

# Status of Operational Flash Flood Forecasting & Early Warning System in Nepal

05 June, 2018

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Department of Hydrology and Meteorology (DHM)  
NEPAL

# Outline

- About Department of Hydrology and Meteorology
- Major Weather Influence in Nepal
- Weather Forecasting
- Flood Forecasting
- Early Warning Status

# About Department of Hydrology and Meteorology

- Established in 1988
- 246 Manpower
- 4 Division( Meteorological Forecasting Division, Flood Forecasting Division, Climate Division and Network and Supervision Unit
- 3 Basin offices and 3 Regional Offices
- Above 500 meteorological and above 200 hydrological station
- 16 Synoptic Station that reports through GTS
- About 100 real time rainfall station and around 75 real time river gauging station used in flood early warning

# Hydrometric Stations under Hydrology Division



## River Hydrology

P1/P2 stations = 83

P3 stations = 67

## Flood Forecasting

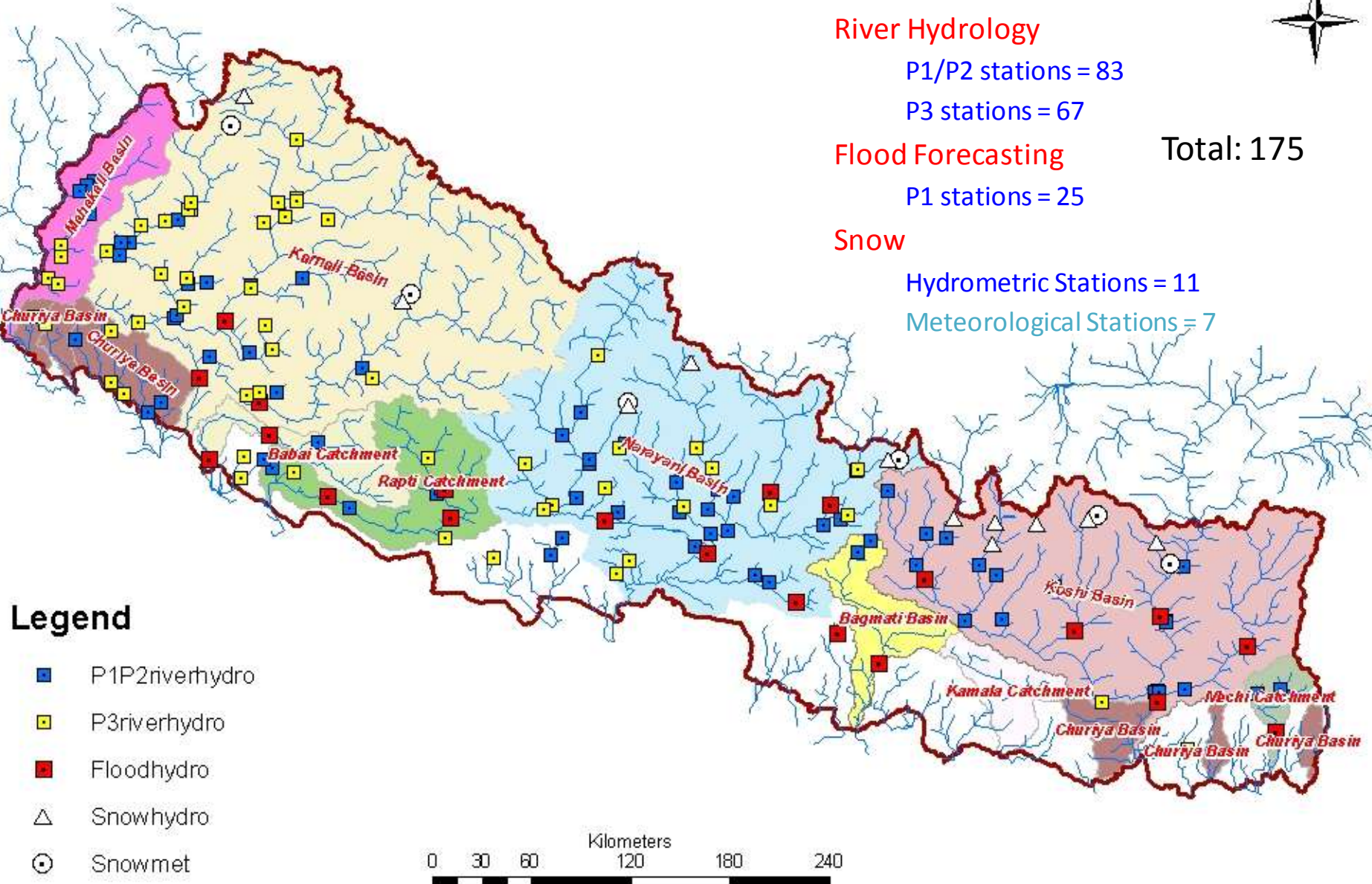
P1 stations = 25

## Snow

Hydrometric Stations = 11

Meteorological Stations = 7

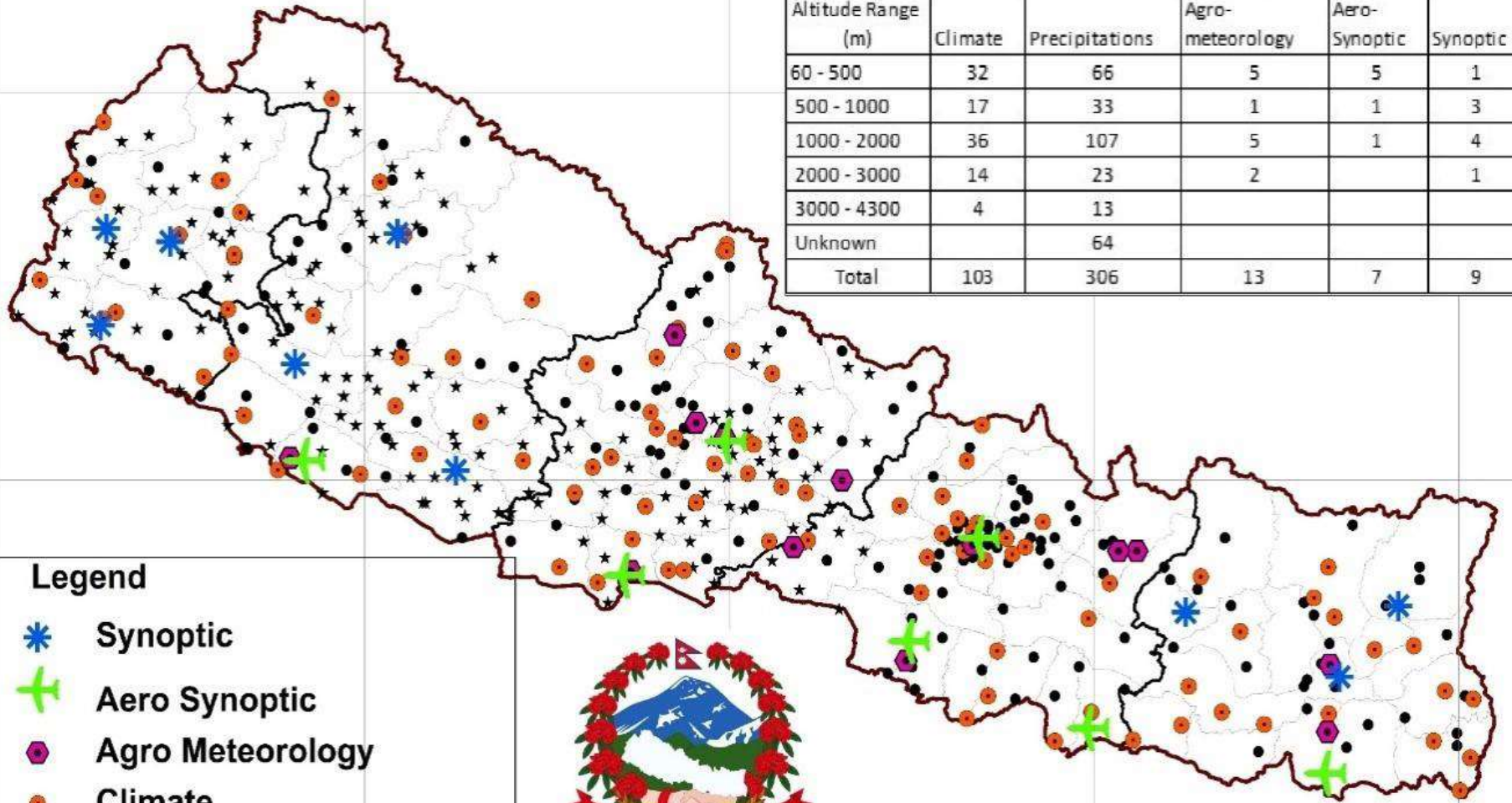
Total: 175








# METEOROLOGICAL STATIONS : NEPAL



Altitude Range (m)	Climate	Precipitations	Agro-meteorology	Aero-Synoptic	Synoptic
60 - 500	32	66	5	5	1
500 - 1000	17	33	1	1	3
1000 - 2000	36	107	5	1	4
2000 - 3000	14	23	2		1
3000 - 4300	4	13			
Unknown		64			
<b>Total</b>	<b>103</b>	<b>306</b>	<b>13</b>	<b>7</b>	<b>9</b>

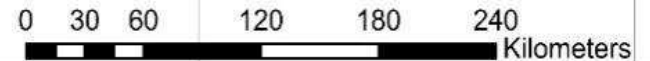


## Legend

-  Synoptic
-  Aero Synoptic
-  Agro Meteorology
-  Climate
-  Precipitation 1
-  Precipitation 2

