

भारत सरकार
अन्तरिक्ष विभाग
राष्ट्रीय सुदूर संवेदन केन्द्र
बालानगर, हैदराबाद-500 625, आं.प्र. भारत
टेलिफोन : +040-23879572-76
+040-23879261-65
फैक्स : +040-23878648



Government of India
Department of Space
National Remote Sensing Centre
Balanagar, Hyderabad-500 625, AP, India
Telephone : +040-23879572-76
+040-23879261-65
Fax : +040-23878648

Dr. A V Suresh Babu

Head, Flood Mapping & Risk Assessment Division
Disaster Management Support Group

Phone: 040-23884544,
e-mail: sureshbabu_av@nrs.c.gov.in

Date: Jun 29, 2022

No: 02-FL-2022-ASSAM/30

Dear Sir,

Sub: Assam Heavy Rains 2022- Near Real Time Flood Mapping using satellite data

Please refer to our earlier mail dated 28th Jun 2022 regarding Near Real Time Flood Inundation Mapping project using satellite data. So far we have sent 29 flood maps covering floods in part of Assam State. Heavy incessant rains in many regions of Assam during the third week of Jun 2022 has led to floods in Assam State. We have analysed IRS SAR & Sentinel-1A SAR data of 28th Jun 2022 (1800 Hrs IST) and an inundation map for part of Assam State is prepared. The map along with a brief report is enclosed herewith for your kind information. **Since the image was acquired during/immediate to the rainfall event, large extents of wet areas were also observed.**

Further, we request you to visit flood page in Bhuvan portal (<https://bhuvan-app1.nrs.c.gov.in/disaster/disaster.php?Id=flood>) NDEM portal (<https://ndem.nrs.c.gov.in>) for better visualization of flood extent in Assam State.

In addition, the inundation layer in GIS ready format and inundation statistics are transmitted to Assam State Remote Sensing Application Centre and North Eastern State Application Centre by e-mail for further value addition and dissemination to user departments.

We will continue to keep a watch on the flood situation and update the information as and when required. Your support and active interaction is highly appreciated. Please provide feedback on the information being provided.

With kind regards

Yours sincerely,
(A V SURESH BABU)

As per the distribution list enclosed in the report.

Assam Heavy Rains – 2022

1.0 Background

Floods were reported in Assam due to heavy incessant rains followed by rise in water levels of Brahmaputra & its tributaries during the third week of Jun, 2022. According to ASDMA, Govt. of Assam, Silchar & Barak valley is the worst affected due to floods. According to Central Water Commission, Brahmaputra river and its tributaries are flowing in severe flood situation at many sites and Barak river is flowing in severe flood situation and has inundated many low lying areas along its banks. (Source: CWC, news media)

2.0 Satellite Data

Flood Disaster Team is keeping a constant watch on the flood situation and checked the satellite data coverage over the affected areas. IRS SAR & Sentinel-1A SAR data of 28th Jun 2022 (1800 Hrs IST) is acquired & analysed. (Refer Table-1).

Table-1 Satellite Data acquired over Flood Affected Area

S No	Date	Satellite / Sensor	Status
1	18-05-2022 (1800 Hrs)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
2	19-05-2022	Indian EO	Analysed and 1 flood map was sent.
3	19-05-2022 (1800 Hrs IST)	RADARSAT-2 SAR	Analysed and 1 flood map was sent.
4	19-05-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
5	19-05-2022 (1000 Hrs IST)	NOVA SAR	Analysed and 1 flood map was sent.
6	20-05-2022 (1000 Hrs IST)	NOVASAR & IRS SAR	Analysed and 1 flood map was sent.
7	21-05-2022 (0600 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
8	22-05-2022 (0600 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
9	22-05-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
10	23-05-2022 (1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
11	24-05-2022	MODIS AQUA	Analysed and 1 flood map was sent.
12	25-05-2022 (1100 Hrs IST)	ALOS-2 PALSAR	Analysed and 1 flood map is being sent.
13	25-05-2022 (1800	Sentinel-1 A SAR	Analysed and 1 flood map was sent.

