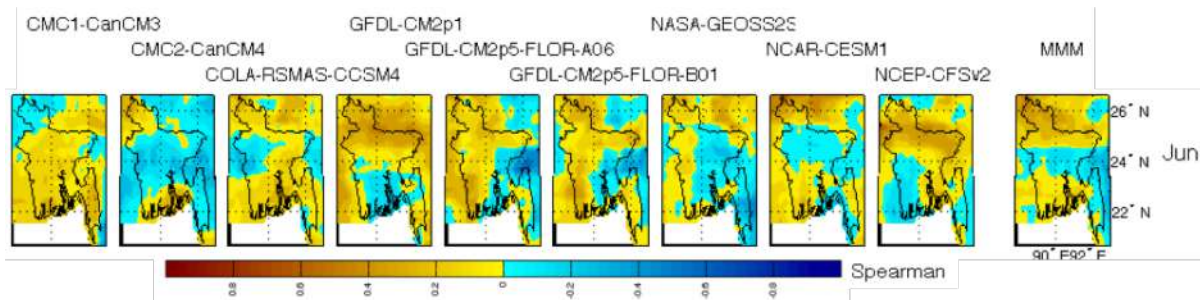
Climate to weather

Years of above/below normal rainfall

Possible to be inferred from seasonal forecasting

NMME models:

JJAS rainfall, 1 month lead time



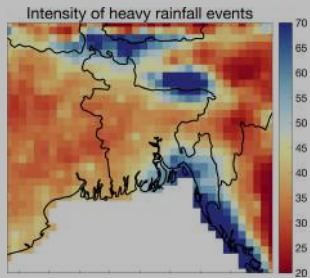
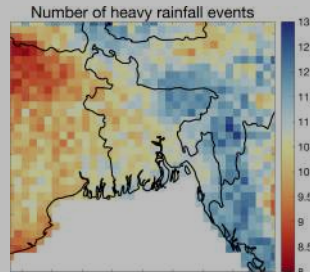
Strategy

Identification and characterization of weather-related risk factors for agriculture and aquaculture

Sub-seasonal metrics

Number and intensity of heavy rainfall events

Climatology JJAS

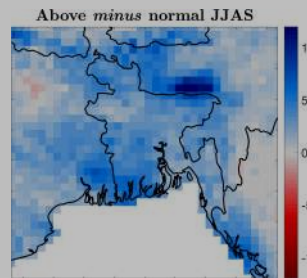
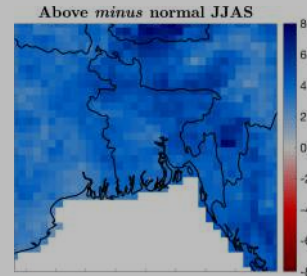


Analysis

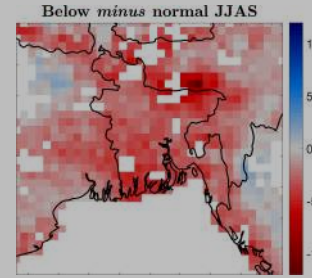
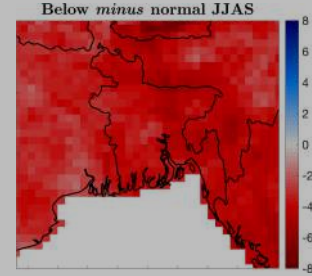