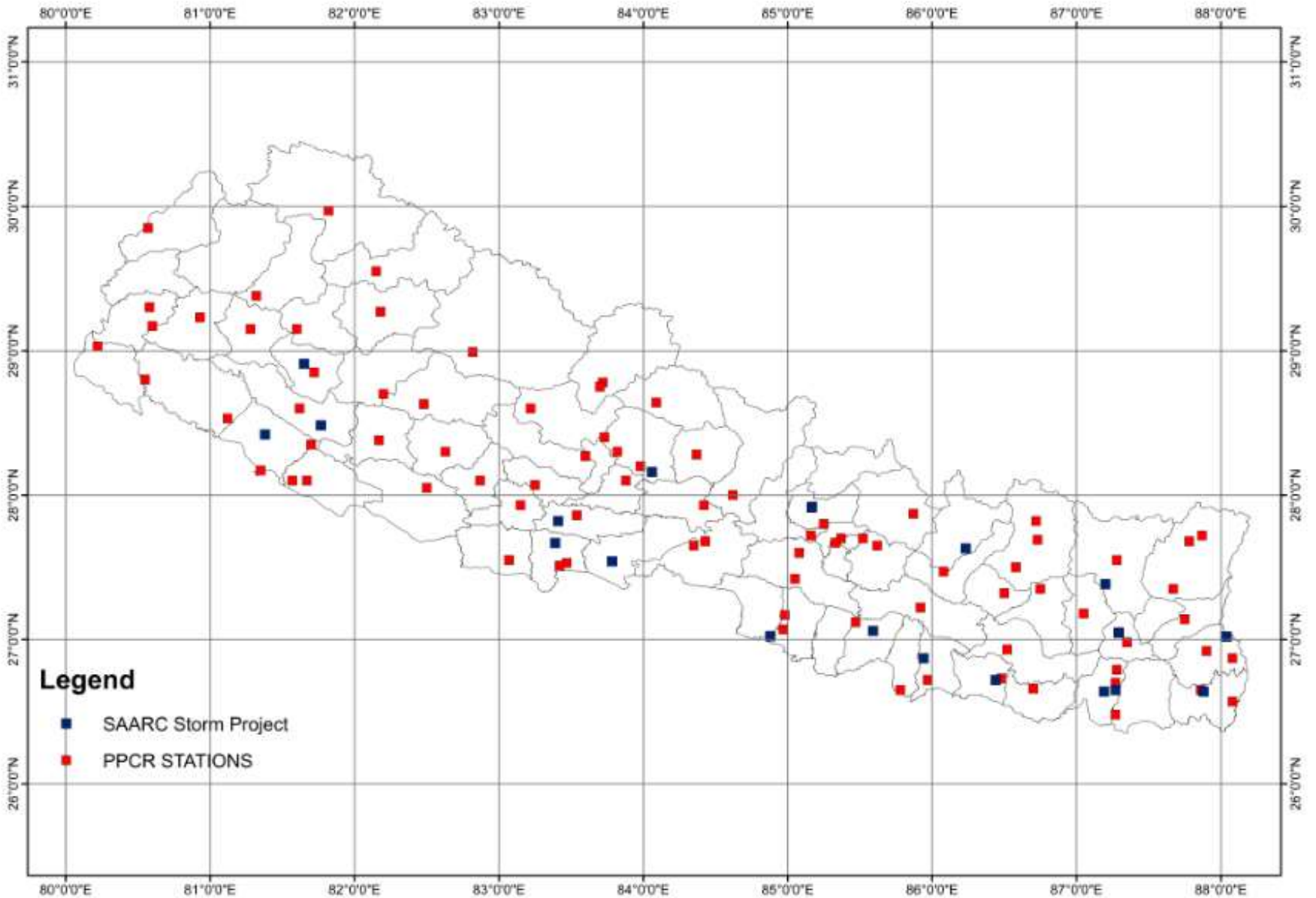


Government of Nepal  
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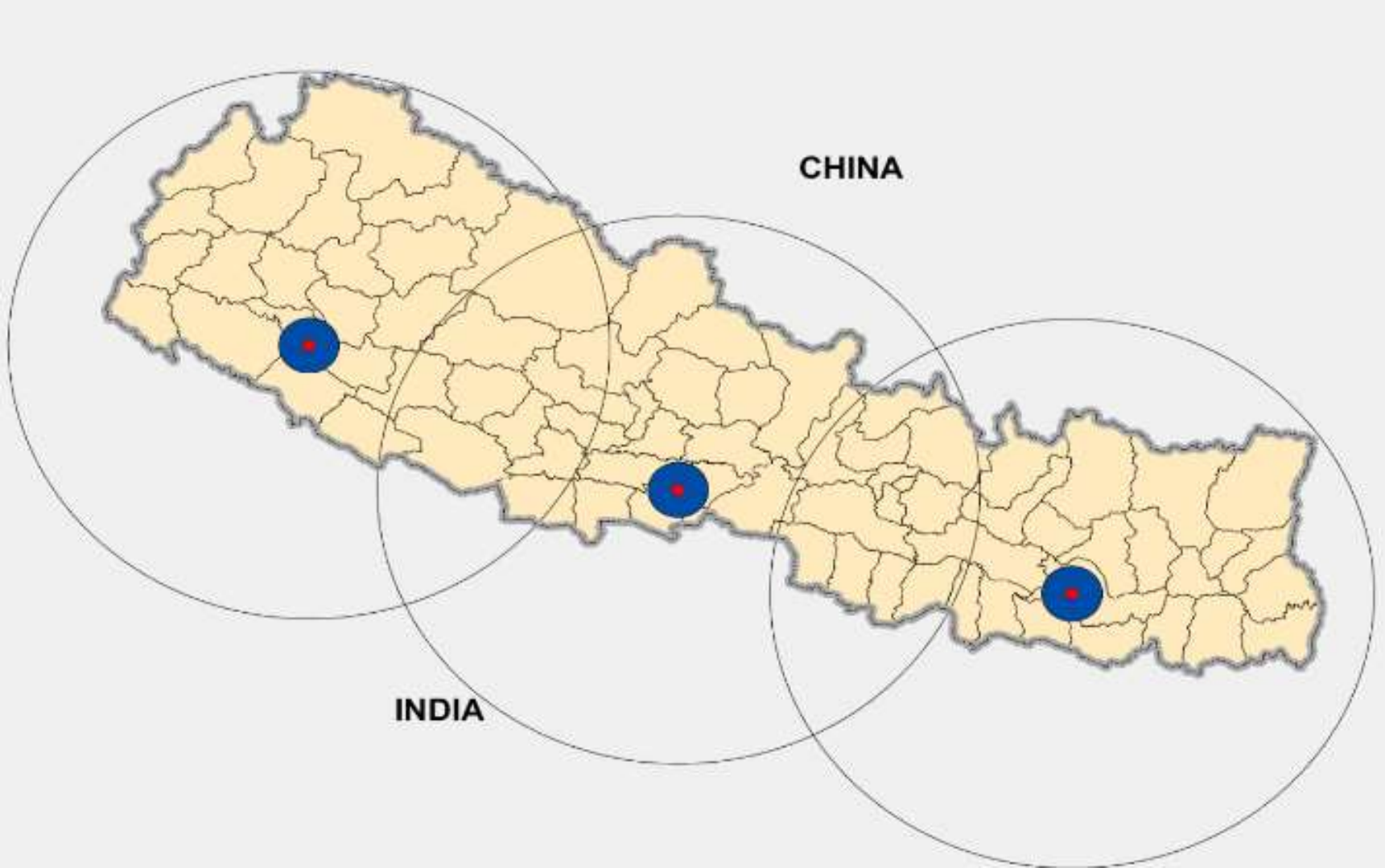




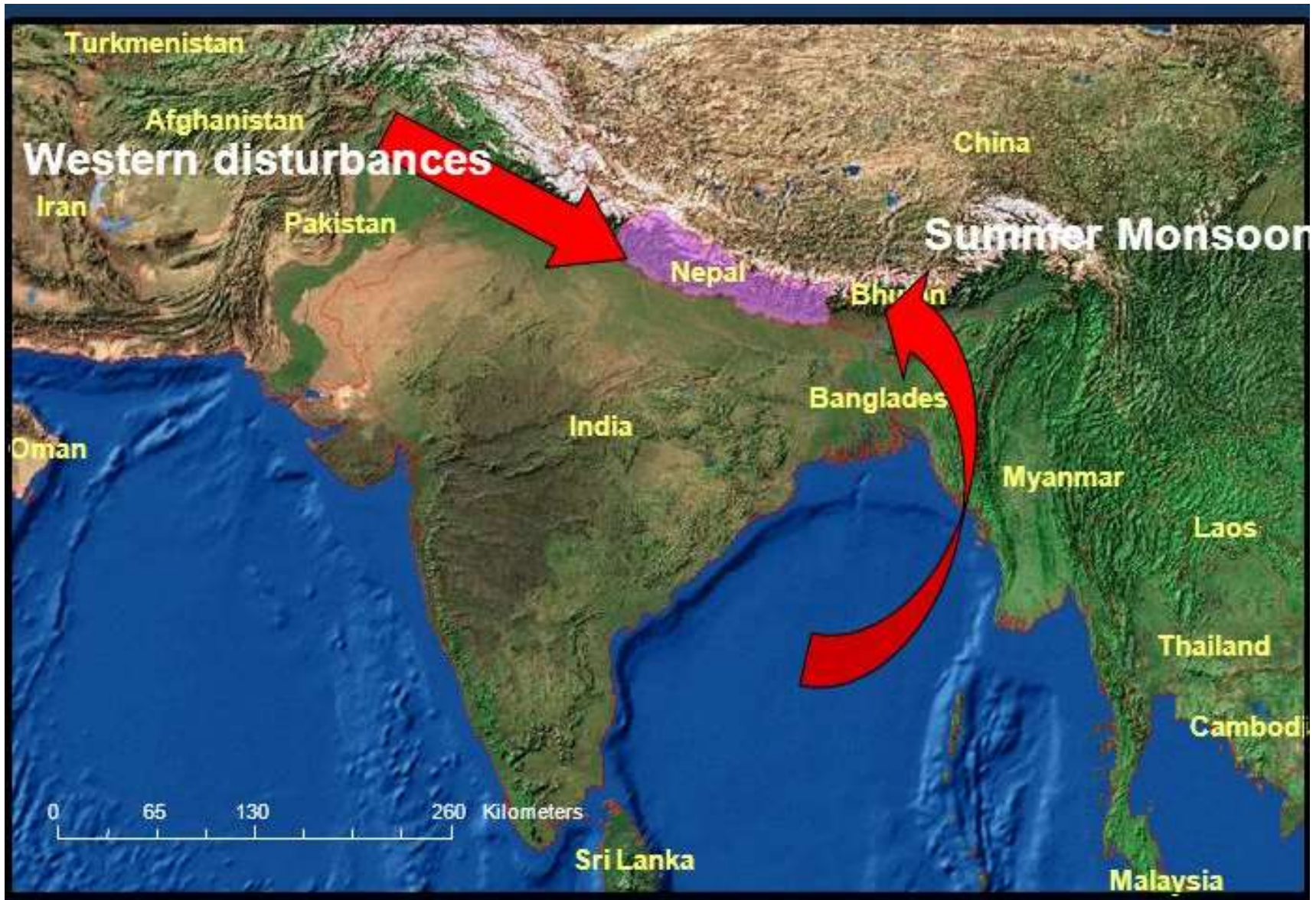
# Automatic Weather Stations



# Proposed Doppler Radar Location

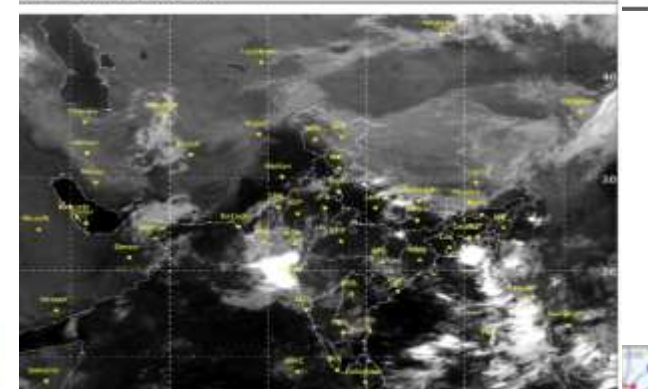
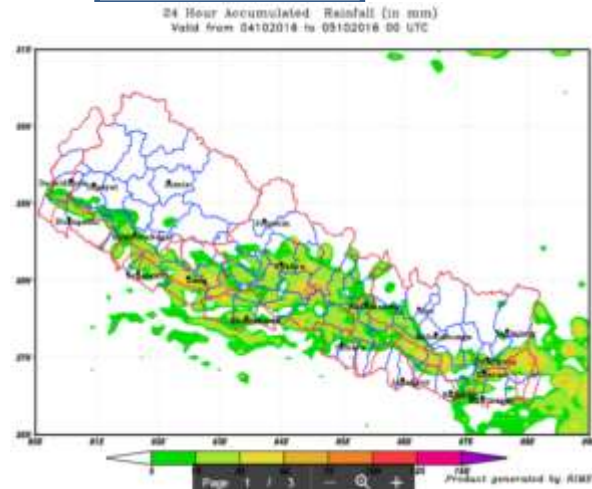
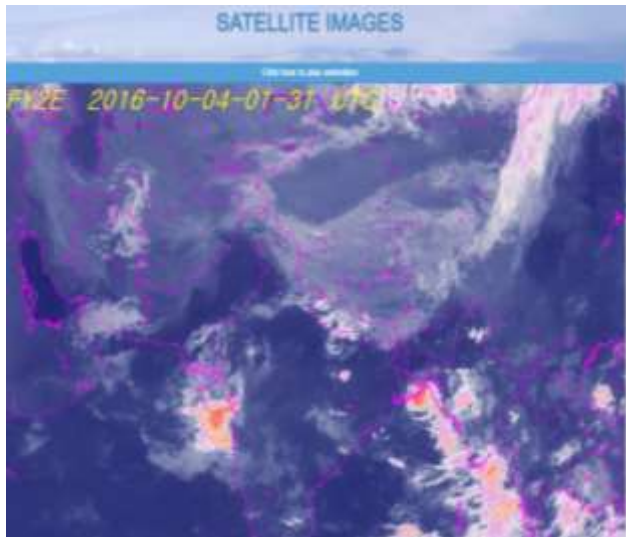
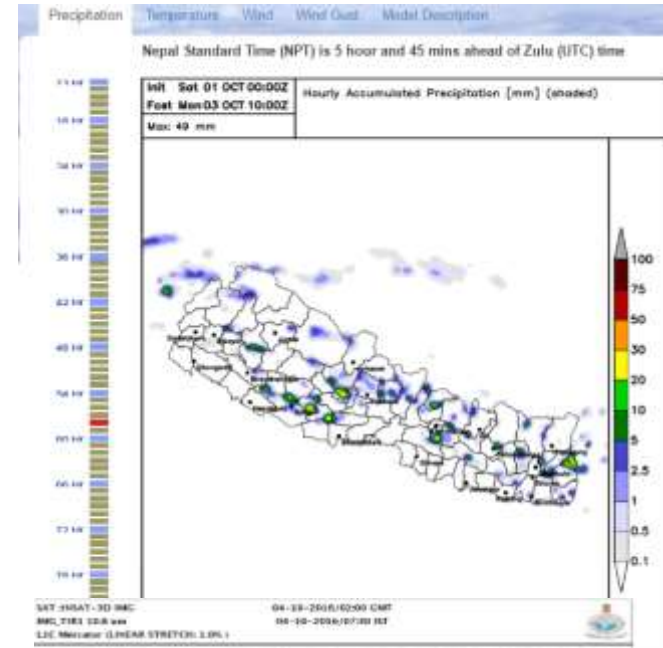
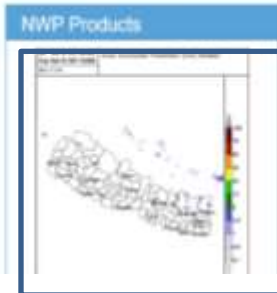
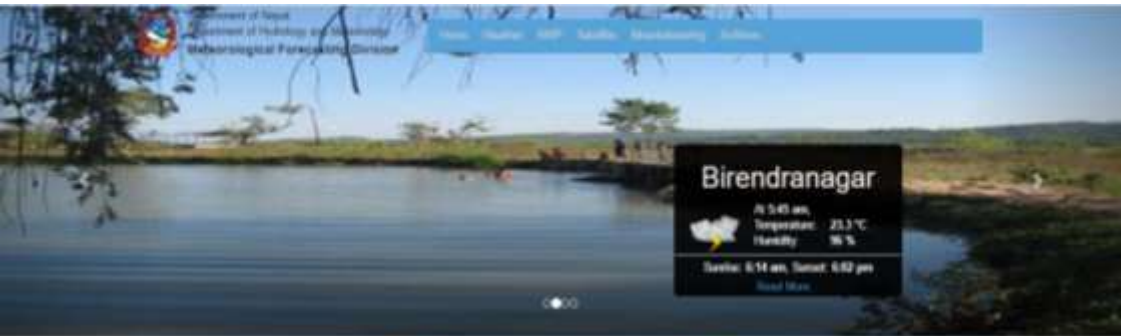