	Hrs IST) & 26-05-2022 (0600 Hrs IST)		
14	26-05-2022	MODIS TERRA	Analysed and 1 flood map was sent.
15	16-06-2022 (1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
16	16-06-2022 (0600 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
17	17-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
18	18-06-2022 (1800 Hrs IST) 19-06-2022 (0600 Hrs IST)	IRS SAR & Sentinel-1A SAR	Analysed and 1 flood map was sent.
19	19-06-2022 (1800 Hrs IST)	RADARSAT-2 SAR	Analysed and 1 flood map was sent.
20	20-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
21	21-06-2022 (0900 Hrs IST)	NOVA SAR	Analysed and 1 flood map was sent.
22	21-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
23	21-06-2022 (1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
24	22-06-2022 (1100 Hrs IST)	ALOS-2 PALSAR	Analysed and 1 flood map was sent.
25	23-06-2022 (1800 Hrs IST) & 24-06-2022 (0600 Hrs IST)	IRS SAR & Sentinel-1A SAR	Analysed and 1 flood map was sent.
26	24-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
27	25-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
28	26-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
29	27-06-2022 (1800 Hrs IST)	IRS SAR	Analysed and 1 flood map was sent.
30	28-06-2022 (1800 Hrs IST)	IRS SAR & Sentinel-1A SAR	Analysed and 1 flood map is being sent.

3.0 Data Analysis

Satellite data is rectified and inundation layer is extracted. Further, inundation map was composed for part of Assam state based on the analysis of IRS SAR & Sentinel-1A SAR data of 28th Jun 2022 (1800 Hrs IST). The inundation layer is integrated with district boundary layer, for extracting district-wise flood inundation statistics which are shown in the Table-2.

4.0 Observations

Based on the analysis of satellite data, the following points were observed.

- Satellite data covers part of Assam State
- Major inundation was observed in Nagaon, Cachar, Morigaon, Karimganj , Hojai & Barpeta districts.
- The Inundation may include water accumulation in low lying areas due to heavy incessant rainfall.

Table-2:

S. No.	DISTRICT	Inundated Area (in ha)
1	NAGAON	46803
2	CACHAR	35823
3	MORIGAON	31406
4	KARIMGANJ	17453
5	HOJAI	13740
6	BARPETA	13215
7	KAMRUP_RURAL	11732
8	DARRANG	8018
9	HAILAKANDI	7772
10	SONITPUR*	6353
11	KAMRUP_METRO	3724
12	KARBI ANGLONG*	3558
13	NALBARI	3358
14	GOALPARA	3153
15	WEST_KARBI_ANGLONG	2630
16	BAKSA*	2518
17	BAJALI	1970
18	UDALGURI*	1288
19	BONGAIGAON	868
20	BISWANATH*	832
21	DHUBRI*	823
22	CHIRANG*	509
	Total	217546

Note:

-Flood inundation may include rain water accumulation / flood water in low lying areas.

- Districts with inundation less than 100 ha are not included in the statistics
 -* Partially covered in satellite data.

Distribution List:

1	MHA	<ol style="list-style-type: none"> 1. Joint Secretary, NDM, Ministry of Home Affairs, North Block, New Delhi - 110 001. (Through e-mail). 2. NDM control Room, Ministry of Home Affairs, North Block, New Delhi - 110 001 (Through e-mail). 3. DG, NDRF, New Delhi
2	NODAL MINISTRIES	<ol style="list-style-type: none"> 1. Director, FCA, Central Water Commission, Sewa Bhavan, R K PURAM, New Delhi-110066 2. Deputy Director General, Hydrology, India Meteorological Department, Mausam Bhavan, New Delhi -110003
3	STATE	<ol style="list-style-type: none"> 1. Additional Chief Secretary & Relief Commissioner, Govt. of Assam, Janatha Bhavan, Assam Secretariat, Dispur, GUWAHATI-781005. (Hard copy of the map through NESAC/ARSAC also). 2. Scientific Officer, Assam State Remote Sensing Application Centre (ARSAC) Govt of Assam, Guwahati, Assam Fax: 0361-452455 (with a request to disseminate the information to the concerned user depts.)
4	ISRO/DOS	<ol style="list-style-type: none"> 1. Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail) 2. Programme Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail) 3. Associate Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail)
5	NRSC	<ol style="list-style-type: none"> 1. Group Head, DMSG, NRSC 2. Deputy Director (RSA) & Project Director, RRES 3. Associate Director, NRSC 4. Director, NRSC

