

# Value addition for sector-specific impact products



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**9th RIMES Council Meeting**  
**23rd August 2017,**  
**Port Moresby, Papua new Guinea**



SESAME

Specialized Expert System for Agro-Meteorological Early Warning for Climate Resilient Agriculture



# SESAME

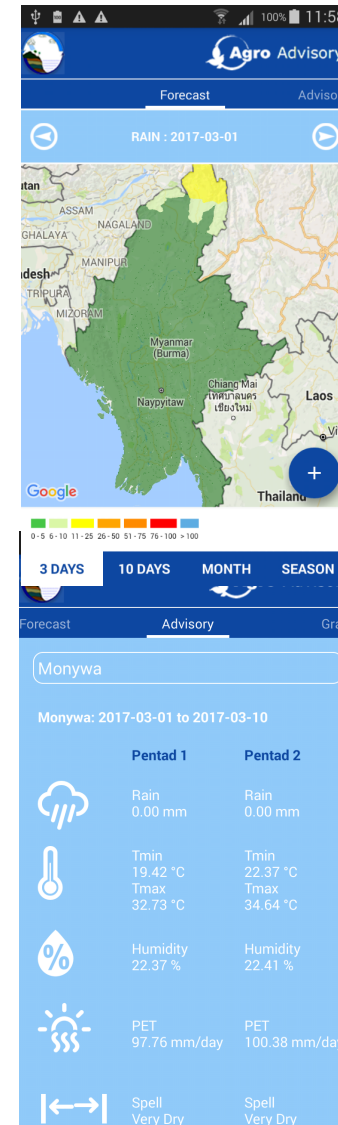


- Dynamic Crop information panel for expert users
- Weather bulletins for Pentads, monthly and seasonal outlooks
- Real time verification of forecast products
- Generate Contingency plan
- Prepare your own crop specific advisory



# SESAME – Specialized Expert System for Agro-Meteorological Early Warning for Climate Resilient Agriculture

- Dissemination of information
  - Email service
  - SMS service, through gateways
  - Fax service
- Mobile application
  - Android version - Beta

**Agro Advisory**

Forecast Advisory

RAIN : 2017-03-01

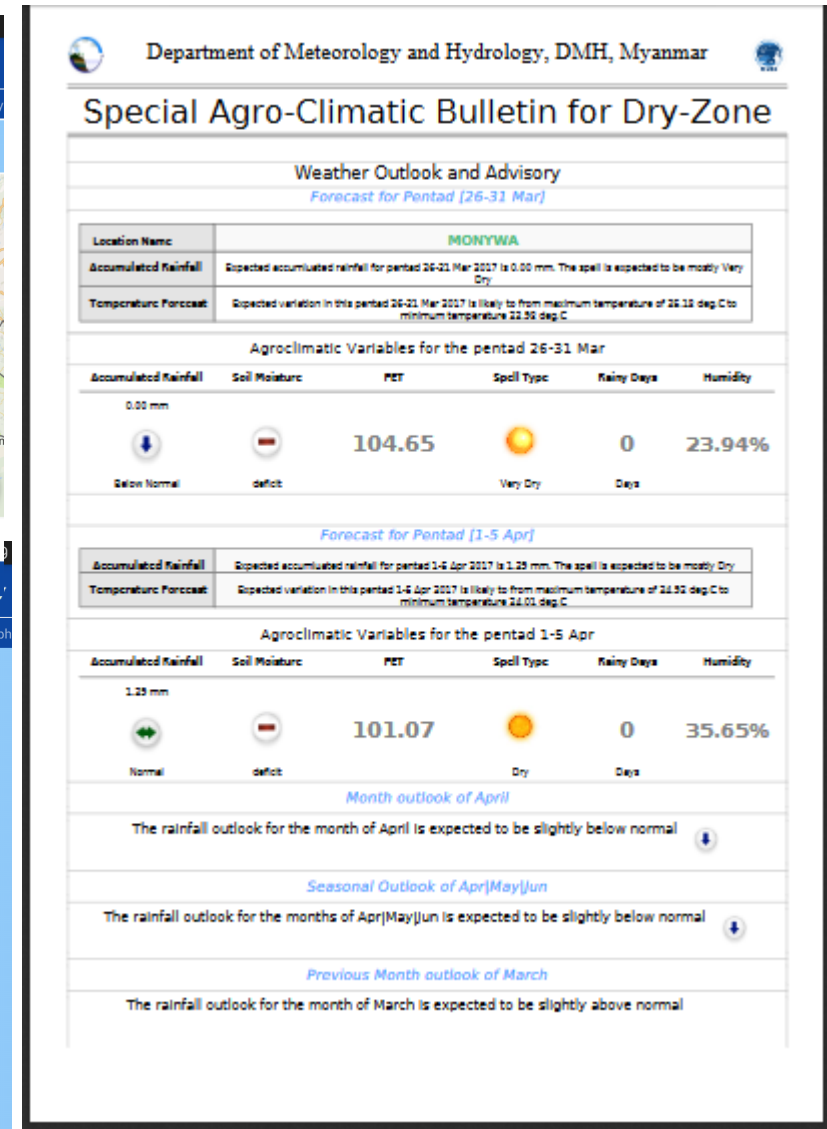
3 DAYS 10 DAYS MONTH SEASON

Forecast Advisory Graph

Monywa

Monywa: 2017-03-01 to 2017-03-10

	Pentad 1	Pentad 2
	Rain 0.00 mm	Rain 0.00 mm
	Tmin 19.42 °C Tmax 32.73 °C	Tmin 22.37 °C Tmax 34.64 °C
	Humidity 22.37 %	Humidity 22.41 %
	PET 97.76 mm/day	PET 100.38 mm/day
	Spell Very Dry	Spell Very Dry



Department of Meteorology and Hydrology, DMH, Myanmar

## Special Agro-Climatic Bulletin for Dry-Zone

Weather Outlook and Advisory  
Forecast for Pentad [26-31 Mar]

Location Name	MONYWA
Accumulated Rainfall	Expected accumulated rainfall for pentad 26-31 Mar 2017 is 0.00 mm. The spell is expected to be mostly Very Dry
Temperature Forecast	Expected variation in this pentad 26-31 Mar 2017 is likely to from maximum temperature of 26.10 deg C to minimum temperature 21.90 deg C

Agroclimatic Variables for the pentad 26-31 Mar

Accumulated Rainfall	Soil Moisture	PET	Spell Type	Rainy Days	Humidity
0.00 mm		104.65		0	23.94%
Below Normal	deficit		Very Dry	Days	

Forecast for Pentad [1-5 Apr]

Accumulated Rainfall	Expected accumulated rainfall for pentad 1-5 Apr 2017 is 1.29 mm. The spell is expected to be mostly Dry
Temperature Forecast	Expected variation in this pentad 1-5 Apr 2017 is likely to from maximum temperature of 24.90 deg C to minimum temperature 21.00 deg C

Agroclimatic Variables for the pentad 1-5 Apr

Accumulated Rainfall	Soil Moisture	PET	Spell Type	Rainy Days	Humidity
1.29 mm		101.07		0	35.65%
Normal	deficit		Dry	Days	

Month outlook of April

The rainfall outlook for the month of April is expected to be slightly below normal

Seasonal Outlook of Apr|May|Jun

The rainfall outlook for the months of Apr|May|Jun is expected to be slightly below normal

Previous Month outlook of March

The rainfall outlook for the month of March is expected to be slightly above normal