# Major Weather Influences in Nepal





# Weather Information for Flood Forecast



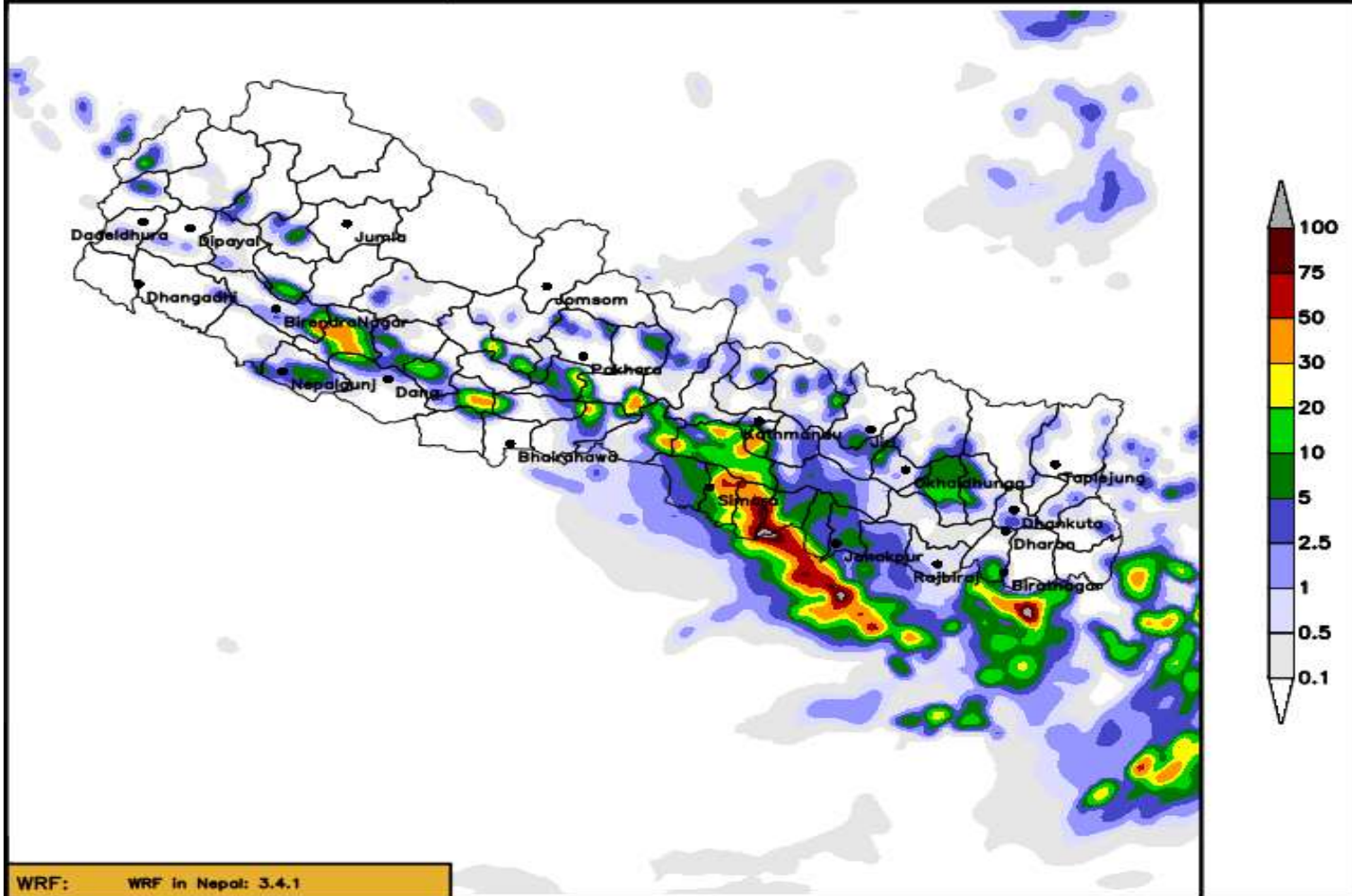
# Rainfall prediction from NWP.

Init Thu 10 AUG 23:45 NPT

Fcst Fri 11 AUG 23:45 NPT

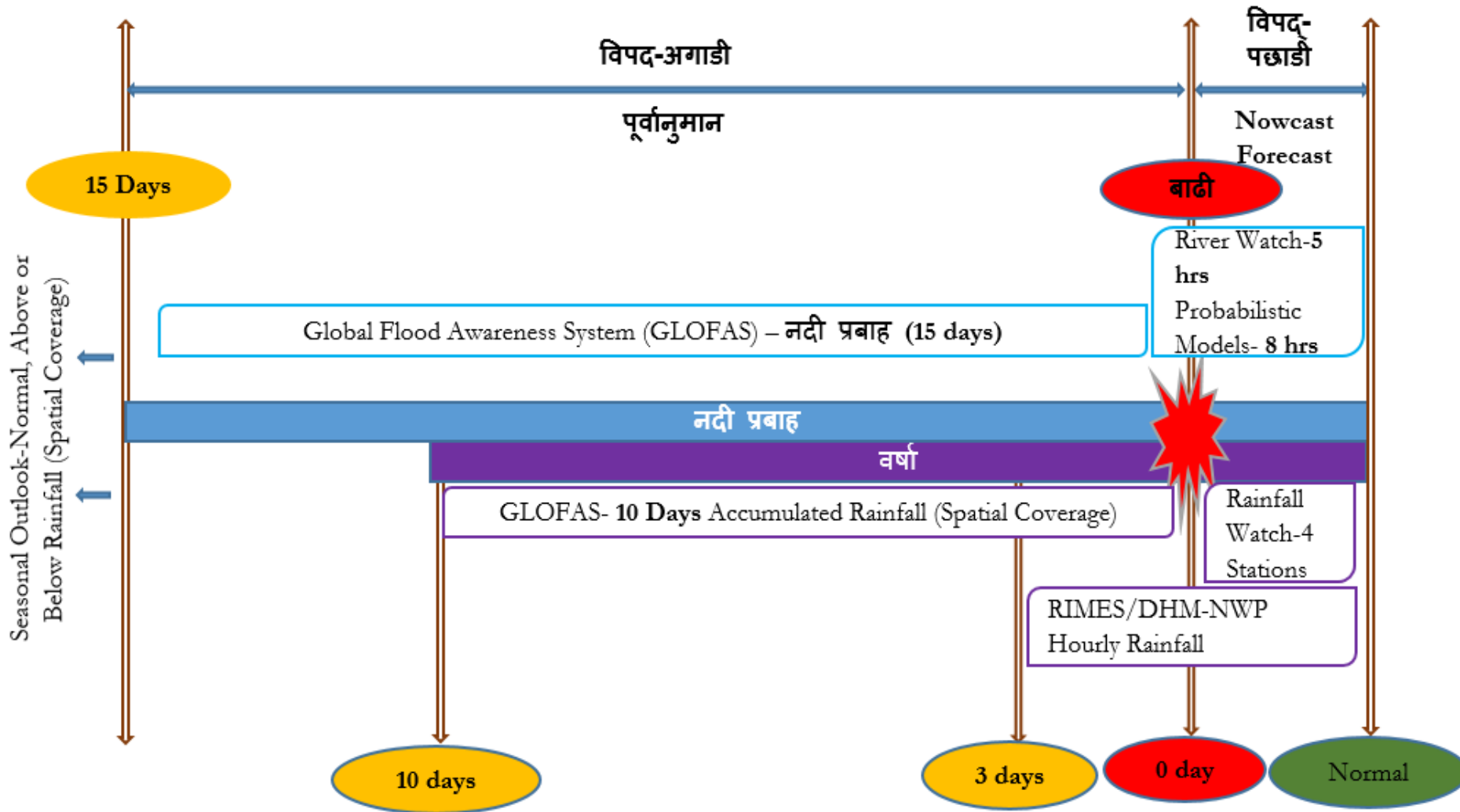
Max: 117 mm

Hourly Accumulated Precipitation [mm] (shaded)



WRF: WRF in Nepal: 3.4.1

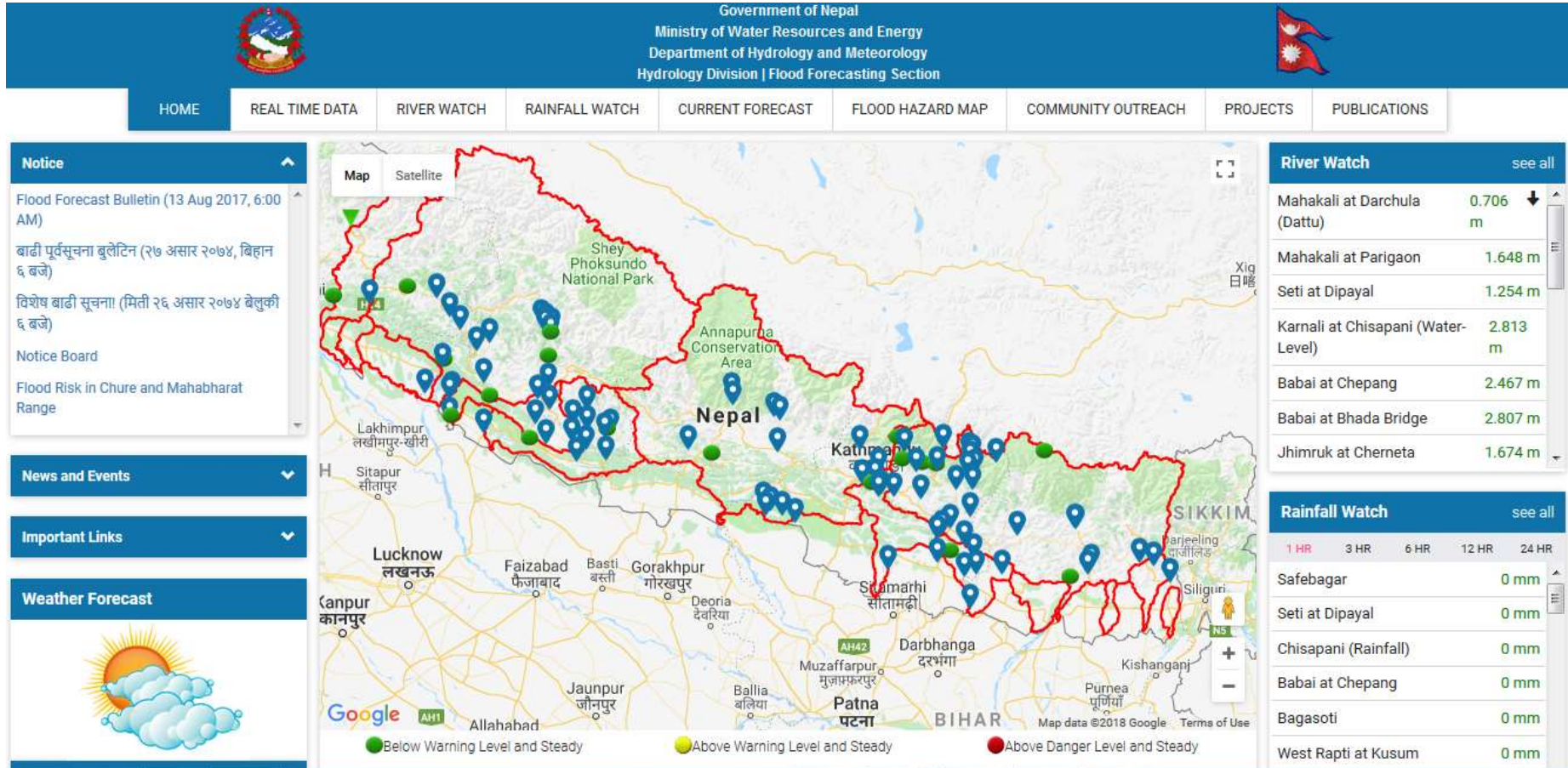
# बाढी पूर्वानुमान बर्तमान प्रणाली (Current Flood Forecast System)



Note: With increase in lead time, the forecast uncertainty increases.



# Website



**Automatic Rainfall Stations: 100+**  
**Automatic Water Level Station: 75+**  
**Website: hydrology.gov.np, mfd.gov.np**



# River Watch



Government of Nepal  
 Ministry of Energy, Water Resources and Irrigation  
 Department of Hydrology and Meteorology  
 Hydrology Division | Flood Forecasting Section


[HOME](#)
[REAL TIME DATA](#)
[RIVER WATCH](#)
[RAINFALL WATCH](#)
[CURRENT FORECAST](#)
[FLOOD HAZARD MAP](#)
[COMMUNITY OUTREACH](#)
[PROJECTS](#)
[PUBLICATIONS](#)

Last updated on Tue, Jun 5, 2018 7:08 AM

S.N	Basin Name	Station Index	Station Name	Water Level (m)	Approx Flow (m <sup>3</sup> /sec)	Warning Level (m)	Danger Level (m)	Trend	Status	O & M by
1	Mahakali	105	Mahakali at Darchula (Dattu) Tue, Jun 5, 2018 4:45 AM	2.405	-	5.80	6.50	STEADY	BELOW WARNING LEVEL	DHM
2	Mahakali	169.8	Surnaya Gad at Gajur Gaon Tue, Jun 5, 2018 6:30 AM	1.564	-			STEADY	BELOW WARNING LEVEL	
3	Mahakali	178	Mahakali at Parigaon Tue, Jun 5, 2018 6:45 AM	2.007	-	5.80	7.00	STEADY	BELOW WARNING LEVEL	
4	Karnali	225	Sinja Khola at Diware Tue, Jun 5, 2018 6:30 AM	1.138	-			STEADY	BELOW WARNING LEVEL	
5	Karnali	230	Tila Nadi at Serighat Tue, Jun 5, 2018 6:45 AM	1.187	-			STEADY	BELOW WARNING LEVEL	
6	Karnali	242	Lohare Khola at Dailekh Tue, Jun 5, 2018 7:00 AM	0.336	-			STEADY	BELOW WARNING LEVEL	
7	Karnali	259.2	Seti River at Gopaghat Tue, Jun 5, 2018 6:45 AM	1.387	-			STEADY	BELOW WARNING LEVEL	
8	Karnali	259.5	Seti at Dipayal Tue, Jun 5, 2018 12:20 AM	1.402	-	8.60	9.00	STEADY	BELOW WARNING LEVEL	
9	Karnali	260	West Seti at Banga Tue, Jun 5, 2018 12:20 AM	2.644	-			STEADY	BELOW WARNING LEVEL	

# Web Based Telemetry : Rainfall Watch 11Aug, 2017: Midnight: 1:30 am

Sl. No.	Station	Station ID	Station Name	0.00	05.00	11.00	11.00	11.00	Warning Level
13	Babai	408	Gularia	18.80	19.60	19.60	21.00	22.00	Below Warning Level
14	Babai	417	Ranijaruwa	2.20	10.40	15.80	20.40	20.40	Below Warning Level
15	Babai	508	Tulsipur	29.60	44.60	44.60	44.60	48.40	Below Warning Level
16	Babai	512	Luwamjyula	0.60	1.20	1.20	1.20	1.20	Below Warning Level
17	Babai	515	Ghorahi	94.20	99.40	99.40	99.40	99.60	Above Warning Level
18	Babai	519	Tharmare	0.00	0.00	0.00	0.00	0.00	Below Warning Level
19	Babai	529	Padampur	32.00	50.80	50.80	51.20	54.80	Below Warning Level
20	Babai	531	Ambapur	62.80	164.80	169.00	169.00	169.00	Above Warning Level
21	West Rapti	350	West Rapti at Bagasoti	N/A	N/A	N/A	0.00	0.20	Below Warning Level
22	West Rapti	375	West Rapti at Kusum	122.20	191.40	223.60	224.40	224.40	Above Warning Level
23	West Rapti	504	Libang Gaon	0.00	0.00	0.00	0.00	0.00	Below Warning Level
24	West Rapti	505	Bijuwartar	0.00	0.00	0.00	0.00	0.00	Below Warning Level
25	West Rapti	537	Lamahi	51.80	82.20	82.20	82.20	82.20	Above Warning Level

