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Date: June 26, 2023

Ref No: 2023/FL/AS/11

Dear Sir,

Sub: Assam Heavy Rains 2023- Near Real Time Flood Mapping using satellite data

Please refer to our earlier mail dated 26-Jun-2023 regarding mapping and monitoring of flood inundation in Near Real Time in Assam State using Sentinel-1A SAR satellite data. Heavy incessant rains in many regions of Assam during the third week of June, 2023 has led to floods in Assam State. We have analyzed Sentinel-1A SAR satellite dataset of 26<sup>th</sup> June 2023 (0600 Hrs) and an inundation flood 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 NDEM portal (<https://ndem.nrs.gov.in>) and Bhuvan portal (<https://bhuvan-app1.nrs.gov.in/disaster/disaster.php?id=flood>) for better visualization of flood extent in Assam State.

In addition, the flood 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.**

# Mapping and Monitoring of Flood situation in Assam State during 2023

## 1.0 Background

Floods were reported in Assam due to heavy rains followed by rise in water levels of Brahmaputra & its tributaries during the third week of June, 2023.

(Source: CWC, News media, ASDMA-Assam )

## 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 Sentinel-1A SAR satellite dataset of 26<sup>th</sup> June 2023 (0600 Hrs) is acquired & analyzed. (Refer Table-1).

**Table-1 Satellite Data acquired over Flood Affected Area**

S No	Date	Satellite / Sensor	Districts affected
1	16.06.2023 (1800 Hrs)	Sentinel-1A SAR	Goalpara, Dhubri, Bongaigaon, Barpeta*, Kokrajhar, Kamrup Rural*, Chirang, Baksa, South Salmara Mancachar
2	17.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- MRS	Dhemaji, Tinsukia, Sibsagar, Charaideo, Dibrugarh
3	18.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Golaghat, Cachar, Biswanath*, Lakhimpur, Karimganj, Sonitpur, Jorhat*, Nagaon
4	16.06.2023 to 18.06.2023	Multi Satellite/ Sensor Data	Golaghat, Cachar, Goalpara, Biswanath, Dibrugarh*, Dhubri, Lakhimpur, Bongaigaon, Kokrajhar, Barpeta*, Karimganj, Sonitpur, Jorhat*, Nagaon
5	19.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Dibrugarh, Sibsagar, Tinsukia
6	20.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Barpeta, Kamrup Rural, Baksa, Cachar*, Karimganj, Nalbari, Bongaigaon, Goalpara*, Darrang, Marigaon
7	21.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Cachar, Kamrup Rural*, Darrang, Karimganj, Nagaon, Baksa*
8	22.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Sibsagar, Lakhimpur*, Jorhat

9	23.06.2023 (1800 Hrs)	Sentinel-1A SAR	Barpeta*, Kamrup Rural, Darrang, Cachar, Nalbari, Nagaon, Karimganj, Baksa*, Marigaon*, Sonitpur*, Udalguri*, Hojai, Goalpara*, Hailakhandi, Bongaigaon*
10	25.06.2023 (1800 Hrs)	Sentinel-1A SAR	Sibsagar*, Dibrugarh
11	26.06.2023 (0600 Hrs)	Sentinel-1A SAR	Kamrup Rural*, Darrang, Marigaon, Nalbari, Cachar, Karimganj, Nagaon

### 3.0 Satellite Data Analysis

Satellite data is rectified and flood inundation layer is extracted. Further, flood inundation map was composed for part of Assam state based on the analysis of Sentinel-1A SAR satellite dataset of 26<sup>th</sup> June 2023 (0600 Hrs). The cumulative flood 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 from Satellite Images

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

- Satellite data covers part of Assam State
- Major inundation was observed in Kamrup Rural\*, Darrang, Marigaon, Nalbari, Cachar, Karimganj and Nagaon districts.
- The Inundation may include water accumulation in low lying areas due to heavy incessant rainfall.