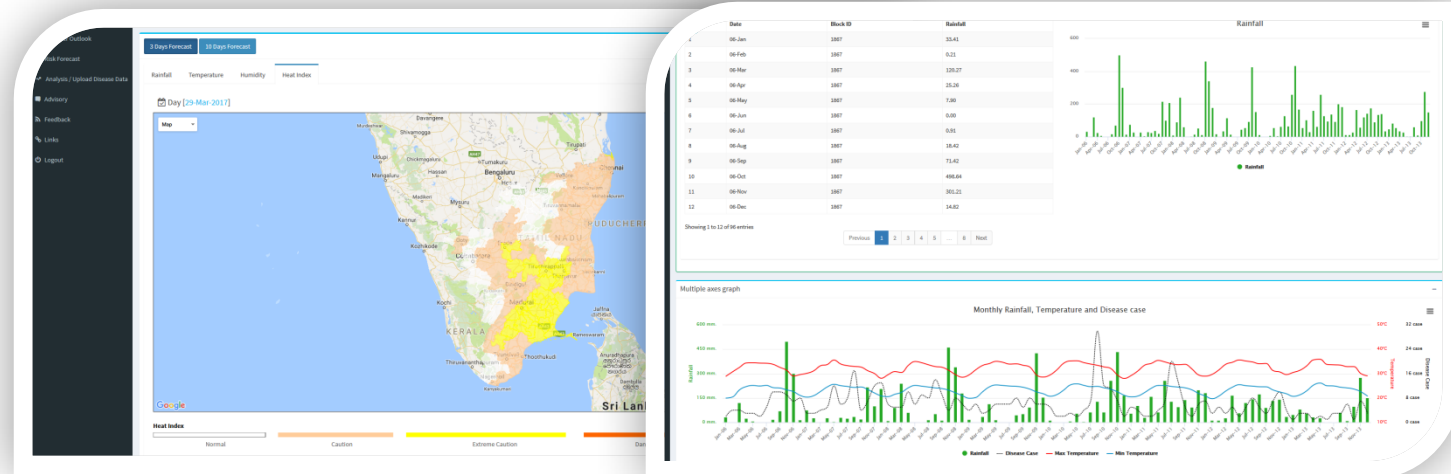
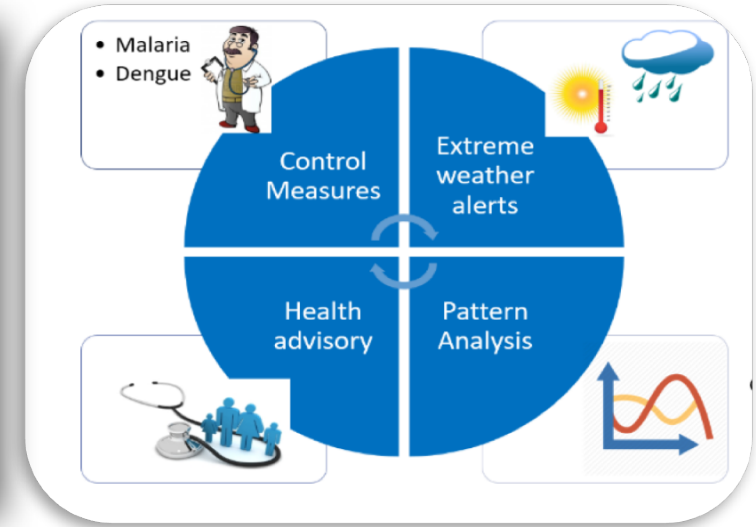
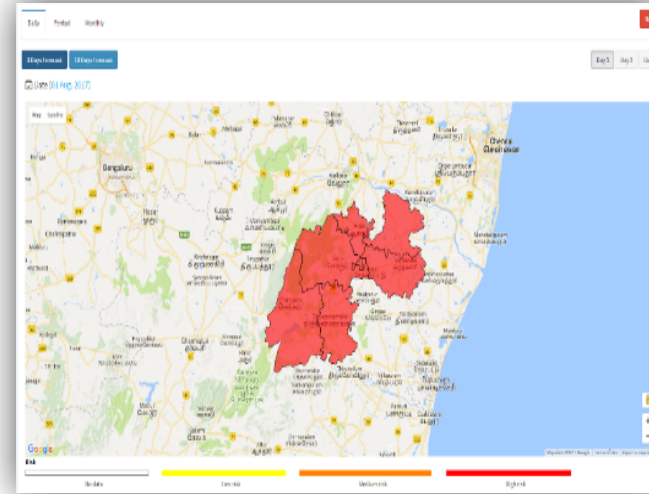
Climate Risk Information System for public Health



# CRISH



- Portal for public health warning information
- Extreme heat indicators,
- Building Correlation-disease pattern and weather conditions
- Risk based information for Malaria and Dengue spreading
  - piloted in two districts in Tamil Nadu, India
  - At taluk level
- Generation of health Advisories





# SMART – System for Multi-Hazard potential impact Assessment and Emergency Response Tracking



- Integrated platform for Disaster response
- Block level Disaster profiles
- Assessment of historical disaster events
- Real time monitoring of weather parameters
- Short- medium range forecast and extreme event alerting
- Analysis – Evaluation of forecast performance
- Generation of risk information based on weather forecast at different time scales
- Integration of EDEN SAHANA for response and resource allocation – **work under progress**

8/23/17

RIMES Council

System for Multi-Hazard Potential Impact Assessment and Emergency Response Tracking (SMART)

Hazard Profile

- Flood
- Flash Flood
- Drought
- Tropical Cyclone
- Land Slides
- Heat Waves
- Heavy Rain
- Strong Wind

Year	Houses Destroyed	Houses Damaged	Crop Damaged	Road Damaged	People Dead	People Injured	People Missing	People Affected	People Relocated	People Evacuated	Hospitals Affected	Education Center Affected
1977	18326	19566	1305	24470	89	0	300	8247	0	0	0	7
1978	135	30	50	1000	11	0	0	28	0	0	0	0
1979	1755	4561	0	0	0	0	0	16	0	0	0	0
1981	11	0	0	0	4	0	0	0	0	0	0	0
1982	31	1	0	0	2	0	0	0	0	0	0	0
1983	2045	3168	3	800	0	0	0	1500	0	1300	0	0
1984	4954	4467	32000	0	15	0	0	4000	0	0	0	0
1985	89	69	0	0	40	103	0	3006	0	0	0	0
1986	85	93	0	0	0	0	0	0	0	0	0	0
1987	54	578	0	0	0	3	0	0	0	0	0	0
1988	3	6	0	0	0	0	0	0	0	0	0	0
1989	39	3	0	0	0	0	0	0	0	0	0	0
1990	86	170	0	318800	0	0	0	19	0	19	0	0
1991	166	634	0	555800	2	0	0	55	0	0	0	0
1992	3801	4474	321615	774425	22	254	0	3755	2000	2200	3	4
1993	7581	50176	0	540200	2	15	0	569	0	0	0	0
1994	1460	6890	0	212200	4	0	0	2	0	0	0	0
1995	58	405	0	207600	2	0	0	0	0	0	0	0

Forecast

EDMWF WORK IN PROGRESS

Rainfall Temperature Humidity

Day [ From 26-Mar-17 To 06-Apr-17 ]

Hazard Risk Map

Map is under Progress



# Flood Forecast and Advisory System



# RIMES Flood Advisory Systems

RIMES support member countries to develop and enhance:

- Medium range (1-10 days) flood forecast
- Flash Flood Guidance System
- Long range (1-3 month) hydrological outlook