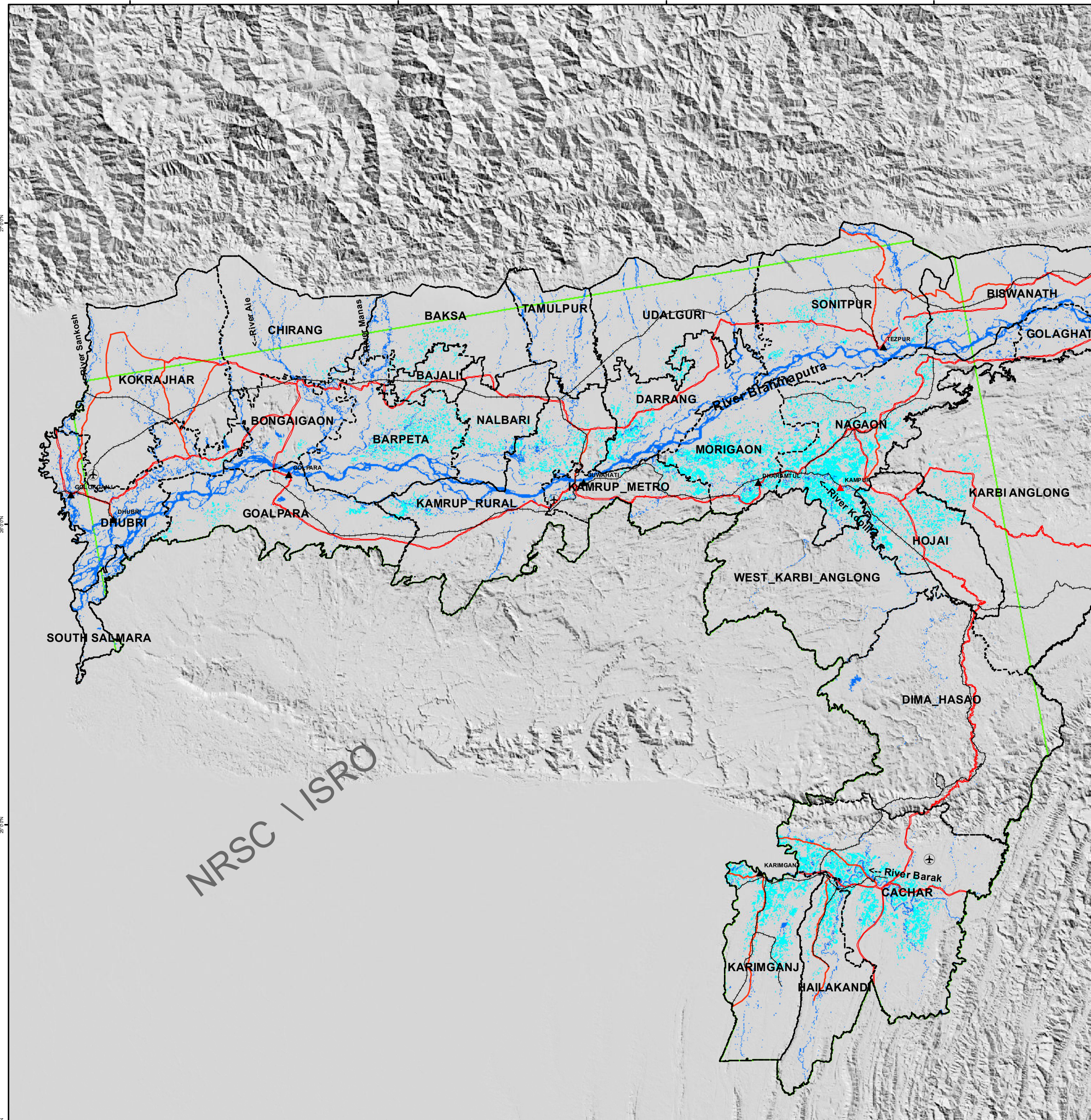
Flood Inundated Areas in Part of Assam State

Based on the analysis of IRS & Sentinel-1A SAR satellite data of 28-Jun-2022 (1800 Hrs IST)