**Note: warning level for rainfall :60mm in 1 hr,80 mm in 3 hour, 100 mm in 6 hr, 120mm in 12 hr,140 mm in 24 hr- potential landslide in steep slope and high flood in local areas**

# 12 Aug, 2017 Babai: Rainfall

10	Karnali	433	Kalidamar	0.00	0.00	0.20	0.20	0.20	Below Warning Level
11	Karnali	441	Birendranagar, Surkhet	0.00	2.20	15.80	16.00	16.20	Below Warning Level
12	Babai	289.95	Babai at Chepang	N/A	39.20	56.20	170.20	172.80	Above Warning Level
13	Babai	408	Gularia	0.00	2.00	14.40	34.00	35.40	Below Warning Level
14	Babai	417	Ranijaruwa	N/A	0.20	58.60	87.80	92.40	Below Warning Level
15	Babai	508	Tulsipur	6.80	26.60	104.80	160.20	164.00	Above Warning Level
16	Babai	512	Luwamjyula	0.60	3.00	17.20	18.40	18.40	Below Warning Level
17	Babai	515	Ghorahi	0.60	8.60	52.60	156.20	156.40	Above Warning Level
18	Babai	519	Tharmare	0.00	0.20	0.40	0.40	0.40	Below Warning Level
19	Babai	529	Padampur	38.80	58.40	77.20	146.00	150.00	Above Warning Level
20	Babai	531	Ambapur	4.40	19.00	101.80	281.40	281.40	Above Warning Level
21	West Rapti	350	West Rapti at Bagasoti	N/A	N/A	N/A	N/A	0.20	Below Warning Level
22	West Rapti	375	West Rapti at Kusum	N/A	13.00	193.60	426.80	427.60	Above Warning Level

# 13 Aug, 2017 West Rapti: Rainfall

11	Karnali	441	Birendranagar, Surkhet	0.00	0.20	11.80	27.20	27.60	Below Warning Level
12	Babai	289.95	Babai at Chepang	0.00	1.80	56.80	120.40	198.00	Above Warning Level
13	Babai	408	Gularia	0.00	0.00	0.20	33.60	35.40	Below Warning Level
14	Babai	417	Ranijaruwa	N/A	N/A	N/A	78.00	92.40	Below Warning Level
15	Babai	508	Tulsipur	1.00	7.00	27.60	175.60	179.40	Above Warning Level
16	Babai	512	Luwamjyula	0.00	0.00	1.80	18.40	18.40	Below Warning Level
17	Babai	515	Ghorahi	3.00	9.40	15.40	167.20	167.40	Above Warning Level
18	Babai	519	Tharmare	0.00	0.00	0.00	0.40	0.40	Below Warning Level
19	Babai	529	Padampur	1.20	2.80	70.40	156.40	167.60	Above Warning Level
20	Babai	531	Ambapur	0.20	1.00	9.20	267.80	284.20	Above Warning Level
21	West Rapti	350	West Rapti at Bagasoti	N/A	N/A	N/A	N/A	0.20	Below Warning Level
22	West Rapti	375	West Rapti at Kusum	N/A	N/A	N/A	365.80	427.60	Above Warning Level



# 13 Aug, 2017 East Rapti: Rainfall

27	Narayani	445	Budhigandaki at Arughat	0.00	0.40	10.80	15.80	18.00	Below Warning Level
28	Narayani	447	Trishuli at Betrawati	0.00	0.40	11.60	13.40	13.40	Below Warning Level
29	Narayani	450	Narayani at Narayanghat	0.00	0.00	0.00	0.00	0.00	Below Warning Level
30	Narayani	460	East Rapti at Rajaiya	0.60	5.60	23.40	213.20	492.60	Above Warning Level
31	Narayani	601	Jomsom	0.00	0.00	0.25	0.51	0.51	Below Warning Level
32	Narayani	609	Beni	0.00	0.00	0.00	0.00	0.00	Below Warning Level
33	Narayani	842	Ghalekharkha	6.40	16.40	27.00	28.80	32.60	Below Warning Level
34	Narayani	5009	Langtang	0.00	1.00	17.00	22.00	22.00	Below Warning Level
35	Narayani	5104	Madi	2.20	18.40	22.80	90.80	135.20	Below Warning Level
36	Narayani	5106	Myagdi	0.00	0.40	0.60	1.80	11.60	Below Warning Level
37	Narayani	9321	Riukhola at Bankatta	21.00	97.80	147.60	207.40	241.20	Above Warning Level
38	Narayani	9324	Govindbasti	N/A	N/A	N/A	72.60	165.40	Above Warning Level
39	Narayani	9325	Thori	N/A	N/A	N/A	N/A	0.00	Below Warning Level

10	Karnali	433	Kalidamar	0.00	0.00	0.20	0.20	0.20	Below Warning Level	
11	Karnali	441	Birendranagar, Surkhet	0.00	2.20	15.80	16.00	16.20	Below Warning Level	
12	Babai	289.95	Babai at Chepang	N/A	39.20	56.20	170.20	172.80	Above Warning Level	
13	Babai	408	Gularia	0.00	2.00	14.40	34.00	35.40	Below Warning Level	
14	Babai	417	Ranijaruwa	N/A	0.20	58.60	87.80	92.40	Below Warning Level	
15	Babai	508	Tulsipur	6.80	26.60	104.80	160.20	164.00	Above Warning Level	
16	Babai	512	Luwamjyula	0.60	3.00	17.20	18.40	18.40	Below Warning Level	
17	Babai	515	Ghorahi	0.60	8.60	52.60	156.20	156.40	Above Warning Level	
18	Babai	519	Tharmare	0.00	0.20	0.40	0.40	0.40	Below Warning Level	
19	Babai	529	Padampur	38.80	58.40	77.20	146.00	150.00	Above Warning Level	
20	Babai	531	Ambapur	4.40	19.00	101.80	281.40	281.40	Above Warning Level	
21	West Rapti	350	West Rapti at Bagasoti	N/A	N/A	N/A	N/A	0.20	Below Warning Level	
22	West Rapti	375	West Rapti at Kusum	N/A	13.00	193.60	426.80	427.60	Above Warning Level	
10	Karnali	280	Fri, Apr 27, 2018 6:00 AM	2.91	-	10	10.8	STEADY	BELOW WARNING LEVEL	DHM

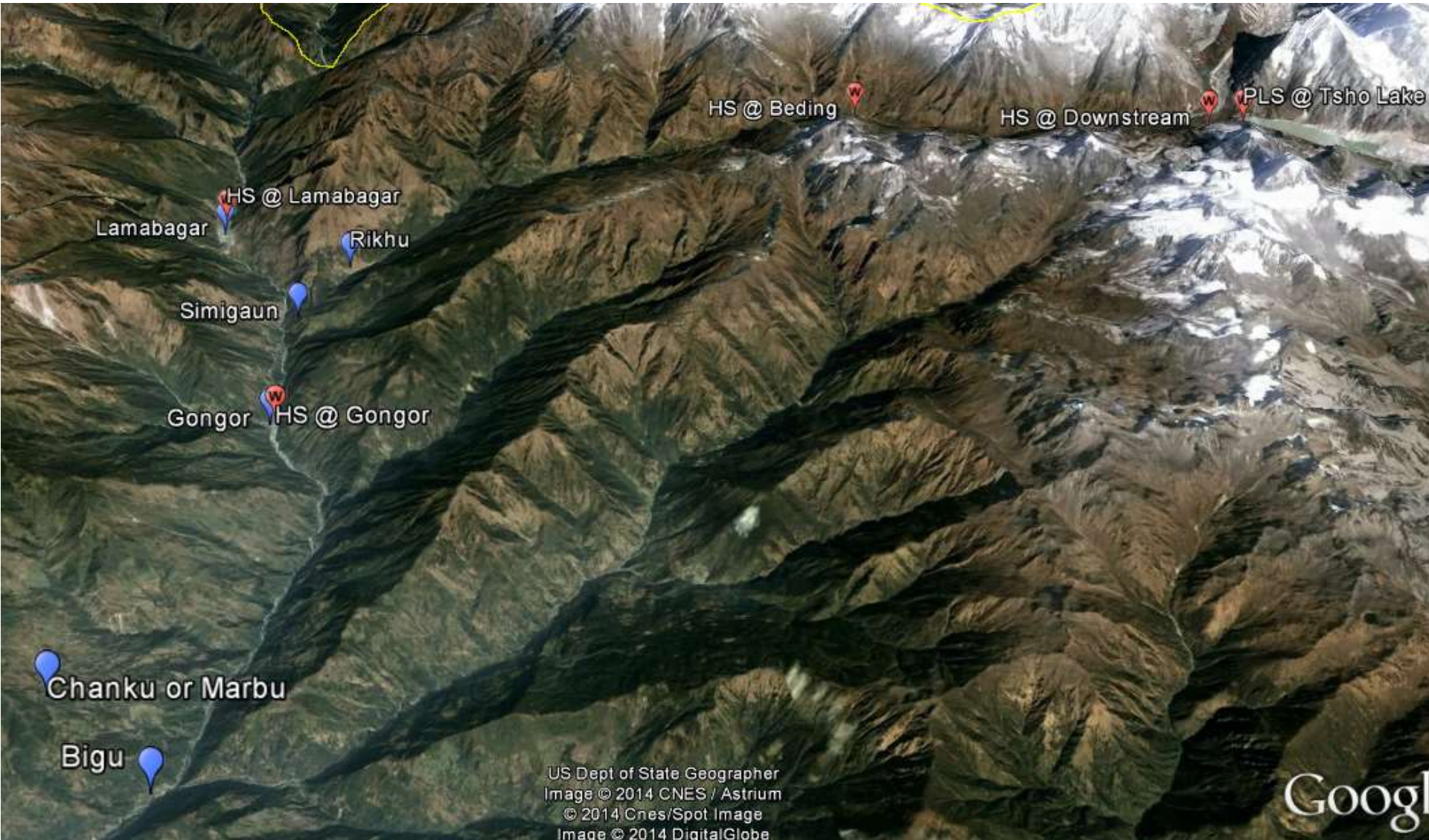
# Web Based Telemetry :Rainfall Watch 12Aug: Babai

10	Karnali	433	Kalidamar	0.00	0.00	0.20	0.20	0.20	Below Warning Level
11	Karnali	441	Birendranagar, Surkhet	0.00	2.20	15.80	16.00	16.20	Below Warning Level
12	Babai	289.95	Babai at Chepang	N/A	39.20	56.20	170.20	172.80	Above Warning Level
13	Babai	408	Gularia	0.00	2.00	14.40	34.00	35.40	Below Warning Level
14	Babai	417	Ranijaruwa	N/A	0.20	58.60	87.80	92.40	Below Warning Level
15	Babai	508	Tulsipur	6.80	26.60	104.80	160.20	164.00	Above Warning Level
16	Babai	512	Luwamjyula	0.60	3.00	17.20	18.40	18.40	Below Warning Level
17	Babai	515	Ghorahi	0.60	8.60	52.60	156.20	156.40	Above Warning Level
18	Babai	519	Tharmare	0.00	0.20	0.40	0.40	0.40	Below Warning Level
19	Babai	529	Padampur	38.80	58.40	77.20	146.00	150.00	Above Warning Level
20	Babai	531	Ambapur	4.40	19.00	101.80	281.40	281.40	Above Warning Level
21	West Rapti	350	West Rapti at Bagasoti	N/A	N/A	N/A	N/A	0.20	Below Warning Level
22	West Rapti	375	West Rapti at Kusum	N/A	13.00	193.60	426.80	427.60	Above Warning Level

**Note: warning level for rainfall :60mm in 1 hr,80 mm in 3 hour, 100 mm in 6 hr, 120mm in 12 hr,140 mm in 24 hr- potential landslide in steep slope and high flood in local areas**



# CB-EWS in Tsho Rolpa Glacial Lake





# Imja Lake Lowering CB-EWS in Imja Glacial Lake and d/s



# Hydrological, Meteorological and Communication Stations at Imja





# Flood Forecasting Using Hydrological Model



## Flood Forecasting Server

The results on the Flood Forecasting Server are based upon the prototype version of the Data Based Mechanistic flood forecasting models. It has been developed in partnership with the Department of Hydrology and Meteorology (DHM), Government of Nepal and Practical Action Consulting.

As the results are based upon a prototype version a reasonable performance can be expected. However, if you encounter bugs or want to suggest (or implement) new features please contact paul@waternumbers.co.uk.

On technical issues concerning the server, please contact sailesh.kasaju@rts.com.np at Real Time Solutions.