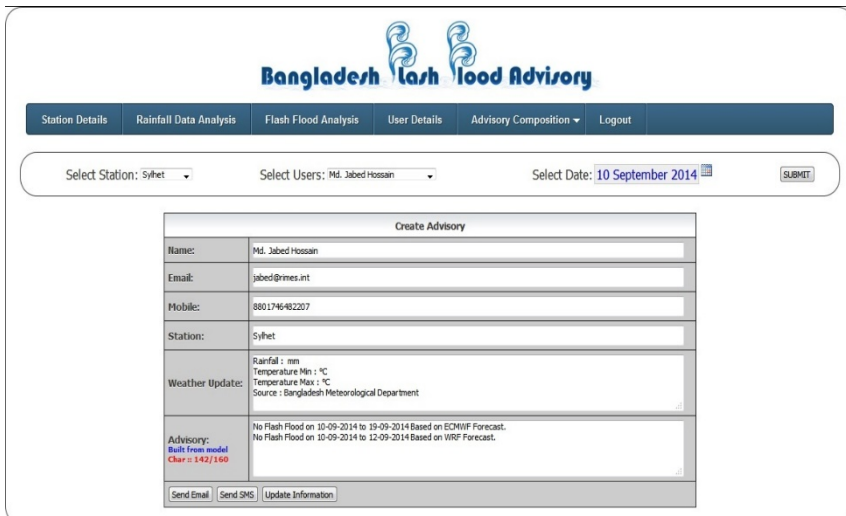


# Water Sector Operational Systems

- **Bangladesh** – 10 days flood forecast, flash flood forecast, seasonal flow outlook
- **Myanmar** – 72 hours flood forecast
- **Nepal** – 72 hours flood forecast
- **Philippines** – 72 hours flood forecast
- **Sri Lanka** – 72 hours flood forecast, reservoir management tool

# Flash Flood Warning and advisory System

- 1) Based on 72 hours downscaled WRF Forecast
- 2) 10 Days Deterministic ECMWF forecast
- 3) Threshold based approach



**Bangladesh Flash Flood Advisory**

Station Details | Rainfall Data Analysis | Flash Flood Analysis | User Details | Advisory Composition | Logout

Select Station: Sylhet | Select Users: Md. Jabed Hossain | Select Date: 10 September 2014

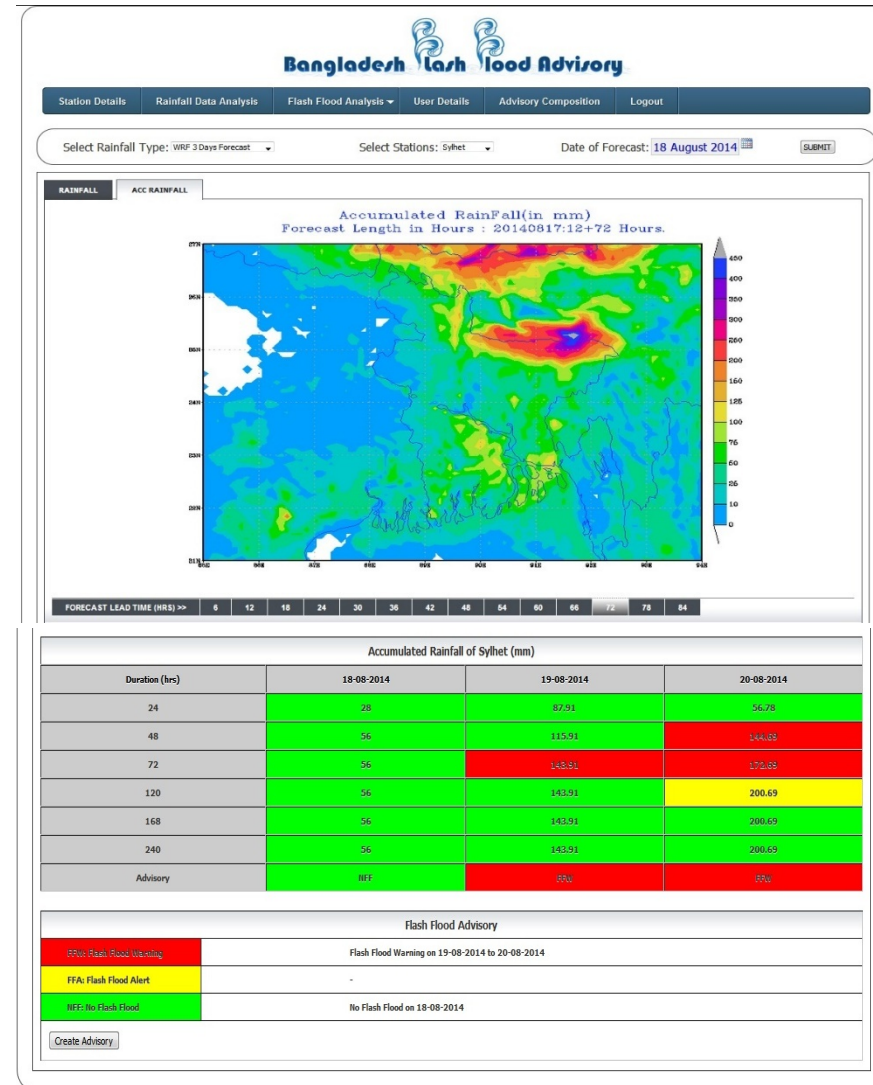
**Create Advisory**

Name: Md. Jabed Hossain  
 Email: jabed@rimes.int  
 Mobile: 8801746482207  
 Station: Sylhet

Weather Update:  
 Rainfall : mm  
 Temperature Min : °C  
 Temperature Max : °C  
 Source : Bangladesh Meteorological Department

Advisory:  
 Built from model  
 Char : 1427190  
 No Flash Flood on 10-09-2014 to 19-09-2014 Based on ECMWF Forecast.  
 No Flash Flood on 10-09-2014 to 12-09-2014 Based on WRF Forecast.

Send Email | Send SMS | Update Information





# Myanmar Flood Advisory System

[http://203.159.16.215/myanmar\\_flood/index.php/home](http://203.159.16.215/myanmar_flood/index.php/home)

72-hours lead time flood forecast operational for Ayeyarwady, Chindwin and Sittaung rivers

Hydrological stations: ▲ Normal ▲ Warning ▲ Danger ▲ Forecast not available

### Information

Chindwin Basin | **Ayeyarwady Basin** | Sittaung Basin

Day [ From 21-Aug-2017 To 23-Aug-2017 ] Day 1 | Day 2 | Day 3

Station	Status	Forecasted Flow Q (m3/s)	Forecasted Water Level H (m)	Warning Water Level H (m)	Danger Water Level H (m)
Myitkyina	▲ Below Warning Level	8518.00	6.15	11.00	12.00
Katha	▲ Above Warning Level	15566.00	9.99	9.40	10.40
Sagaing	▲ Above Danger Level	26476.00	11.83	10.50	11.50
NyaungOo	▲ Above Warning Level	30272.00	20.70	20.20	21.20
Chauk	▲ Below Warning Level	27236.00	12.81	13.50	14.50
Magway	▲ Below Warning Level	28965.00	14.49	16.00	17.00
Aunglan	▲ Below Warning Level	30833.00	23.25	24.50	25.50
Pyay	▲ Below Warning Level	32829.00	27.08	28.00	29.00
Seiktha	▲ Below Warning Level	31656.00	10.51	11.00	12.00
Zalun	▲ Above Warning Level	28106.00	11.12	10.60	11.60
Thabeikyin	▲ Above Danger Level	21664.00	14.68	10.40	11.60