**Table-2:**

S. No.	District	Inundated Area (ha)
1	KAMRUP RURAL *	17742
2	DARRANG	13717
3	MARIGAON	11852
4	NALBARI	11058
5	CACHAR	8347
6	KARIMGANJ	7712
7	NAGAON	6043
8	HOJAI	3817
9	KARBI ANGLONG	3271

10	KAMRUP METRO	2865
11	HAILAKANDI	2822
12	UDALGURI	2411
13	SONITPUR	2356
14	BARPETA*	1233
15	BISWANATH	990
16	GOLAGHAT*	807
17	BAKSA*	164
	<b>TOTAL</b>	<b>97207</b>

**Note:**

- Flood inundation may include rain water accumulation / flood water in low lying areas/ swampy 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"> <li>1. Additional Secretary,(DM &amp; FFR), Ministry of Home Affairs, Govt. of India, Room No.171-B, North Block, New Delhi-110001.</li> <li>2. Joint Secretary, NDM, Ministry of Home Affairs, North Block, New Delhi - 110 001.</li> <li>3. NDM control Room, Ministry of Home Affairs, North Block, New Delhi - 110 001.</li> <li>4. DG, NDRF, New Delhi</li> </ol>
2	NODAL MINISTRIES	<ol style="list-style-type: none"> <li>1. Director, FCA, Central Water Commission, Sewa Bhavan, R K PURAM, New Delhi-110066</li> <li>2. Deputy Director General, Hydrology, India Meteorological Department, Mausam Bhavan, New Delhi -110003</li> </ol>
3	STATE	<ol style="list-style-type: none"> <li>1. Additional Chief Secretary &amp; Relief Commissioner, Govt. of Assam, Janatha Bhavan, Assam Secretariat, Dispur, GUWAHATI-781005.</li> <li>2. Scientific Officer, Assam State Remote Sensing Application Centre (ARSAC) Govt of Assam, Guwahati, Assam.</li> </ol>
4	ISRO/DOS	<ol style="list-style-type: none"> <li>1. Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.</li> <li>2. Programme Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.</li> <li>3. Associate Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.</li> </ol>
5	NRSC	<ol style="list-style-type: none"> <li>1. Group Director, DMSG,NRSC</li> <li>2. Deputy Director (RSA) &amp; Project Director, RRES</li> <li>3. Director, NRSC</li> </ol>

### Flood Inundation Areas in Part of ASSAM State

Based on the analysis of Sentinel-1A - SAR Satellite Image of 26-06-2023 (0600 Hrs IST)