To view the graphs that have been generated by the model, click on SVG

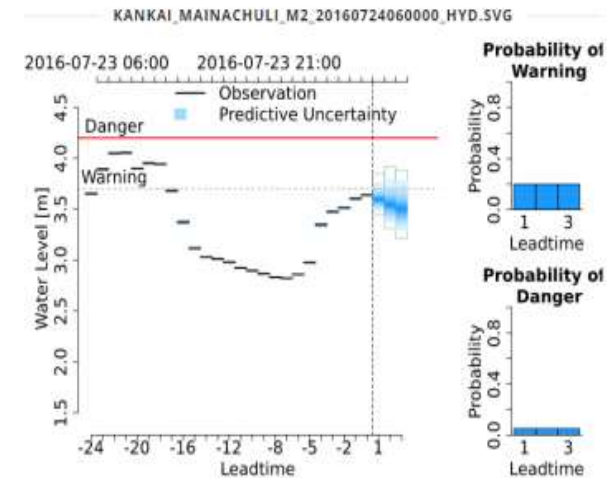
To view and download the data generated by the model, click on CSV



## Probabilistic Forecast for coming three hours

Flood Forecasting Server Kankai\_Mainachuli\_M2 CSV SVG Download Account Logout

Search
Kankai_Mainachuli_M2_201607-2016-07-24 06:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 05:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 04:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 03:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 02:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 01:00:00
Kankai_Mainachuli_M2_201607-2016-07-24 12:00:00
Kankai_Mainachuli_M2_201607-2016-07-23 11:00:00
Kankai_Mainachuli_M2_201607-2016-07-23 10:00:00



- The probabilistic model is being run in 6 major river basins
- 5 years of real time hourly data used for the calibration and validation of the model



Issued Forecast Bulletin at 09 am, informed to cross warning level within 1-2 hours & real time observation showed that warning level crossed at 11 am

Department of Hydrology and Meteorology  
Flood Forecasting Section

Water Level Forecast for West Rapti River at Kusum

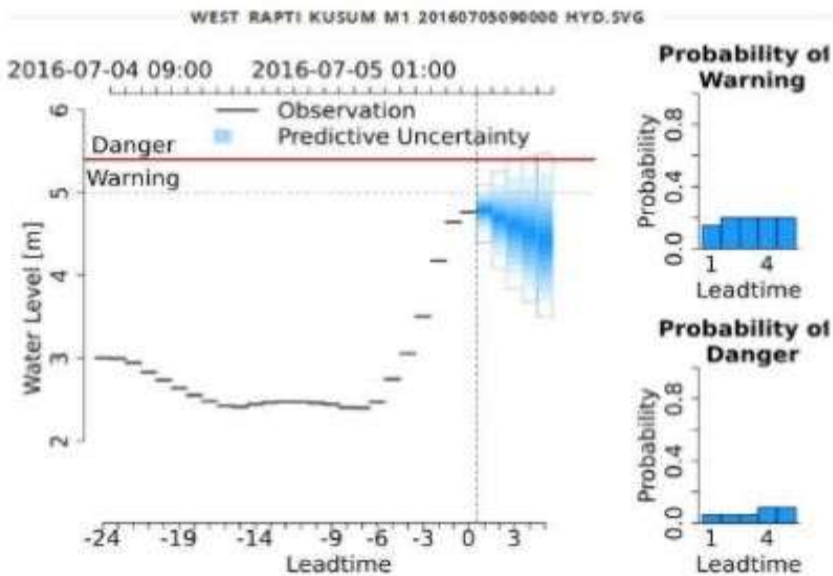
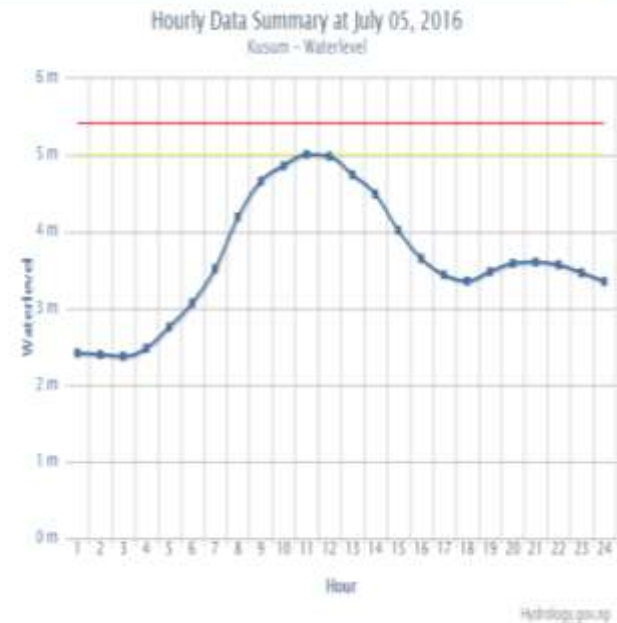
The current water level is 4.77m and it is in rising trend, the forecasted water level for coming five hours shows the probability of crossing warning level of 5m is 20% around 10 AM till 1PM and probability of crossing danger level of 5.4 m is 10% around 1PM.

**Forecast Duration: 2016-07-05-09:00 to 2016-07-05-01:00**

Choose Your Option

Select Date:  View Type:

Hour	Value (m)	Flow (m <sup>3</sup> /s)
1	2.41	85.99
2	2.39	82.45
3	2.37	79.15
4	2.47	97.33
5	2.75	160.00
6	3.06	253.40
7	3.90	431.00
8	4.18	629.20
9	4.64	1191.20
10	4.85	1385.00
11	4.99	1621.30
12	4.97	1601.90
13	4.73	1271.60
14	4.48	1056.00
15	4.01	714.60
16	3.64	500.80
17	3.43	399.50
18	3.16	364.40

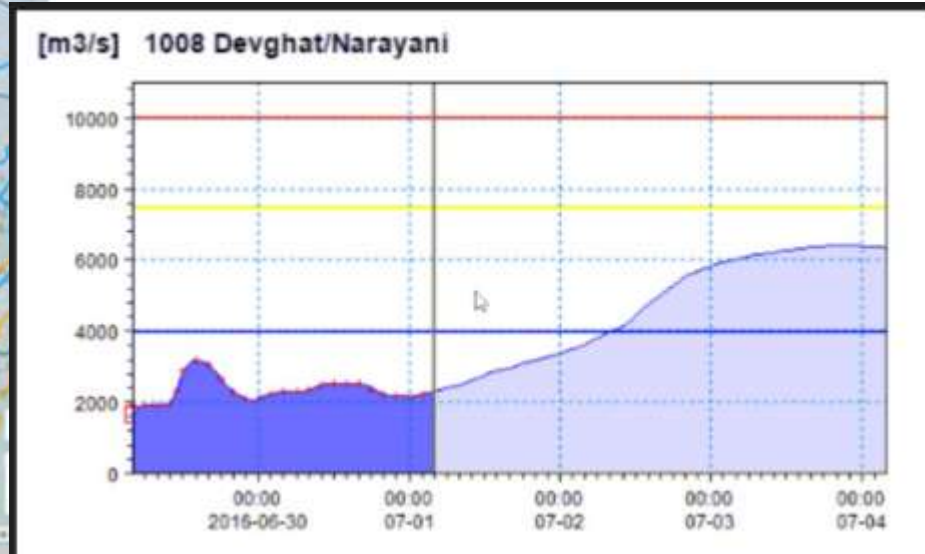




# Flood Forecasting Using Hydrological Model

## HKH-HYCOS Project

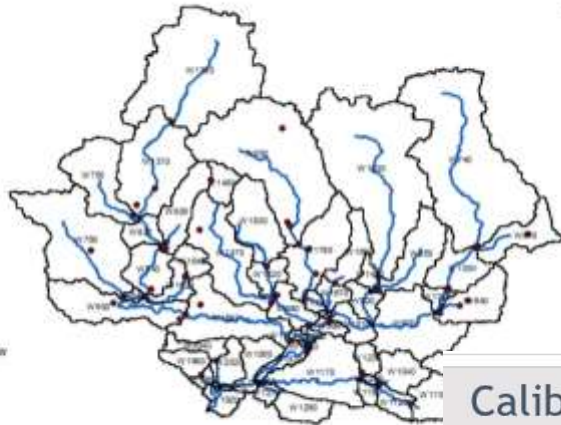
### Regional Flood Information Map



Mike 11 model is being run in 5 river basins using GFS(Global Forecast System) rainfall forecast and WRF(Weather Research and Forecasting) Rainfall forecast Data Assimilation part is also included in the model

# 3-Days Flood Forecasting Using Hydrological Model

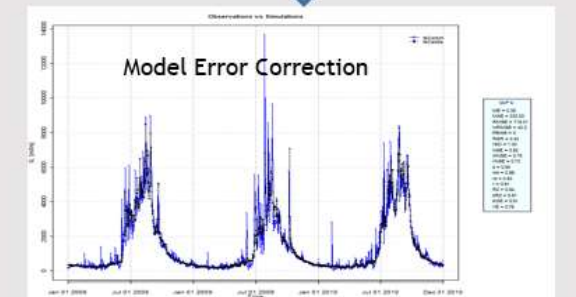
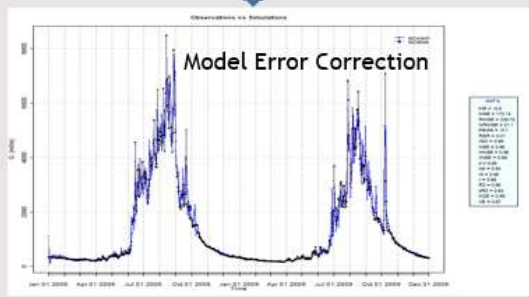
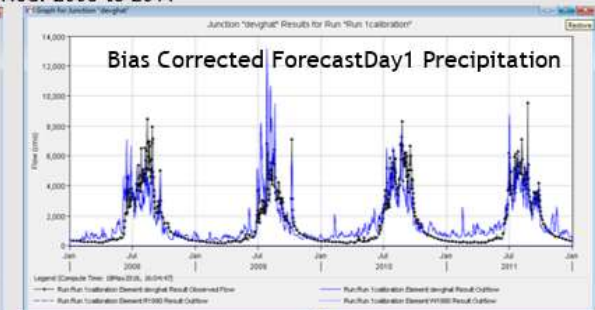
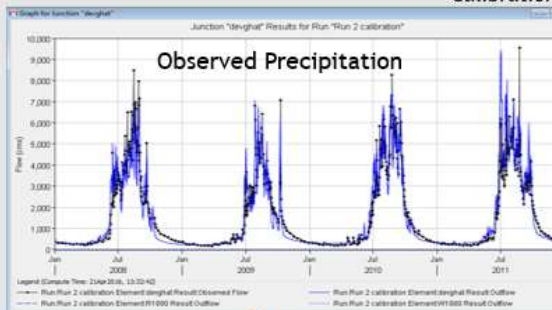
56 Subbasins Delineated using HEC-GeoHMS in Narayani River basin



Calibration, validation, Model Error Correction and testing is completed in 3 major river basins: Karnali, Babai and Narayani