# Nepal Flood Advisory System

[http://203.159.16.215/nepal\\_flood/index.php/home](http://203.159.16.215/nepal_flood/index.php/home)

72-hours lead time flood forecast operational for Narayani, Karnali and Babai rivers

Dashboard

HYDROLOGICAL FORECAST RAINFALL FORECAST

Hydrological stations: ▲ Normal gage height ▲ Warning gage height ▲ Danger gage height ▲ Forecast not available

Hydrological stations: ▲ Normal water level ▲ Warning water level ▲ Danger water level ▲ Forecast not available

Hydrological stations: ▲ Normal gage height ▲ Warning gage height ▲ Danger gage height ▲ Forecast not available

**Information**

Day [ From 31-Mar-2017 To 02-Apr-2017 ]

Station	Day 1	Day 2	Day 3	Estimated Discharge Q (m3/s)	Estimated Gage Height H (m)	Warning Gage Height (H)	Danger Gage Height (H)	Notes
Betrawoti	▲ Below Warning Level	▲	▲	55.00	1.18	4.50	4.90	
Devghat	▲ Below Warning Level	▲	▲	249.00	0.95	7.70	8.70	
Jomsom	▲ Below Warning Level	▲	▲	11.00	1.18	4.10	5.10	
Kumalgaun	▲ Below Warning Level	▲	▲	77.00	1.17	7.80	8.80	
Asaraghat	▲ Below Warning Level	▲	▲	427.00	2.23	6.10	6.50	
Chisapani	▲ Below Warning Level	▲	▲	482.00	3.60	11.90	12.90	
Samajighat	▲ Below Warning Level	▲	▲	41.00	1.35	7.30	7.80	
Humlakarnali	▲ Below Warning Level	▲	▲	398.00	2.91	4.60	5.60	
Thulobheri	▲ Below Warning Level	▲	▲	41.00	1.37	5.80	6.80	
Bheri	▲ Below Warning Level	▲	▲	482.00	3.34	5.50	6.50	
Chepang	▲ Below Warning Level	▲	▲	15.00	1.07	5.50	6.10	
Daredhunga	▲ Below Warning Level	▲	▲	1.00	0.68	5.50	6.10	



# Philippines Flood Advisory System

[http://203.159.16.215/philippines\\_flood/index.php/home](http://203.159.16.215/philippines_flood/index.php/home)

## Dashboard

72-hours lead time flood forecast functional for Agno, Pampanga and Pasig-Marikina rivers

Hydrological stations: ▲ Normal ▲ Warning ▲ Danger ▲ Forecast not available

**Select Basin & Station** Pampanga Arayat submit

STATION NAME Arayat Notes

Date	Qobs (m <sup>3</sup> /s)	Hobs (m)	Qfor (m <sup>3</sup> /s)	Hfor (m)	Qcorr (m <sup>3</sup> /s)	Hcorr (m)
07-Aug-2017	NA	NA	1079.00	7.46	NA	NA
08-Aug-2017	NA	NA	992.00	7.12	NA	NA
09-Aug-2017	NA	NA	862.00	6.55	NA	NA
10-Aug-2017	NA	NA	772.00	6.15	NA	NA
11-Aug-2017	NA	NA	658.00	5.59	NA	NA
12-Aug-2017	NA	NA	587.00	5.22	NA	NA
13-Aug-2017	NA	NA	636.00	5.47	NA	NA
14-Aug-2017	NA	NA	678.00	5.69	NA	NA
15-Aug-2017	NA	NA	623.00	5.40	NA	NA
16-Aug-2017	NA	NA	563.00	5.10	NA	NA
17-Aug-2017	NA	NA	506.00	4.77	NA	NA
18-Aug-2017	NA	NA	474.00	4.57	NA	NA
19-Aug-2017	NA	NA	540.00	4.98	NA	NA
20-Aug-2017	NA	NA	678.00	5.69	NA	NA

Date	Qfor (m <sup>3</sup> /s)	Hfor (m)	Qcorr (m <sup>3</sup> /s)	Hcorr (m)
21-Aug-2017	754.00	6.07	NA	NA
22-Aug-2017	732.00	5.97	NA	NA
23-Aug-2017	759.00	6.09	NA	NA



# Sri Lanka Flood Advisory System

[http://203.159.16.215/srilanka\\_flood/index.php/home](http://203.159.16.215/srilanka_flood/index.php/home)

- [Overview](#)
- [Observation](#)
- [Advisory](#)
- [Data Panel](#)
- [Climate Monitoring](#)
- [River Monitoring](#)
- [Flood Hazard Map](#)
- [Archive](#)
- [Logout](#)

HYDROLOGICAL FORECAST
RAINFALL FORECAST

Stations : ▲ Forecast Available ▲ Forecast not available [ ▲ Normal ▲ Warning ▲ Danger ]

Reservoirs : ■ Forecast Available ■ Forecast not available

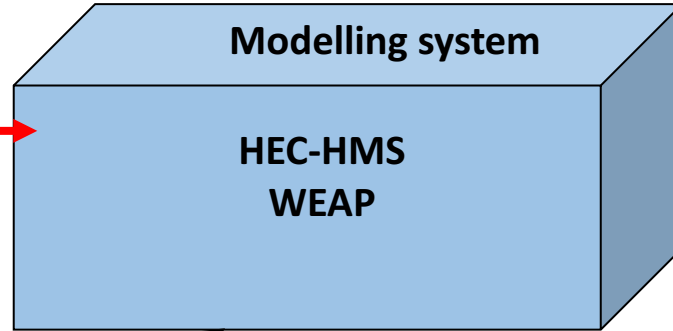
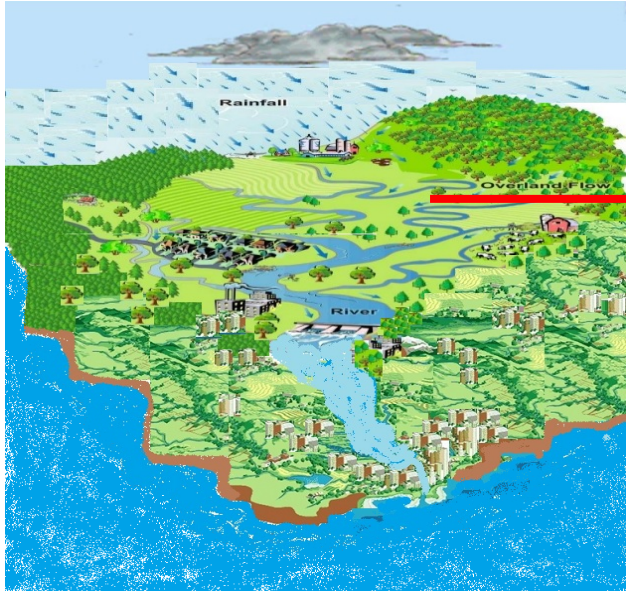
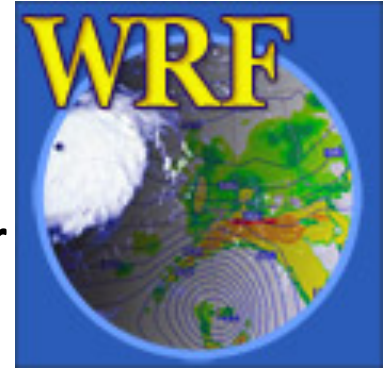
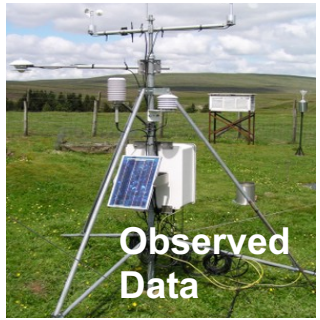
**Information**