Map ID:2022/FL/ASSAM/11/26062023  
Date Of Issue:26.06.2023

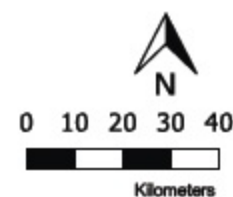
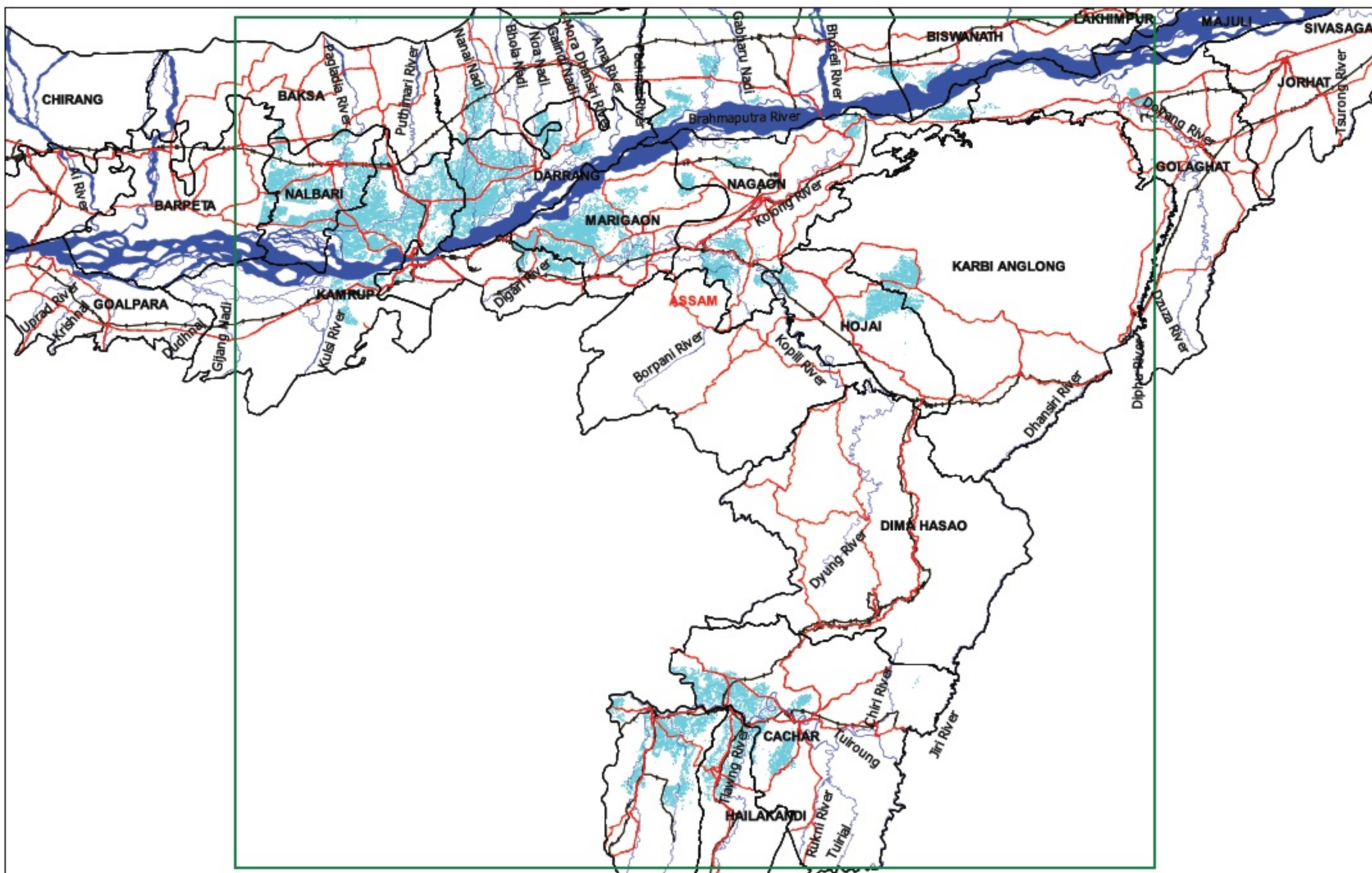
**About the Event**  
Floods were reported in Assam during the third week of June, 2023 due to heavy rains. (Source: ASDMA, CWC, News Media)

**Satellite Observations:**  
This map highlights the inundation in 17 districts of Assam as on 26-Jun-2023 (0600 Hrs)

**Satellite Data Used**  
**Pre Flood Data**  
Satellite: Resourcesat-2A AWiFS  
Date of Pass: 15-03-2023

**Post Flood Data**  
Satellite: Sentinel-1A - SAR  
Date of Pass: 26-06-2023

**Other data used**  
NRSC Landuse/Landcover Data of 2018-19, Bhuvan Geospatial Legacy Data



- District Boundary
- Major Roads
- Railway Line
- River
- Flood Inundation
- Satellite Data Coverage



Disclaimer : 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

Citation ' NRSC (2023) - Flood Inundated areas in Part of assam State (as on 26-06-2023) dated 2023 Map no : 2022/FL/ASSAM/11/26062023, NRSC/ISRO,Hyderabad

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