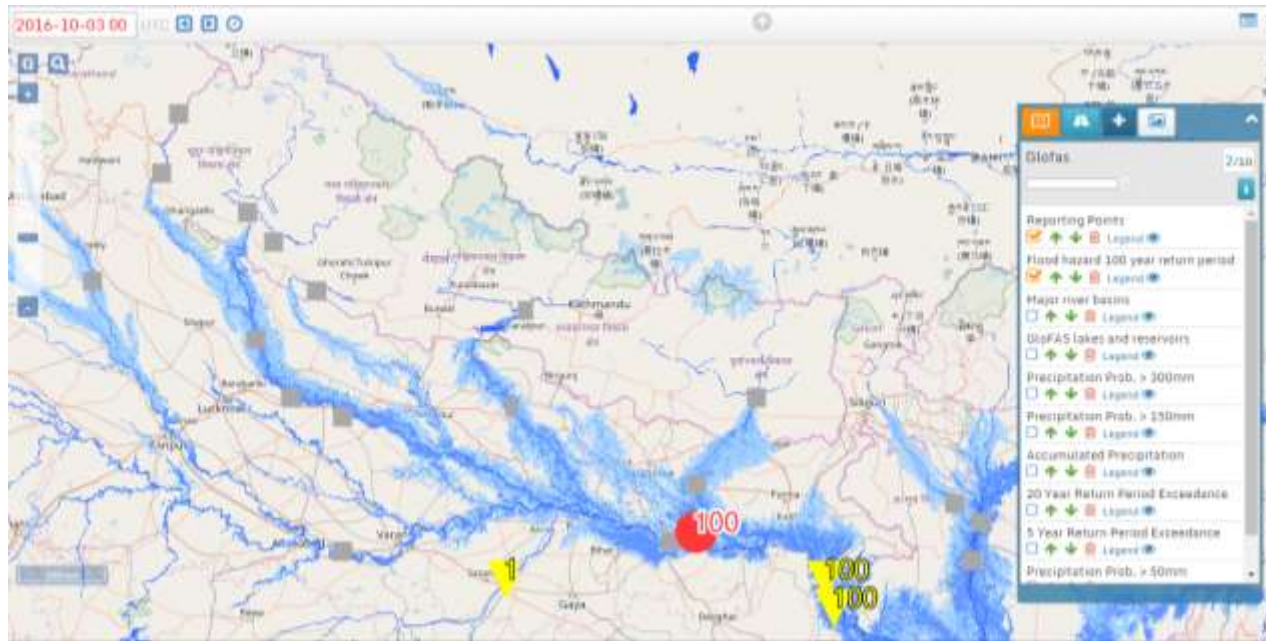
## Calibration Result at Devghat

Calibration Period: 2008 to 2011

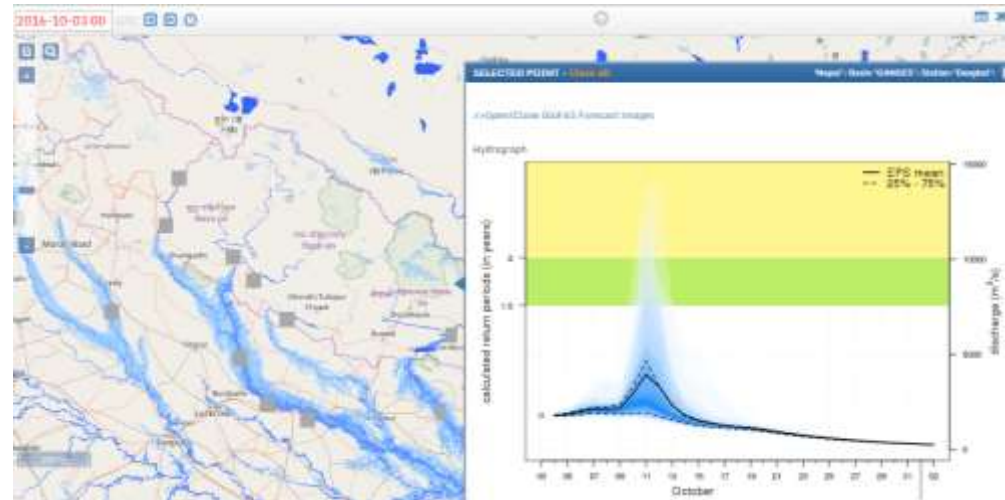


# Flood Forecasting Using Hydrological Model

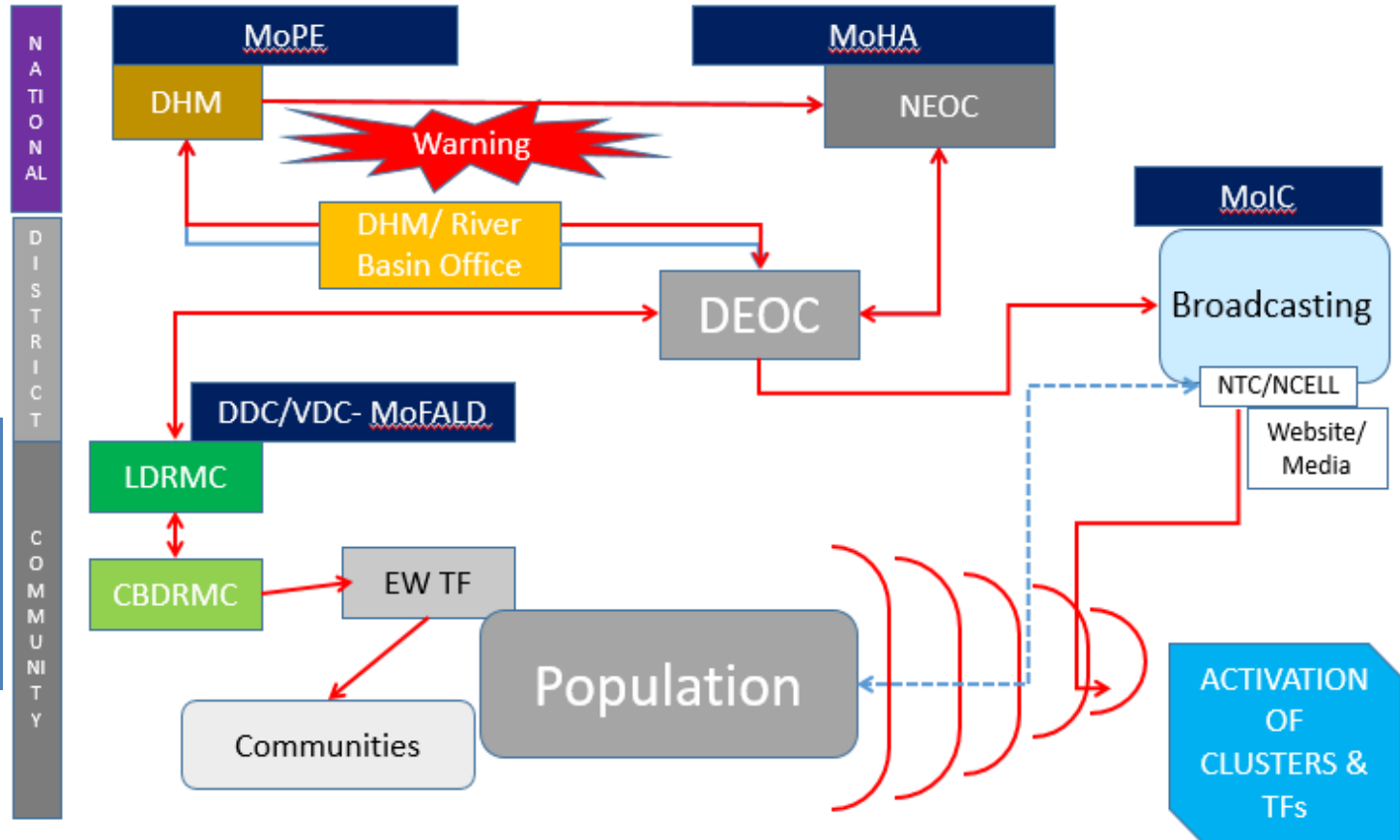
## GLOFAS Outlook



25 Reporting points in Nepal



# Flood Early Warning Dissemination





# Communication & Dissemination of Flood Forecast & Early Warning

Pre monsoon Forum

Website: [hydrology.gov.np](http://hydrology.gov.np) : [mfd.gov.np](http://mfd.gov.np)

- Home Page
- Forecast: Bulletin & Special Bulletin
- River Watch
- Rainfall Watch
- Hazard Map

Social Media: Facebook, Twitter

MASS SMS

Toll Free: 1155 : 4 months

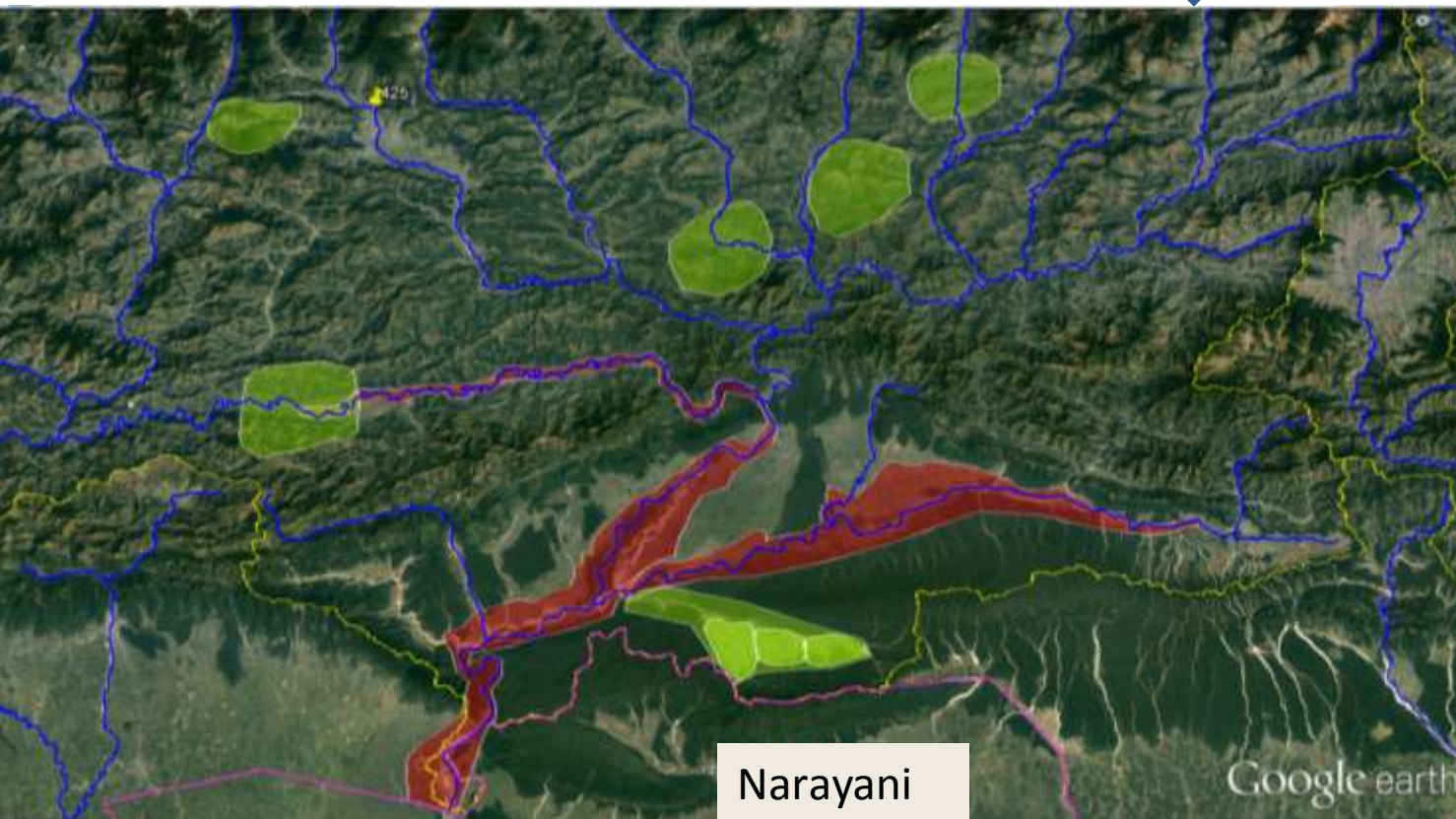
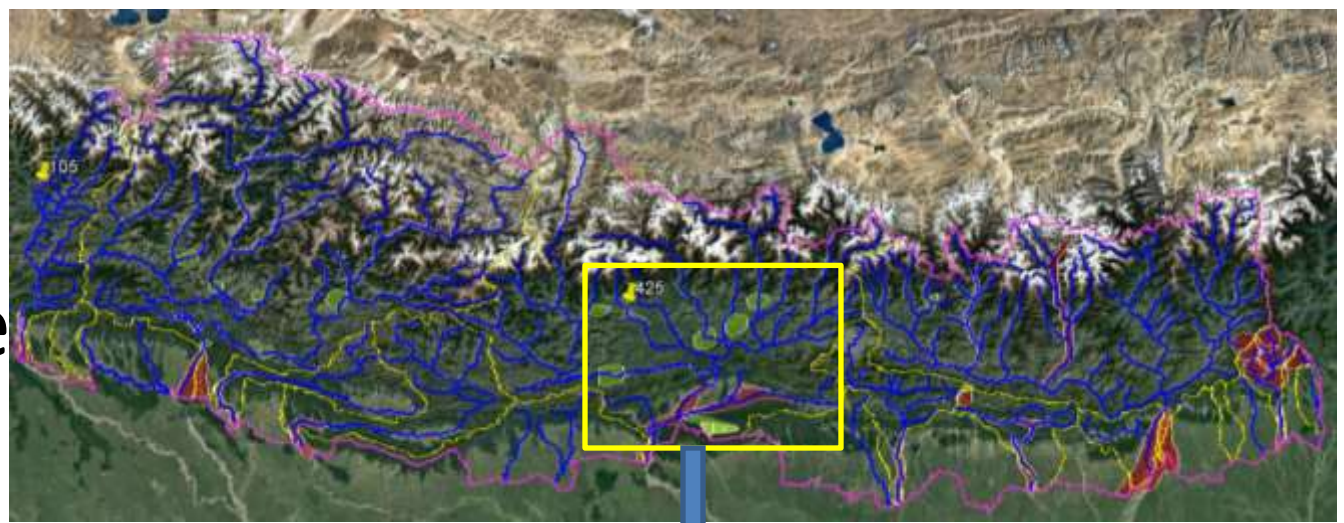
Emails

Interview

CAP in near future



Mass SMS  
To vulnerable  
communities



**42 polygons in  
8 river basins**

**Targeted  
particularly  
for flood and  
landslide**



# DHM-NCELL-NTC Collaboration for Mass SMS

A	B	C	D	E	F
* Please add "-DHM" at the end of SMS content while sending		<b>SMS Messaging</b>			
SN	Polygon Name (File Name in FTP location)	Rising water level: near warning level	above warning level	above danger level	falling water level: below warning
1	WestRapti_Basin_Hydro_West Rapti_Kusum	Westrapti Kusumko jalamapan kendrama jalsataha chetawani taha najik pugekole sajag rahanuhuna anurodh chha	jalamapan kendrama jalsataha le chetawani taha par garekole sajag rahanuhuna anurodh chha	Westrapti Kusumko jalamapan kendrama jalsataha le khatara ko taha par garekole surakchhit sthan ma rahanuhuna anurodh chha	Westrapti Kusumko jalamapan kendrama jalsataha samanya awasthama farkiyekole tatkal kunai khatara chhaina
2	Kankai_Basin_Hydro_kankai_d/s	Kankai Mainachuliko jalamapan kendrama jalsataha chetawani taha najik pugekole sajag rahanuhuna anurodh chha	jalamapan kendrama jalsataha le chetawani taha par garekole sajag rahanuhuna anurodh chha	Kankai Mainachuliko jalamapan kendrama jalsataha le khatara ko taha par garekole surakchhit sthan ma rahanuhuna anurodh chha	jalamapan kendrama jalsataha samanya awasthama farkiyekole tatkal kunai khatara chhaina
3	Kankai_Basin_Rain_IlamTeaState	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			
4	Kankai_Basin_Rain_KanyamTeaState	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			
5	Kankai_Basin_Rain_MaiPokhari	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			
6	Kankai_Basin_Rain_Rake	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			
7	Kankai_Basin_Rain_SoktimTeaState	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			
8	Kankai_Basin_Rain_Jeetpur	Tapain raheko wa aaspasko chhetra ma bhari barsa bhayeko chha viralo jaminma pahiro ra najikaiko khola nalama badhi aauna sakchha sachet bhaie surakchhit sthan ma rahanuhola!			



# Status of Kankai River, Jhapa

## 26 July 2016

- Kanyam Tea State
- Ilam Tea State
- Mai Pokhari
- Rake
- Soktm Tea State
- Zeetpur
- Mahakall
- Others

### Flood Alerts

Water Level of Karmali at Chisapani at 2016-07-26 22:15:00 is rising (8.09 m) and Below Warning Level

Water Level of Babal River at Chepang at 2016-07-26 22:00:00 is falling (4.54 m) and Below Warning Level

Water Level of Rapti River at Kusum at 2016-06-05 21:45:00 is N/A (N/A m) and N/A

Water Level of Narayani River at Devghat at 2016-07-26 16:20:00 is rising (10.24 m) and Higher Than Danger Level

Water Level of East Rapti at Rajaha at 2016-07-26 22:15:00 is N/A (N/A m) and N/A

Water Level of Bagmati River at Karmalya at N/A is N/A (N/A m) and N/A

Water Level of Koshi River at Chatara at 2016-07-26 08:20:00 is rising (5.21 m) and Below Warning Level