Kirindi Basin

Day [ From 21-Aug-2017 To 23-Aug-2017 ] Day 1 Day 2 Day 3

Station	Flow Q (m3/s)	Reservoir	inflow (m3/s)	Storage (m)	Outflow (m3/s)
Wellawaya	0.60	Handapanagala	0.00	7.20	0.00
Tanamalwila	1.70				
Outlet	2.40				

# Reservoir Management System



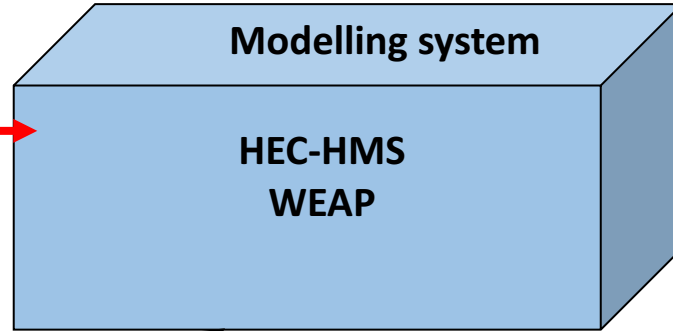
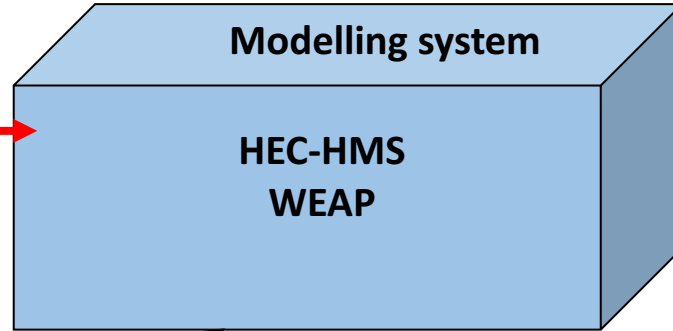
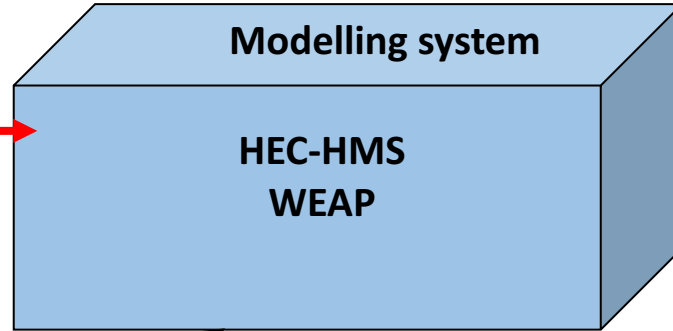
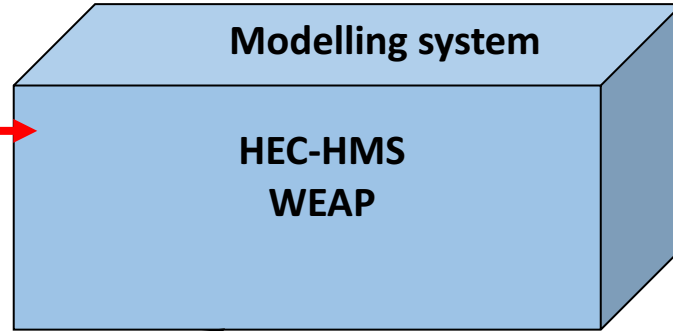
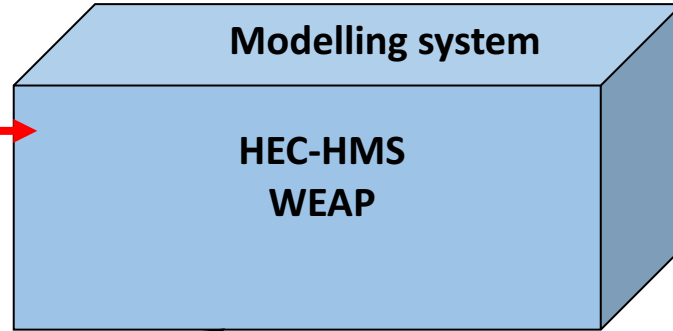
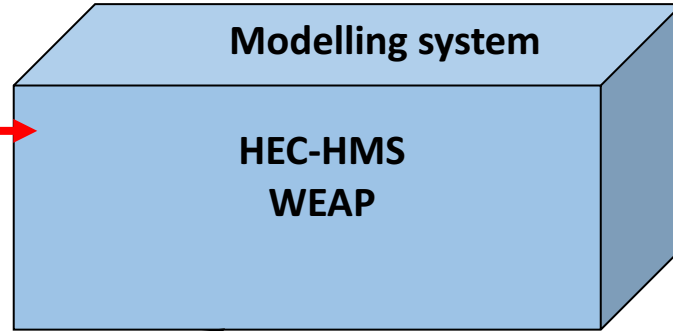
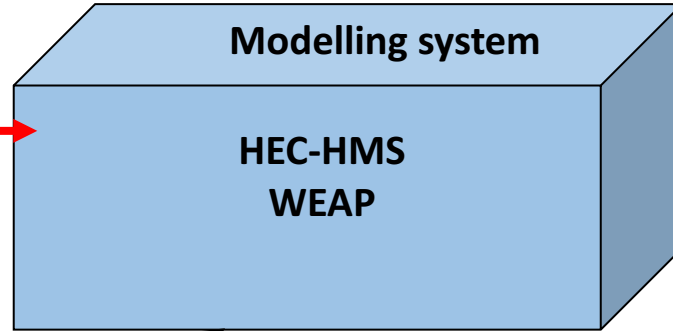
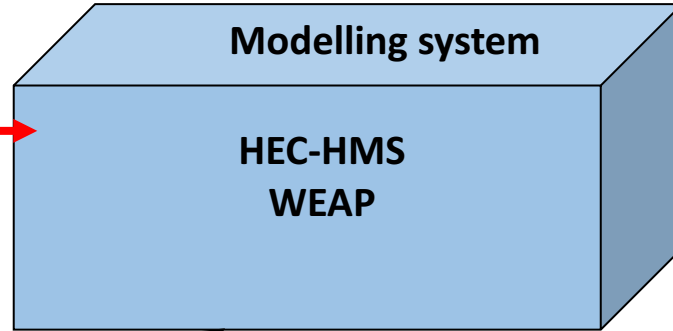
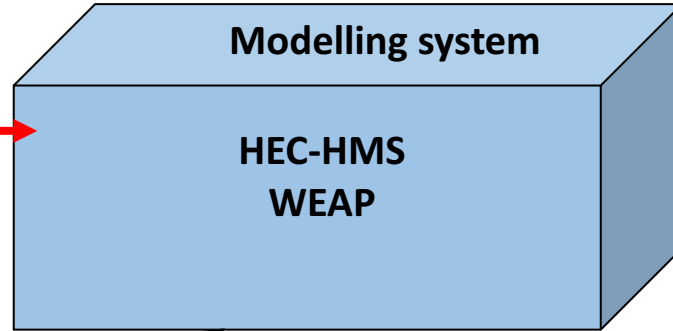
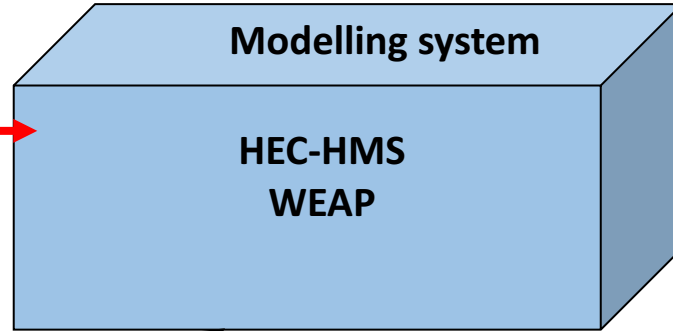
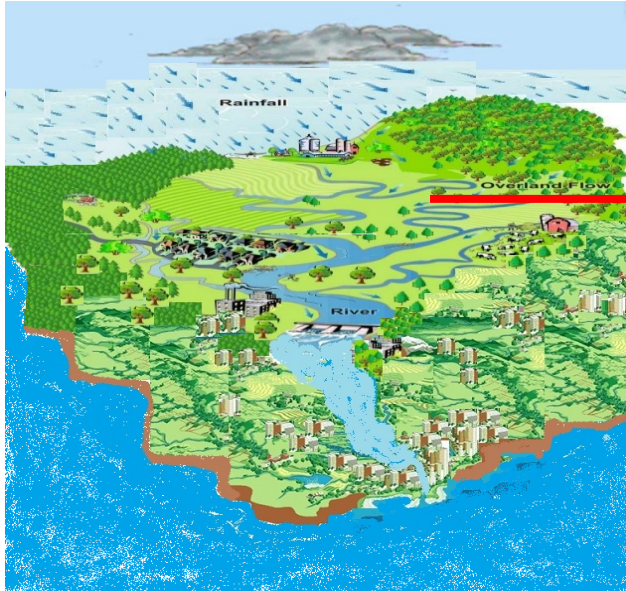
Weather Forecast