Climate to weather

Rainy years



Dry years

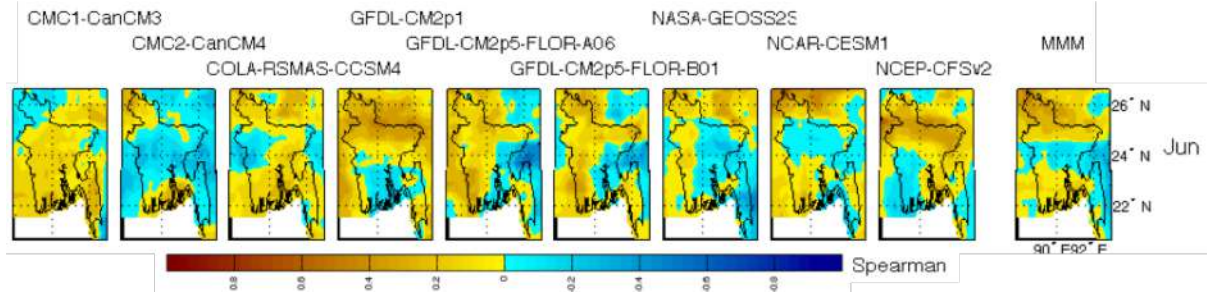


Years of above/below normal rainfall

Possible to be inferred from seasonal forecasting

Example of available forecasts

NMME models:
JJAS rainfall, 1 month lead time



Strategy

Identification and characterization of weather-related risk factors for agriculture and aquaculture

Number and intensity of heavy rainfall events

Sub-seasonal metrics

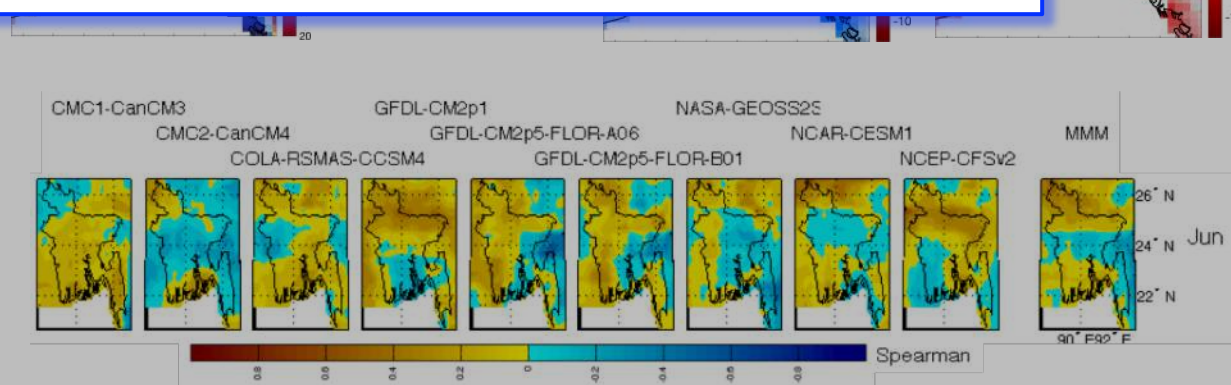
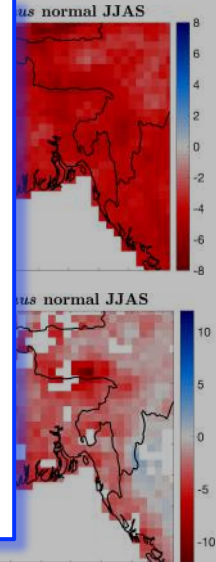
Climatology JJAS

Rainy years

Dry years

Based on local needs and climatological analysis of risk factors:

- Identification of management practices sensitive to weather
- Weather-related risks for study locations identified for forecasting
- Weather-to-seasonal forecasting evaluated
 - Sources (NMME, NOAA-GEFS, observed covariability,...)
 - Skill assessment (weather, seasonal)
- Design of climate services for agriculture and aquaculture



NMME models:
JJAS rainfall, 1 month lead time

Years of above/normal
Possible to be in
forecasting

Activities in Bangladesh

Identifying farm and fisheries relevant information to tailor climate services

- Demand driven climate services designed by partner institutions
- Appropriate information, lead times and uncertainty

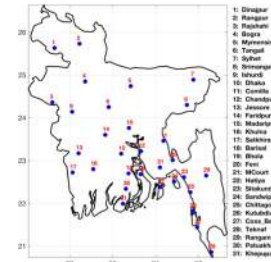


Climate analytics of historical data

- Incidence of weather-related risks
- Partnership with BMD and IRI ACToday
 - Access to historical data and forecasting

