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No: 09-FL-2018-UP/06

Dear Sir,

Sub: Uttar Pradesh Heavy Rains 2018- Near Real Time Inundation Mapping using satellite data

Please refer to our earlier mail dated 3rd September 2018 regarding 'Near Real Time Flood Mapping' project using satellite data. So far we have sent five flood map covering floods in Uttar Pradesh State. Floods were reported due to heavy incessant rains in Uttar Pradesh state during first week of September 2018. We have analyzed Radarsat-2 SAR satellite data of 5<sup>th</sup> September 2018 (1800 Hours) and a flood map for part of Uttar Pradesh State is prepared.

The flood 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 ([bhuvan-noeda.nrsc.gov.in/disaster/disaster/disaster.php](http://bhuvan-noeda.nrsc.gov.in/disaster/disaster/disaster.php)) for better visualization of inundation extent in Uttar Pradesh State.

In addition, the inundation layer in GIS ready format and inundation statistics are transmitted to Uttar Pradesh Remote Sensing Application Centre (UP-RSAC) by e-mail for further value addition and dissemination to concerned 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,**

**(K H V Durga Rao)**

**As per the distribution list enclosed in the report.**

# Uttar Pradesh Floods – 2018

## 1.0 Background

Heavy incessant rains were reported in various parts of Uttar Pradesh in the first week of September, 2018. River Ghaghra was flowing in severe situation at Ayodhya, Turtipar and Elginbridge. River Ramganga was reported to be flowing in severe flood situation at Dabri in Shahjahanpur. River Ganga was reported to be flowing in severe condition at Balia, Fatehgarh in Farrukhabad and at Kachhlalbridge in Badaun.

(Source: News Media, CWC).

## 2.0 Satellite Data

Flood Disaster Team is keeping a constant watch on the inundation situation and checked the satellite data coverage over the affected areas. Radarsat-2 SAR satellite data of 5<sup>th</sup> September 2018 (1800 hours) was acquired and analysed. (Refer Table-1).

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

S No	Date	Satellite / Sensor	Status
1	04-08-18	Sentinel-1A SAR	Analyzed and 1 inundation map was sent.
2	16-08-18	Radarsat-2 SAR	Analyzed and 1 inundation map was sent..
3	28-08-18	Radarsat-2 SAR	Analyzed and 1 inundation map was sent.
4	31-08-18	Radarsat-2 SAR	Analyzed and 1 inundation map was sent.
5	01-09-18	Sentinel-1A SAR	Analyzed and 1 inundation map was sent.
6	05-09-18	Radarsat-2 SAR	Analyzed and 1 inundation 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 Uttar Pradesh state based on the analysis of Radarsat-2 SAR satellite data of 5<sup>th</sup> September 2018. The inundation layer is integrated with district boundaries layer, for extracting district-wise inundation statistics which are shown in the Table-2.

## 4.0 Observations

Based on the analysis of satellite data, the following are observations

- Satellite data covers part of Uttar Pradesh State
- Major Inundation is observed in parts of Unnao, Farrukhabad, Gorakhpur, Hardoi, Azamgarh and Etah districts.

**Table-2**

S. No	DISTRICT	FLOOD AREA (Ha)
1	UNNAO	15588
2	FARRUKHABAD	9807
3	GORAKHPUR*	9783
4	HARDOI	9361
5	AZAMGARH	5008
6	ETAH	4075
7	GONDA	2977
8	BARABANKI	2812
9	SHAHJAHANPUR	2640
10	KANNAUJ	2571
11	BUDAUN	2532
12	BAHRAICH	2405
13	ST.KABIR NAGAR	2261
14	SIDDHARTHANAGAR*	2146
15	BALRAMPUR	1894
16	KANPUR	1866
17	FAIZABAD	1522
18	BASTI	1257
19	RAEBARELI	1144
	<b>Total</b>	<b>81692</b>

-Inundation include rain water accumulation / flood water in low lying areas.

-Districts with inundation less than 1000 ha are not included in the statistics

-\*Partially covered in satellite data

#### **Distribution List (through e-mail):**

1	MHA	1. Joint Secretary, NDM, Ministry of Home Affairs, North Block, New Delhi. 2. NDM control Room, Ministry of Home Affairs, North Block, New Delhi 3. Director, DM-III, NDM, Ministry of Home Affairs, North Block, New Delhi.
2	NDMA	1. Vice Chairman, National Disaster Management Authority (NDMA), New Delhi 2. Control Room, National Disaster Management Authority (NDMA), New Delhi
3	NODAL MINISTRIES	1. Chairman, Central Water Commission, Sewa Bhavan, R K PURAM, New Delhi 2. ADGM (H & A), India Meteorological Department, Mausam Bhavan, New Delhi
4	STATE	1. Secretary, Revenue Department, Govt. of Uttar Pradesh, Bapubhawan, Lucknow – 226 001. 2. Uttar Pradesh Remote Sensing Application Centre, Lucknow (With a request to disseminate the information to the concerned departments)
5	ISRO/DOS	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)
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