Instructions



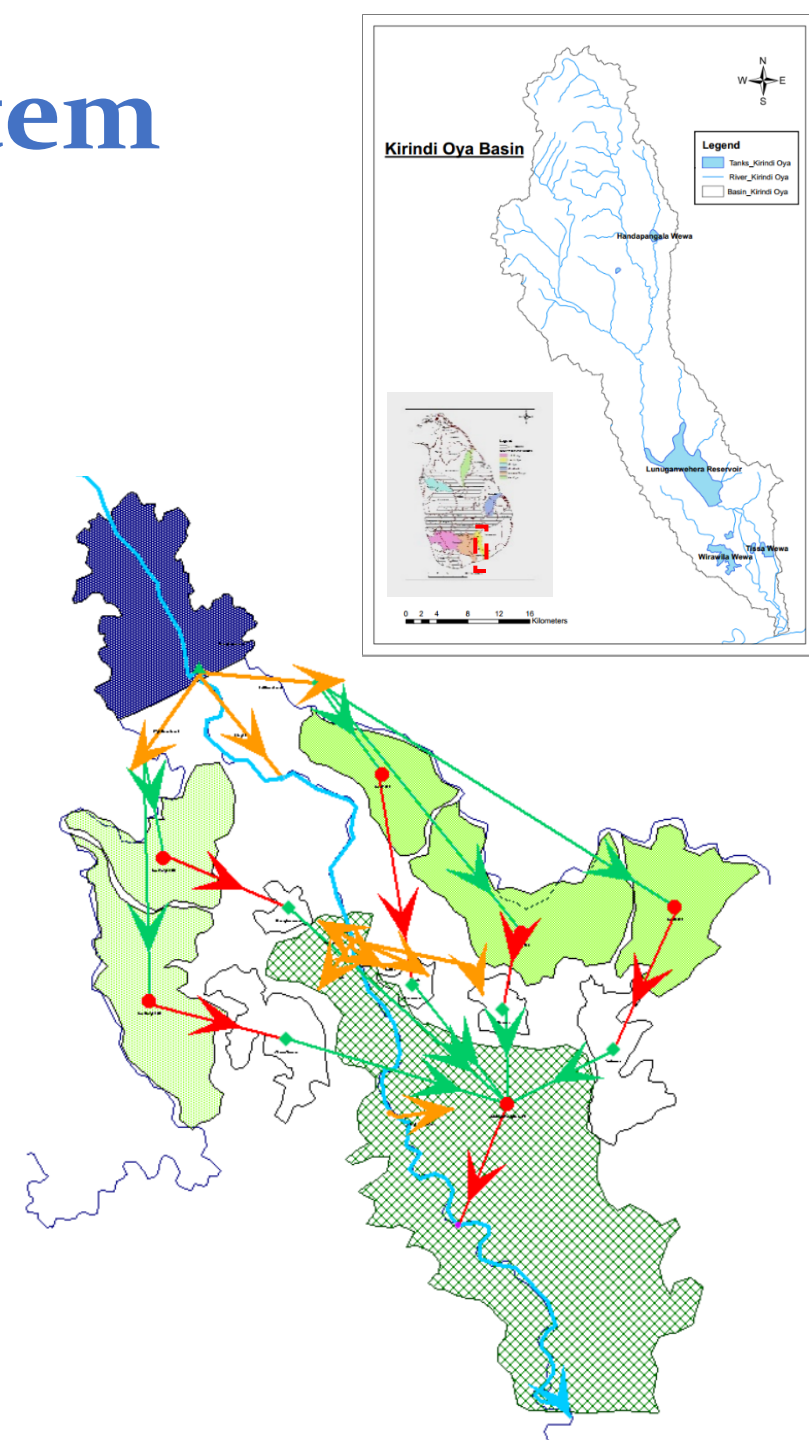
Reservoir release/  
Management Decisions



# Reservoir Management System

## Connect climate information with irrigation and agriculture in Kirindi Oya basin, Sri Lanka

- Provides a mechanism to issue timely flood warning and, a suitable institutional/coordination arrangement
- Improved reservoir operation and management plans, which incorporate and synchronize the role of large, medium and small water storages, to mitigate the impact of floods
- Enhance the capacity to operate reservoirs and manage the river basin with a flood management objective