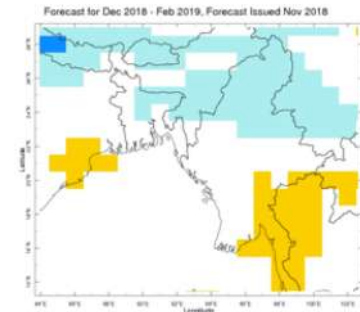
Forecasts, advisory and early warning products

- Weather, sub-seasonal, seasonal
- BMD, IRI ACToday



Communicating the project findings

- Stakeholders workshops with regional partner institutions
- Training modules for forecast interpretation



Activities in Bangladesh

Identifying farm and fisheries relevant information to tailor climate services

- Demand driven climate services designed by partner institutions
- Appropriate information, lead times and uncertainty

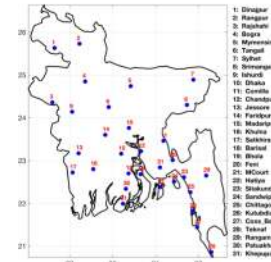


Climate analytics of historical data

- Incidence of weather-related risks
- Partnership with BMD and IRI ACToday
 - Access to historical data and forecasting

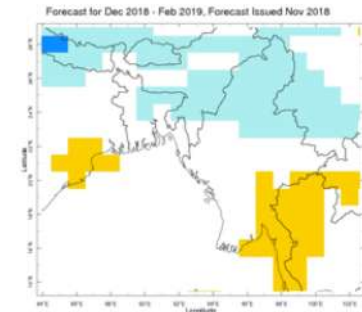
Forecasts, advisory and early warning products

- Weather, sub-seasonal, seasonal
- BMD, IRI ACToday



Communicating the project findings

- Stakeholders workshops with regional partner institutions
- Training modules for forecast interpretation



Activities in Bangladesh

Identifying farm and fisheries relevant information to tailor climate services

- Demand driven climate services designed by partner institutions
- Appropriate information, lead times and uncertainty

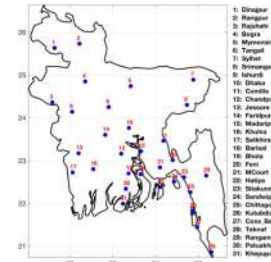


Climate analytics of historical data

- Incidence of weather-related risks
- Partnership with BMD and IRI ACToday
 - Access to historical data and forecasting

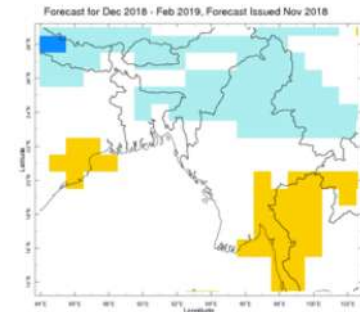
Forecasts, advisory and early warning products

- Weather, sub-seasonal, seasonal
- BMD, IRI ACToday



Communicating the project findings

- Stakeholders workshops with regional partner institutions
- Training modules for forecast interpretation



Activities in Bangladesh

Identifying farm and fisheries relevant information to tailor climate services

- Demand driven climate services designed by partner institutions
- Appropriate information, lead times and uncertainty

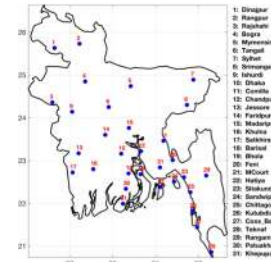


Climate analytics of historical data

- Incidence of weather-related risks
- Partnership with BMD and IRI ACToday
 - Access to historical data and forecasting

Forecasts, advisory and early warning products

- Weather, sub-seasonal, seasonal
- BMD, IRI ACToday



Communicating the project findings

- Stakeholders workshops with regional partner institutions
- Training modules for forecast interpretation