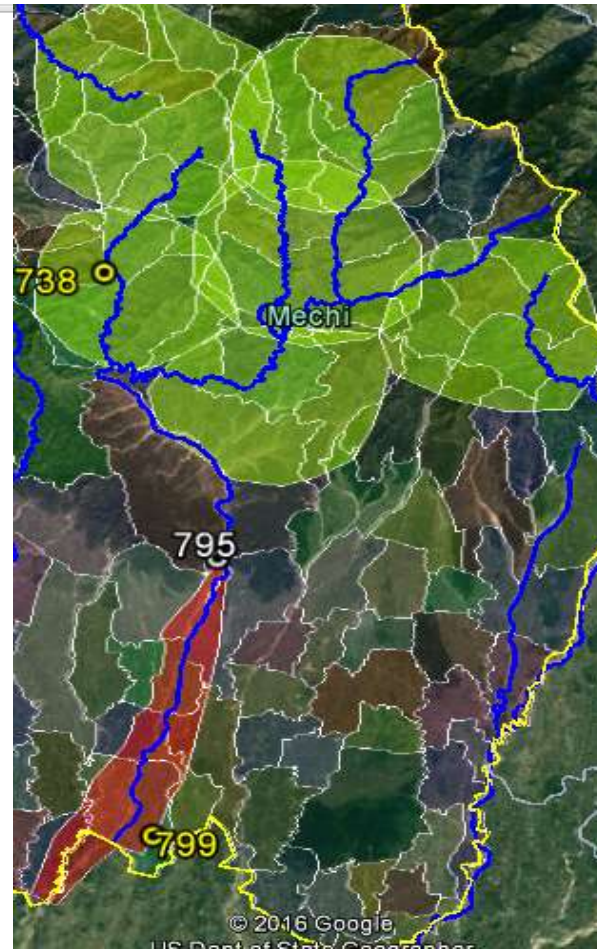
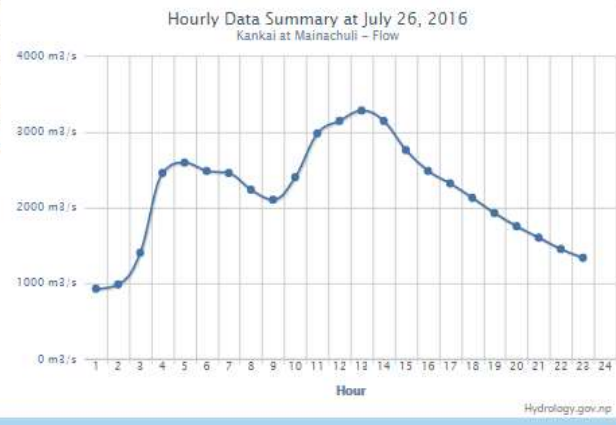
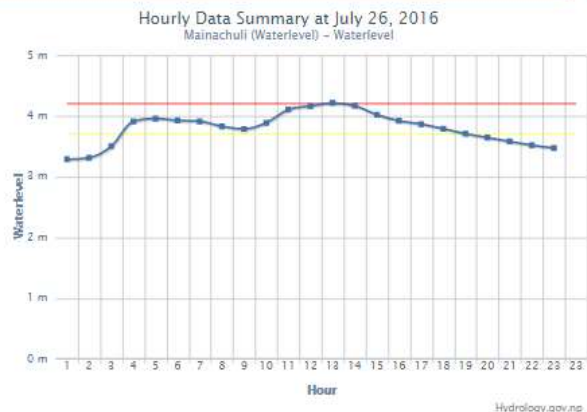
Water Level of Kankai River at Mainachuli at 2016-07-26 22:15:00 is falling (3.47 m) and Below Warning Level

### Weather Forecast



Select Date: 2016-07-26 View Type: Hourly View

Hour	Value (m)	Flow (m <sup>3</sup> /s)
1	3.28	926.00
2	3.31	982.00
3	3.50	1400.00
4	3.91	2452.50
5	3.96	2590.00
6	3.92	2480.00
7	3.91	2452.50
8	3.83	2232.50
9	3.78	2100.00
10	3.89	2387.50
11	4.10	2975.00
12	4.16	3140.00
13	4.21	3277.50
14	4.16	3140.00
15	4.02	2755.00
16	3.92	2480.00
17	3.86	2315.00
18	3.79	2125.00
19	3.71	1925.00
20	3.64	1750.00
21	3.58	1600.00
22	3.52	1450.00
23	3.47	1334.00
24	-	-



Rising water level: near warning level	above warning level	above danger level	falling water level: below warning
Kankai Mainachuliko jalamapan kendrama jalsataha chetawani taha najik pugokole sa jag rahanuhuna anurodh chha	jalamapan kendrama jalsataha le chetawani taha par garekole sa jag rahanuhuna anurodh chha	Kankai Mainachuliko jalamapan kendrama jalsataha le khatara ko taha par garekole surakchhit sthan ma rahanuhuna anurodh chha	jalamapan kendrama jalsataha samanya awasthama farkiyekole tatkal kunai khatara chhaina

Total Number of Message Sent: 32429  
 Total Number of Successful Message: 31240  
 Total Number of Failed Message: 1189

# Effectiveness of Flash Flood EWS in Media

श्रावण २९, २०७३- २०६६ मा झापामा भीषण बाढी आउँदा २६ जनाले ज्यान गुमाएका थिए । हालैको बाढी पनि विगतको जस्तै थियो तर क्षति निकै कम भयो । पूर्वसूचना दिने प्रणालीका कारण जनधनको क्षति घटेको हो ।

रेडक्रसले 'प्राक्टिकल एक्सन' को सहकार्यमा 'अर्ली वार्निङ सिस्टम' सुरु गरेकैले बाढीबाट हने क्षति कम भएको छ ।

यसपटकको बाढीमा ९ जनाले ज्यान गुमाए । तीन बेपत्ता छन् । 'तिनीहरूको मृत्यु बाढीले बगाएर भएको होइन,' रेडक्रस झापाका सभापति लोकराज ढकालले भने, 'लापरबाहीका कारण भएको हो ।'

देश

## पूर्वसूचना प्रणालीले क्षति न्यून

- पर्वत पोर्तेल, काँकडभिट्टा



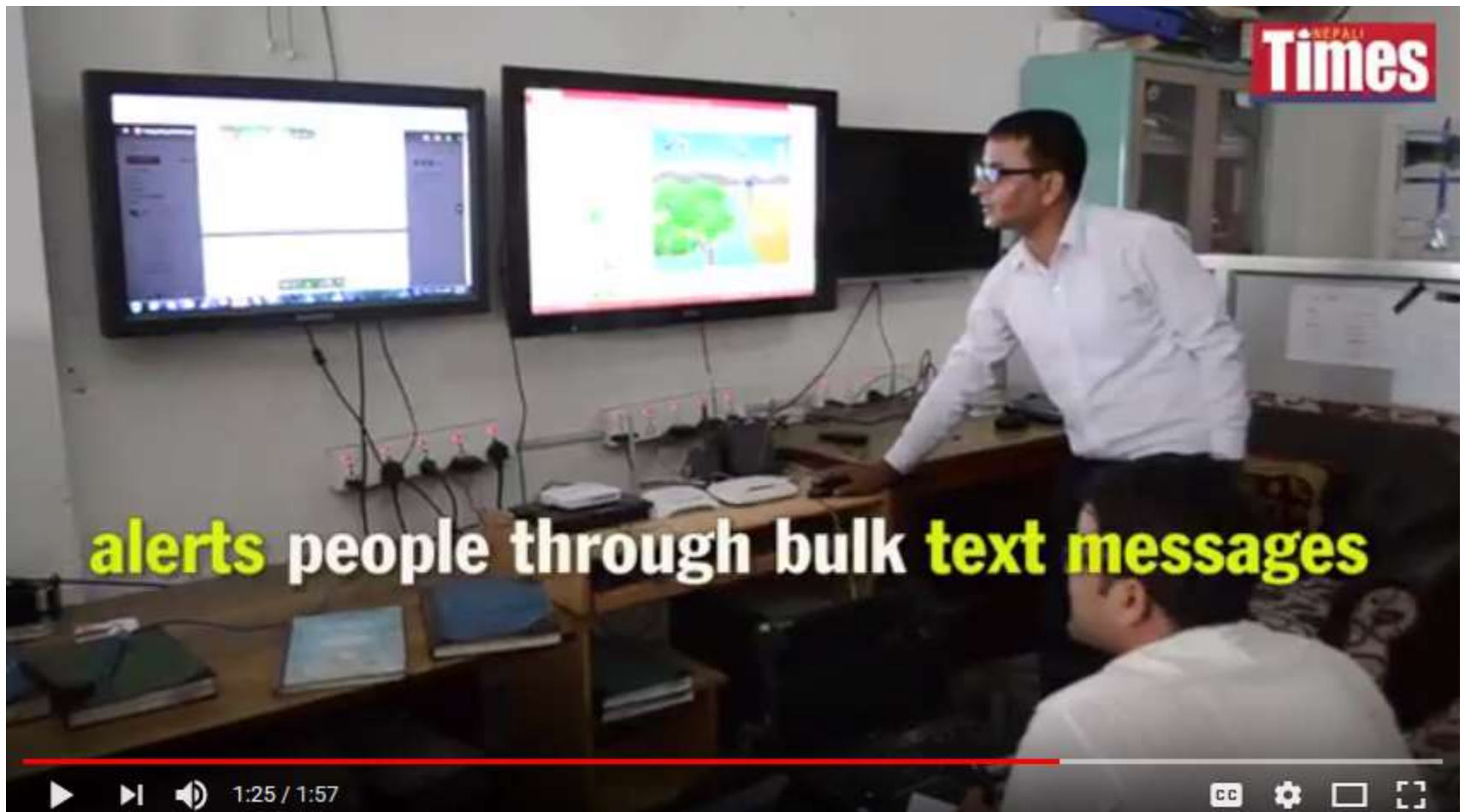
झापा-इलाम सीमास्थित मैनाचुली जल तथा वर्षा मापन केन्द्र । तस्बिर : पर्वत/कान्तिपुर

समाचार पढ्नुहोस्

श्रावण २९, २०७३- २०६६ मा झापामा भीषण बाढी आउँदा २६ जनाले ज्यान गुमाएका थिए । हालैको बाढी पनि



# Flood Forecasting and Warning System





# Sample Bulletin

Government of Nepal  
Ministry of Population and Environment  
Department of Hydrology and Meteorology  
Hydrology Division

## Flood Forecasting Section

E-mail: [floodhydrology@gmail.com](mailto:floodhydrology@gmail.com), Site: <http://hydrology.gov.np> Tel: 01-4437238, Toll Free: 1155  
Facebook Page: Flood Forecasting- DHM Nepal, Twitter: @DHM\_FloodEWS

### Bulletin 6

Issued Date: 22 June 2017

Forecast Time: 18.00 (NPT)

Forecast duration: 12 hours

SN	Flood Forecast (Today)	Status	Remarks
1	Water levels in all the major rivers (Mahakali, Karnali, Babai, West Rapti, Narayani, Bagmati, Koshi and Kankai) may likely to be in slightly rising and falling trends from time to time but will remain below warning level during next 12 hours.	No Risk	<b><u>Weather Forecast:</u></b> Generally cloudy in the eastern and central regions along with in the western hilly region and partly cloudy in the rest of the country. Light to moderate rain likely to occur at some places of the eastern and central regions and at a few places of the western region. Source: <a href="http://mfd.gov.np/">http://mfd.gov.np/</a> )

Note: In case of GLOFs and LDOFs or any flood disaster special bulletin will be issued. In order to view the current rainfall and water level of telemetric stations, please go to [http://hydrology.gov.np/new/bull3/index.php/hydrology/rainfall\\_watch](http://hydrology.gov.np/new/bull3/index.php/hydrology/rainfall_watch) & [http://hydrology.gov.np/new/bull3/index.php/hydrology/screen\\_display](http://hydrology.gov.np/new/bull3/index.php/hydrology/screen_display) respectively.

## Media Bulletin

नेपाल सरकार

जनसङ्ख्या तथा वातावरण मन्त्रालय

जल तथा मौसम विज्ञान विभाग

जलविज्ञान महाशाखा

बाढी पूर्वानुमान शाखा

E-mail: [floodhydrology@gmail.com](mailto:floodhydrology@gmail.com), Site: <http://hydrology.gov.np> Tel: 01-4428236, Toll Free: 1155

Facebook Page: Nepal Flood Alert (नेपाल बाढी सूचना), Twitter: @DHM\_FloodEWS

### बिषेश बाढी पूर्वानुमान बुलेटिन

जारी मिति: २९ श्रावण २०७४, बेलुकी ६:०० बजे

**पच्छिम राप्ति र बबई मा हाल सम्म पनि उच्च जोखिम ; जलसतह खतरा भन्दा माथी**

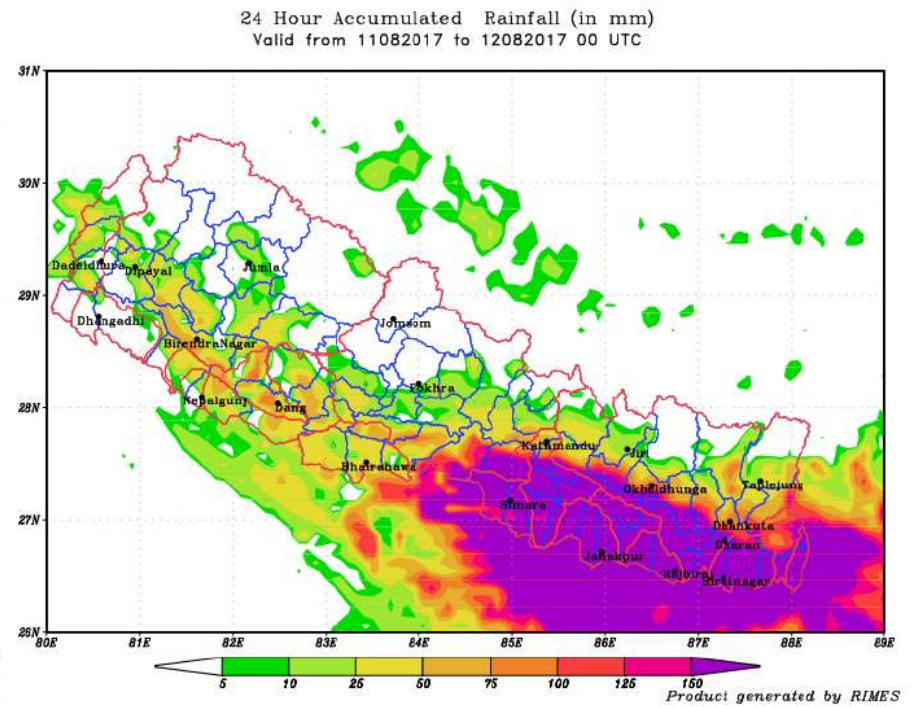
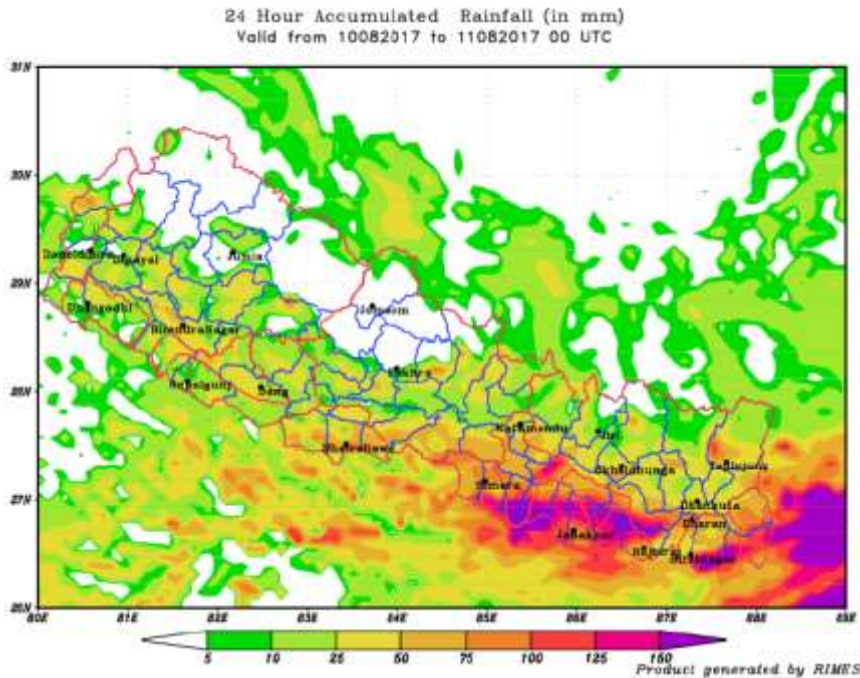
केही दिन देखि निकै सकृय मनसुनले देशको करिव पुरै तराई देखि महाभारत सम्मको क्षेत्रमा भिषण पानी पर्न सुरु भई आज बिहान ६ बजे सम्म कन्काई, बाग्मती, रिउ खोला, रातु, पच्छिम राप्ति, पुर्वि राप्ति, बबई चेपाङ लगायत अन्य बाढि मापन केन्द्रमा जलसतहले खतराको तह पार गरेको र केहिमा जलसतह घट्दै गएको छ भने केही बाढि मापन केन्द्रमा हाल सम्म पनि जलसतह खतराको तह भन्दा उच्च बिन्दुमा छ ।