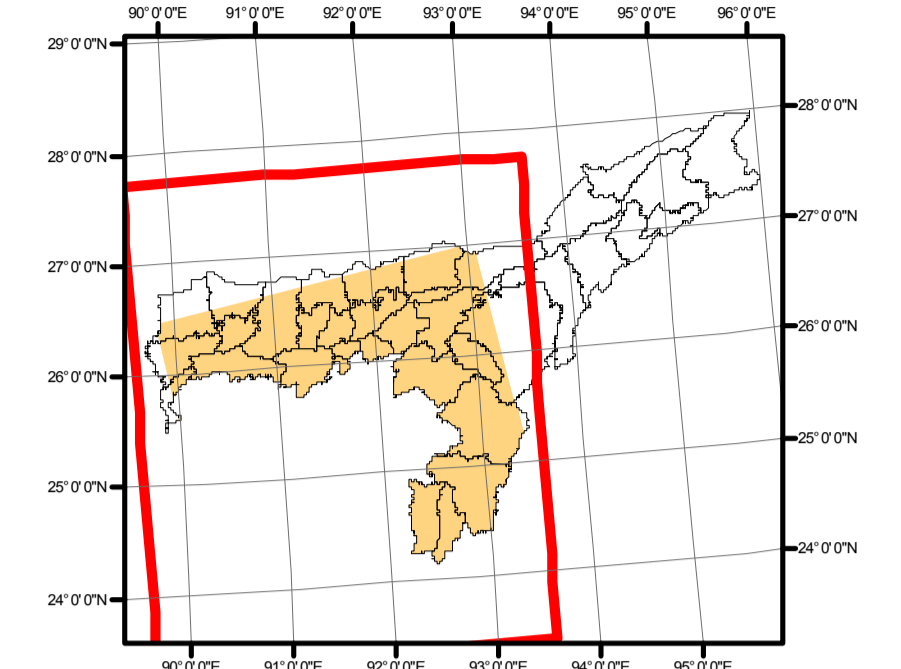
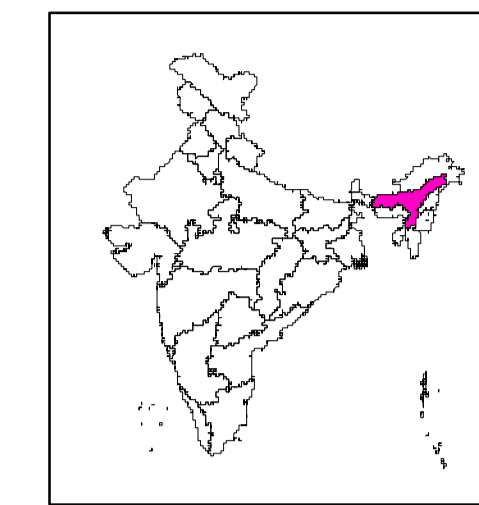
For official use

DISASTER EVENT ID: 02-FL-2022-ASSAM
MAP ID: 2022/29

Date of Issue : 29.06.2022



Location Map



About the Event

Floods were reported in Assam due to heavy incessant rains followed by rise in water levels of Brahmaputra & its tributaries during the third week of Jun, 2022. According to ASDMA, Govt. of Assam, Kamrup-metro is the worst affected district due to flash floods. According to Central Water Commission, River Manas N H Crossing, Pagladiya at N T Crossing, Brahmaputra at Dhubri, Brahmaputra at Nematighat are flowing in severe flood situation. (Source: CWC, newsmedia)

Satellite Observations

This map highlights the inundation in 22 districts of Assam State as on 28 Jun 2022 (1800 Hrs IST).

Satellite data used

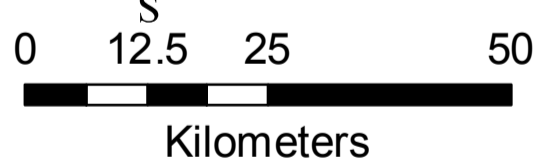
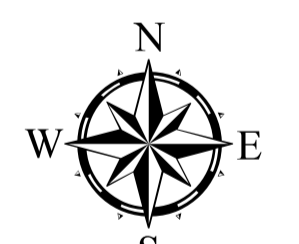
Pre-Flood	Post-Flood
Satellite: ResourceSat-2	IRS SAR data of 28-Jun-22 (1800 Hrs IST)
Sensor: AWiFS	Sentinel-1A SAR data of 28-Jun-22 (1800 Hrs IST)
Date of Pass: 02-Mar-2022	

Other data used

NRC Landuse/Landcover Data
Background data -- Shaded Relief

Legend

	National Highway
	Other Major Roads
	Normal river / Water bodies
	River Bank
	Flood Inundation
	CWC River Gauge- Normal Flood Situation
	CWC River Gauge- Extreme/Severe Flood Situation



This product is prepared on rapid mapping mode for immediate use and sharing amongst official agencies. This provides preliminary results.

Flood inundation may include rain water accumulation / flood water in low lying areas.

All geographic information has limitations due to the scale, resolution, date and interpretation of the original source materials.

No ground verification is done.

RRES
National Remote Sensing Centre, ISRO
Dept. of Space, Govt. of India
Hyderabad- 500 037
E-Mail: flood@nrsc.gov.in
www.nrsc.gov.in



Note: When publishing this map as part of any report, source may be indicated as "NRSC (2022) - Flood Inundated areas in Part of Assam State (as on 28 Jun 2022)" dated 29.06.2022 Map no : 2022/29, NRSC/ISRO, Hyderabad