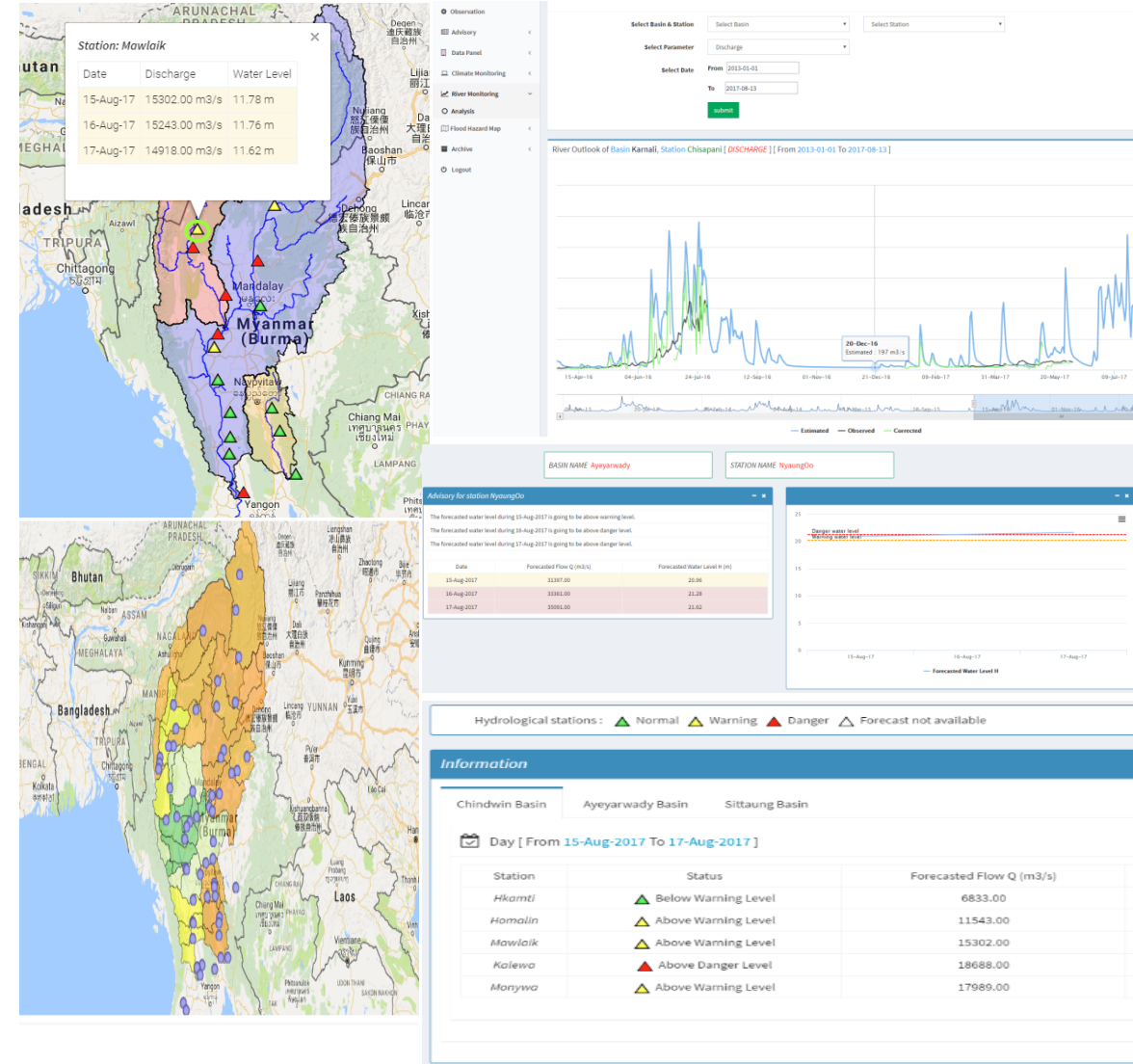




# Flood Forecasting System



- Web based Decision Support tool
- 72 hours lead time forecast for Water level and discharge for selected locations in the river basins
- Real time monitoring of the river situations and color-coded advisories for warning levels
- Flood Advisory generation and dissemination with mapping of flood risk for the selected locations in the river basins
- Hazard Map generation for different return period of flood hazards
- Warning message formulation and dissemination mechanism

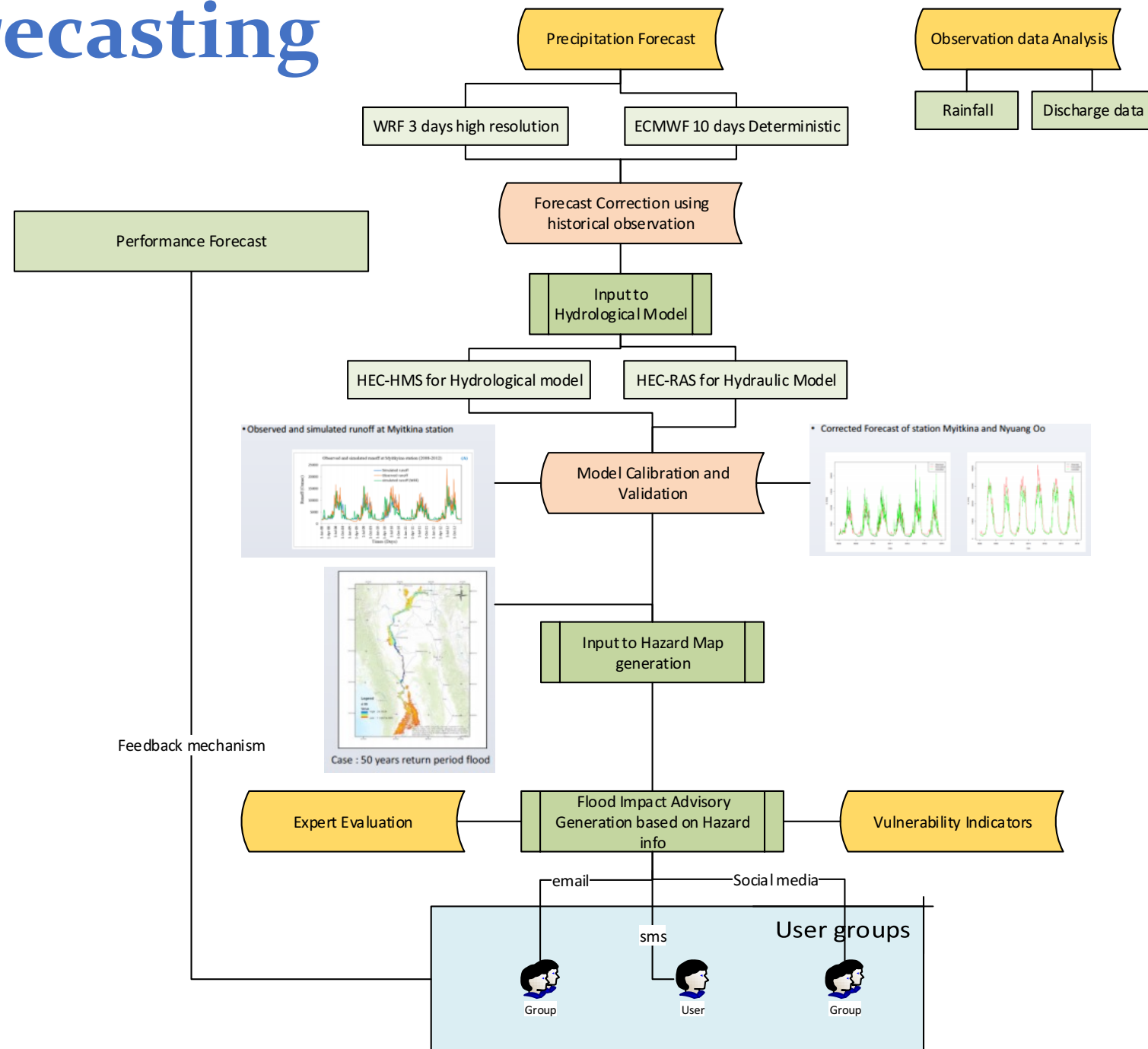




# Flood Forecasting System



## An Integrated Approach





Technical Capacity building

# Capacity Building on using the DSS and products

## RIMES Secondment Program

- Involve met services and users during the development process
- Capable of handling the system once it is transferred

## Training at Pilot Locations

- Train the real users on the usability of new product
- Train met services on product development