हिजो बिहान ५ बजे खतराको तह पार गरेको बबईमा मध्य रातपछि झनै सतह बढ्दै गई बिहान ६ बजे हाल सम्मकै उच्च तह (९.९ मिटरमा) पुगेको, दिनभर बढ्ने र घट्ने कम जारी रहेको र हाल सम्म पनि खतराको तह भन्दा माथि रहेकोले तल्लो तटिय क्षेत्रमा भोली बिहान सम्मै उच्च जोखिममा छ ।

हिजो बेलुकी ८ बजे खतराको तह पार गरेको पुर्वि राप्तिको रजैया बाढीमापन केन्द्रमा आज दिउसो पछि बिस्तारै जलसतह घट्दै गएको, चितवन माडीको रिउखोला स्थित बाढि मापन केन्द्रमा पनि आज दिउँसो पछि जलसतह घट्दै गई हाल सतर्कता तह भन्दा केही तल रहेको छ ।

नदिको तटिय र डुबान भईरहने क्षेत्रमा रहनु हुनेहरु अर्को सुचना प्राप्त नभएसम्म सुरक्षित स्थानमा जान अनुरोध गरी बबईमा हिजै दिउँसो २ पटक, आज बिहान ३ बजे, ४:३० बजे र ८:३० बजे, पच्छिम राप्तिको तटिय क्षेत्रमा रहनेलाई अस्तित् राति देखि पटक पटक र आज दिनको ९:३० बजे, पुर्वि राप्तिको तटिय क्षेत्रमा रहनेलाई बेलुकी ५ बजे, ८ बजे, बिहान ३ बजे, बिहान ८:३० बजे, बाग्मति (रौतहट, सर्लाही) मा हिजो बेलुकी ६ बजे र आज बिहान ९ बजे र माडिको रिउखोलामा बिहान ४ बजे SMS पठाएका छौ ।

# Information of Heavy Precipitation : Known 3-days before





# Special Bulletin Issued Two Days before large flood event: 10 Aug, 2017




## जनसंख्या तथा मौसम विज्ञान मन्त्रालय जल तथा मौसम विज्ञान विभाग

पत्र संख्या :  
च. नं. :

### बाढी पूर्वानुमान शाखा विशेष बाढी पूर्वसूचना बुलेटिन

जारी मिति: २६ श्रावण २०७४, दिनको २:१० बजे

- आज देखि नेपालभर मनसुन थप सक्रिय बनेको छ र विशेषगरी पूर्वी र मध्य नेपालका सर्वैजसो स्थानमा हल्का देखि मध्यम वर्षा हुन शुरु भएको छ। मौसमी भविष्यबाणी अनुसार मध्य भुभागको तराई र महाभारत सम्मको क्षेत्र देखि पुर्वी नेपालको तराई र महाभारत सम्मको सबै क्षेत्रमा आज राती देखि भोली सम्मै मध्यम देखि भारी वर्षाको आंकलन गरिएको छ।
- कम्प्युटर मोडलहरूमार्फत गरिएका बाढी भविष्यबाणीहरूले आज राती देखि पूर्वको कन्काई, कोसी, कमला र मध्य भुभागको बागमती, पूर्वरप्ती लगायत नदीजलाधारहरूमा बहाब सतर्कता तह आसपास पुग्ने अनुमान गरिएको छ। पानी पर्ने क्रम भोली बेलुकी सम्मै निरन्तर रहन सक्ने देखिएकोले आज र भोली देखि बहाब झनै बढ्न सक्ने देखिएको हुँदा उल्लेखित नदी जलाधारहरूका विशेषगरी तराईका तटीय तथा डुवान भईरहने क्षेत्रमा भोली बिहानपछी बहाबले खतरा तह समेत पार गर्न सक्छ। उल्लेखित मध्य केही नदीजलाधारहरूमा खतरा तह भन्दा पनि धेरै माथील्लो बहाब समेत हुन सक्ने संभावना रहेको छ। यस वाहेक विशेषगरी चुरेबाट प्रबाह हुने साना नदीहरू: मेची, निन्दा, बिरिङ, पथरी, त्रियुगा, रातु, खांडो, गागन, लालबकैया र आसपासका सबै स-साना खोलानालाहरूका तटिय भुभागहरू पनि आज देखी भोली बेलुकी सम्मै उच्च जोखिममा छन।
- विकसीत हुँदै गरेको यस विशेष मौसमी परिवेशमा उल्लेखित नदी तटीय क्षेत्रका सबै स्थानिय सर्वसाधारण, सो क्षेत्रमा आवतजावत गर्ने व्यक्तीहरू र संबन्धित सबै सरोकारवाला निकायहरू अत्यन्तै सजगतामा रही पूर्वतयारी गर्नुहुन र प्रतिकार्यका लागि तयारी अवस्थामा रहनुहुन समेत विशेष अपिल गरिन्छ।

  
(राजेश शर्मा)  
१३२४

Issued Special flood bulletin & informed to media, Ministry of Home Affairs & other Disaster Management Authorities on 10 August, 2017.

Sent SMS many time to different basin (Kankai, Bagmati, West Rapti, Babai, East Rapti, Madi & Mohana River basin informing that the flash flood is to be happen.

# Samle SMS

- The water level in Flood Forecasting station at Riu-Khola Madi is increasing and likely to cross warning level within **1-2 hours**. So the residence lying in the downstream low land area are requested to be in alert condition.
- The water level in Flood Forecasting station at Riu-Khola Madi as of now at 1:00 am has crossed warning level of 2.5m and expected to cross danger level (3.0m) within few hours. So the residence lying in the downstream low land area are requested to be in high alert condition till 8am.
- The water level in Flood Forecasting station at Riu-Khola Madi at 3:15 am is 3.01 m has crossed danger level of 3.0m & expected to increase water level for few hours. So the residence lying in the downstream low land area are requested to go to safe place.
- Text to be send first to forecaster him/herself & then to public.

# Email to Disaster Management Agencies & Mass SMS



Binod Parajuli <bp\_gorkhali@hotmail.com>

Aug 11, 2017 at 10:17 AM

To: DHM FFS, Sunil Pokharel

Cc: info@mope.gov.np, info@moir.gov.np, gunaso@moha.gov.np, neoc@moha.gov.np, krishnaraut78@gmail.com and 64 more

आदरणीय सर तथा म्याडमहरु,

देशको करीव पुरै तराई देखि महा  
आसपास सम्म पूर्वको झापा, ईलाम  
चितवन, नवलपरासी, रुपन्देही, क  
निन्दा, बिरिङ्ग, कन्काई, पथरी, 1  
र पश्चिममा, मछेली, मोहना, बबई

Flood Alert Service Alpha0.02a

Settings

## Flood Alert Service

Polygon:

Message:

Status: Sending Complete Total Sms Sent: 64999



# Flood Information through email & SMS to Disaster Management Agencies

Narayani\_Basin\_Madi\_Rain\_Madi\_Whole माडी क्षेत्रको गोविन्द बस्ति र आसपास भारी वर्षा भईरहेको छ, रिड

Narayani\_Basin\_Madi\_Rain\_Madi\_Whole माडी क्षेत्रको गोविन्द बस्ति र आसपास भारी वर्षा भईरहेको छ, रिड

Kankai\_Basin\_Hydro\_kankai\_d/s कन्काई र झापाको अन्य साना नदी आसपास भारि वर्षा भई तटीय क्षेत्रमा र

Re: Narayani\_Basin\_Madi\_Rain\_Madi\_Whole ok Regards, Flood Forecasting Section DHM 2017-08

Narayani\_Basin\_Madi\_Rain\_Madi\_Whole माडी क्षेत्रको गोविन्द बस्ति आसपास भारी वर्षा भईरहेको छ, तर

Re: Flood Forecast Update! Dear Sir/Madam, The flood Forecast Bulletin issued on 31 Shrawan (15 /

Re: Babai\_Basin\_Hydro\_Babai\_Chepang\_poligon ok Regards, Flood Forecasting Section DHM On

Babai\_Basin\_Hydro\_Babai\_Chepang\_poligon मध्यतपछि गुलरिया र आसपासमा भारि वर्षा भएको छ, जल

Re: Babai\_Basin\_Hydro\_Babai\_Chepang\_poligon ok Regards, Flood Forecasting Section DHM 2017

Babai\_Basin\_Hydro\_Babai\_Chepang\_poligon बबईमा जलसतह घट्दै गएको र सतर्कता तह नजिकै छ, जि

Re: Narayani\_Basin\_Madi\_Rain\_Madi\_Whole ok Regards, Flood Forecasting Section DHM 2017-08

Narayani\_Basin\_Madi\_Rain\_Madi\_Whole तपाईंको माडी क्षेत्रमा वर्षा भएको छ र जलसतह बढ्दै गई आज

Re: Narayani\_Basin\_Madi\_Rain\_Madi\_Whole ok Regards, Flood Forecasting Section DHM 2017-08

Re: Narayani\_Basin\_Madi\_Rain\_Madi\_Whole ok Regards, Flood Forecasting Section DHM 2017-08

Narayani\_Basin\_Madi\_Rain\_Madi\_Whole तपाईंको माडी क्षेत्रमा वर्षा भएको छ र जलसतह बढ्दै गई आज

Re: Narayani\_Basin\_EastRapti\_Hydro\_EastRapti ok Regards, Flood Forecasting Section DHM 2017-08

# Problems




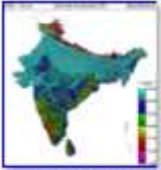

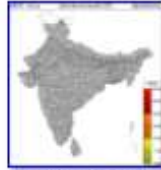
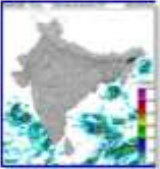


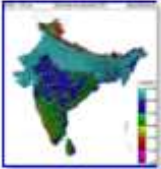

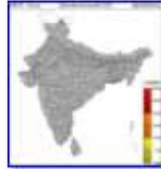
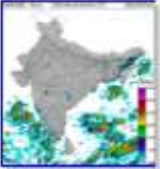
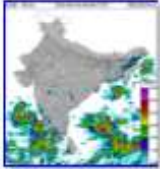



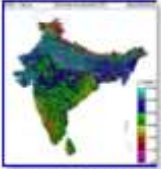

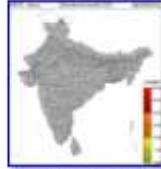



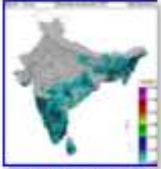
- Limited technical manpower
- Communication network not working during heavy flood in some areas.
- Not good communication network in some area & Satellite communication more expensive.
- Sub basin level forecasting

# Now we have this

## SAsia-FFG - Southern Asia Regional Flash Flood Guidance System

Current Date: 2018-06-05 06:16 UTC      Product Date: 2018-06-04 06:00 UTC  
 Year: 2018    Month: 06    Day: 04    Hour: 06    REGION: REGIONAL    OPTION: MEDIAN    Submit  
 -1 Month    -1 Day    -6 Hours    -1 Hour    +1 Hour    +6 Hours    +1 Day    +1 Month  
 Prev 6-hr Interval (00 UTC)    Reset to Current    Next 6-hr Interval (12 UTC)

### Product Console - Main Table

DT	MWGHE Precipitation	GHE Precipitation	Gauge MAP	Merged MAP	ASM	FFG	IFFT	PFFT
01-hr	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view		 2018-06-04 06:00 UTC Text: view		 2018-06-04 06:00 UTC Text: view	 2018-06-04 01:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view
03-hr	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view		 2018-06-04 06:00 UTC Text: view		 2018-06-04 06:00 UTC Text: view	 2018-06-04 03:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view
06-hr	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view
24-hr	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view	 2018-06-04 06:00 UTC Text: view				

Composite Product: text, CSV, CSVT

SFTP data transfer (requires SFTP Client): EXPORTS/REGIONAL/2018/06/04

### Surfnet Gauge Observations at 2018-06-04 06:00 UTC

Station Identifier	Station Name	Accumulated Precipitation (mm/6hr)	Average temperature (C)	Region	Latitude	Longitude	Elevation	Enable Precipitation Flag	Enable Temperature Flag
41855	Saidpur	No Report	31.00	BANGLADESH	25.75	88.9166667	39	Disabled	Enabled
41859	Rangpur	No Report	31.25	BANGLADESH	26.7333333	89.2333333	33	Disabled	Enabled
41863	Dinajpur	No Report	29.00	BANGLADESH	25.66	89.6833333	36	Disabled	Enabled
41862	Bogra	No Report	31.25	BANGLADESH	24.88	89.2666667	18	Enabled	Enabled
41866	Mymensingh	No Report	31.50	BANGLADESH	24.7166667	90.4333333	18	Disabled	Enabled



Thank You!