Training on development of tool at RIMES Office



Training to DMH Officers at DMH office



Training to stakeholders at Nyuang Oo on 7<sup>th</sup> September 2015



Training to stakeholder at Monywa on 8<sup>th</sup> September 2015

# Capacity building for Agro-Advisory Services

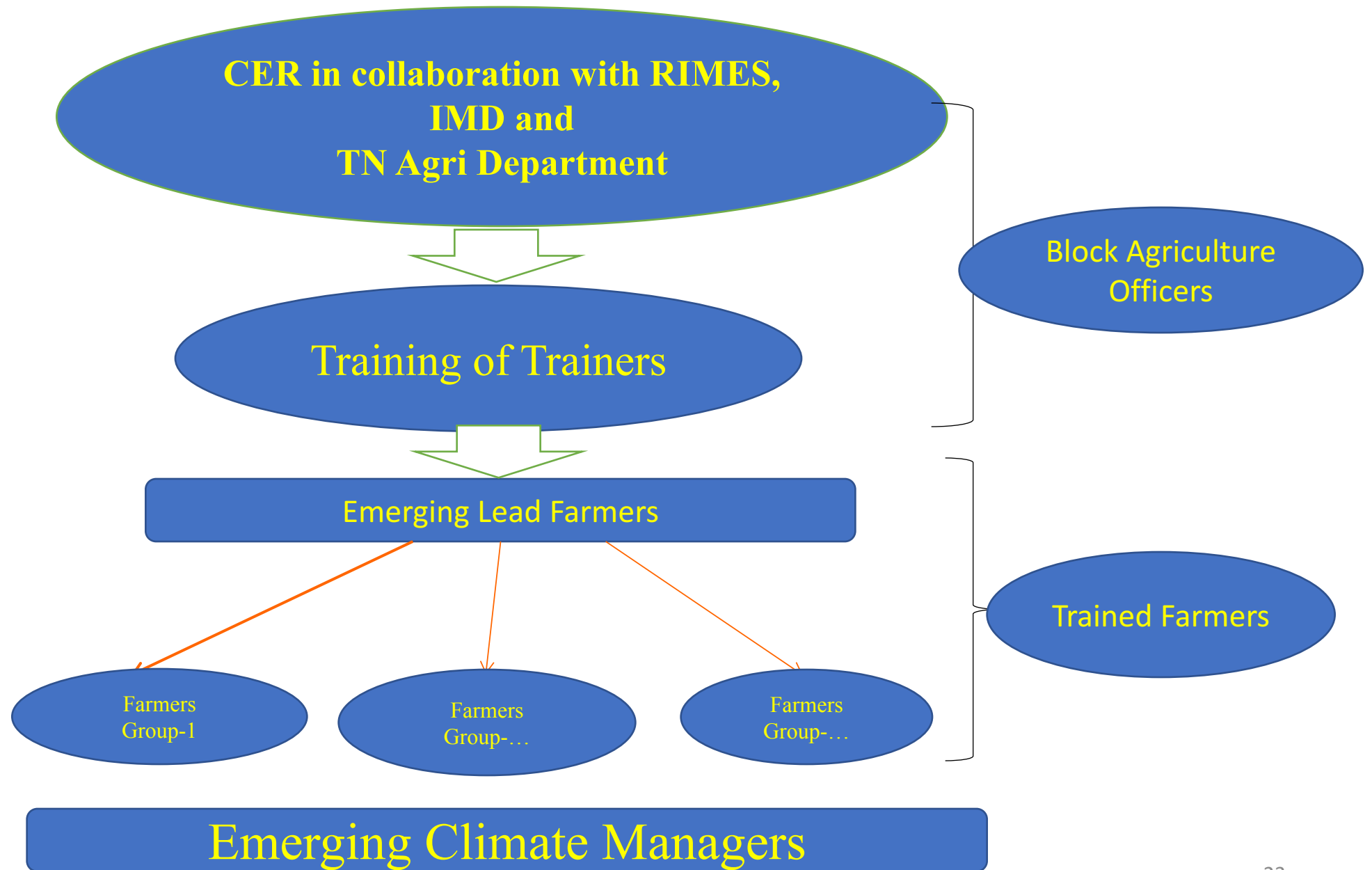
CRMFFS process provide customized modules for the Agriculture Department officials, extension workers and Farmers with help of local partners including NMHSs, Agriculture Department and local NGOs.

**Goal:** Increased capacity of farmers to **understand the weather forecast** and make **use of it in their regular farming operations**.

**Objective:** To employ methodologies to make **scientific processes related to weather and climate understandable to farmers** and to enhance its utilization in regular farming



# Multi Cycle Training Approach (Example from India)

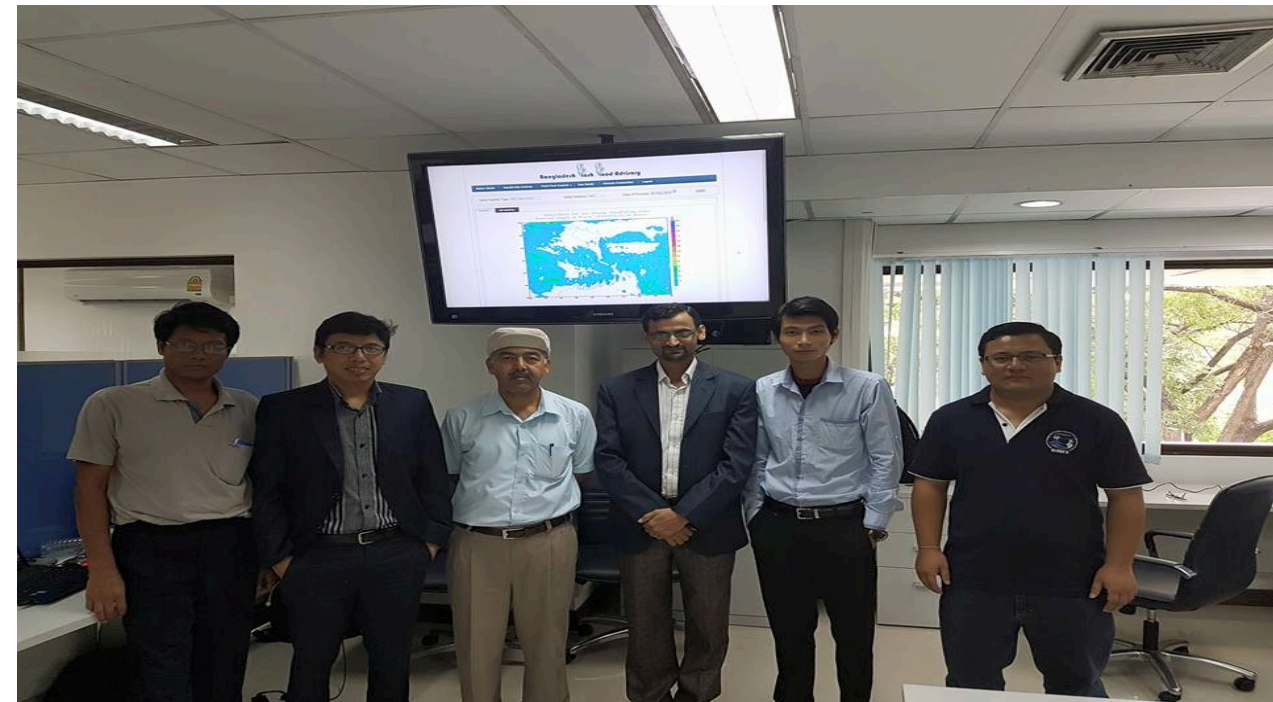


# Capacity Building on using the DSS and products





# Training and Capacity Building



# Training and Capacity Building



# Continuous Support

- 1) Continuous engagement
  - 1) with technical team with series of training
  - 2) Technology transferred
  - 3) Backup support to all activities irrespective of project period
- 2) Feedback on the effectiveness of the information
- 3) Research and development for further improvement

*As soon as I receive the forecast by SMS, I discuss with other members of UDMC and UP, and even share it with my children.*

*This year, we successfully used the forecast in preparing the seedbed for paddy.*

*- Md. Shahidul Islam*





Thank you