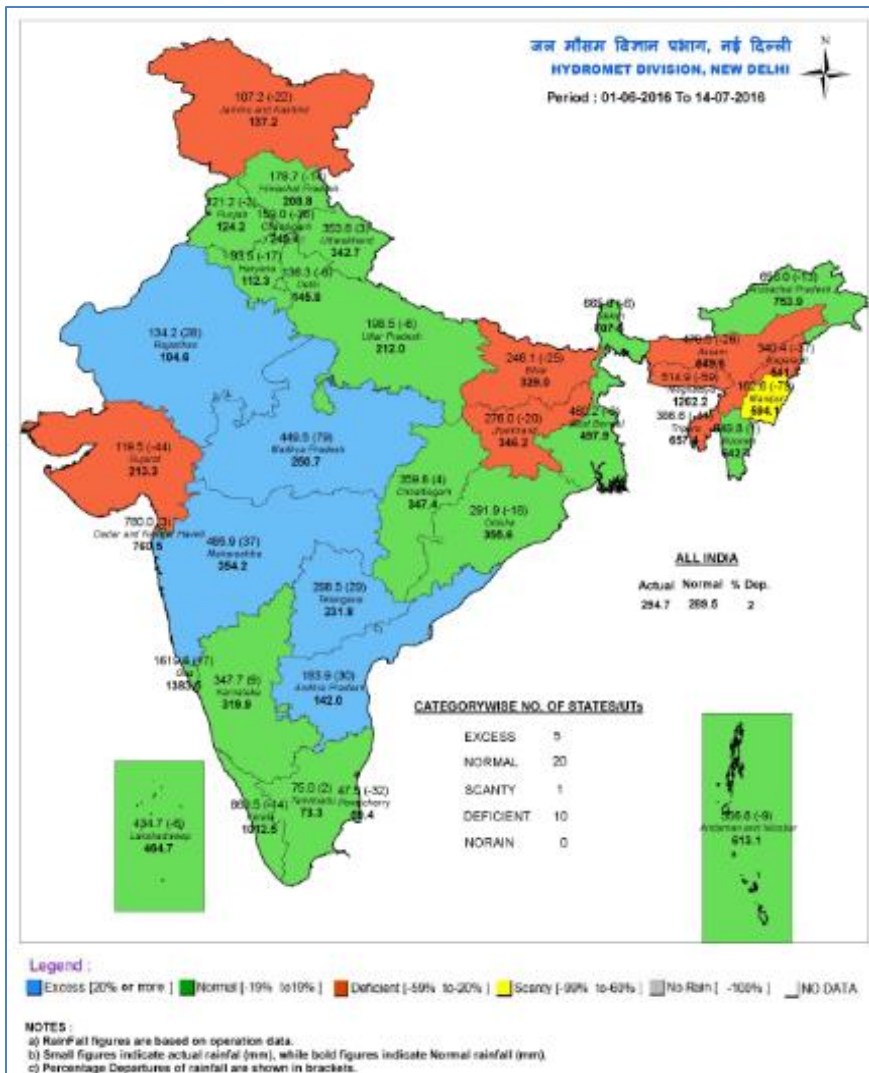


## Indian Monsoon Dynamics

### Recent Weather Development

- Warning of very heavy rainfall in seven states on 16 and 17 July, the India Meteorological Department (IMD) on Thursday issued a red alert in the states of Bihar, Sikkim, Assam, Meghalaya, Himachal Pradesh, Uttar Pradesh and Uttarakhand. In its weekly update, the government forecaster said the monsoon had covered the entire country this week and the surplus stood at 2% since the season began in June. Madhya Pradesh and Assam struggled with floods in the past week as heavy rainfall lashed the states and rivers rose above the danger mark.
- Rain/snow occurred at most places over Uttarakhand; at many places over Himachal Pradesh; at a few places over Jammu & Kashmir. Rain occurred at most places over East Uttar Pradesh, Haryana, Chandigarh & Delhi, Jharkhand, Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, Konkan & Goa, Coastal Karnataka, Kerala & Lakshadweep; at many places over Bihar, Odisha, Sub-Himalayan West Bengal & Sikkim, Assam & Meghalaya, Madhya Maharashtra, Andaman & Nicobar



- Islands; at a few places over West Uttar Pradesh, Punjab, East Rajasthan, Madhya Pradesh, Gujarat, Gangetic West Bengal, South Interior Karnataka & Tamil Nadu and at isolated places over West Rajasthan, Chhattisgarh, Marathawada, Vidarbha & Coastal Andhra Pradesh.
- Minimum temperature are appreciably above normal (3.0°C to 5.0°C) at many places over Jammu & Kashmir; at isolated over Assam & Meghalaya; above normal (1.6°C to 3.0°C) at many places over Uttarakhand, West Rajasthan and Coastal Andhra Pradesh; at a few places over rest Jammu & Kashmir, Himachal Pradesh, East Madhya Pradesh, Vidarbha, Telangana, Rayalaseema, South Interior Karnataka, Tamil Nadu and Andaman & Nicobar Islands; at isolated places over East Rajasthan. They are appreciably below normal (3.1°C to 5.0°C) at isolated places over rest East Madhya Pradesh; below normal (1.6°C to 3.0°C) at isolated places over West Madhya Pradesh and rest Assam & Meghalaya and near normal over rest of the country.

- Maximum temperatures were appreciably above normal (3.1°C to 5.0°C) at many places over Coast Karnataka and Tamil Nadu & Puducherry; above normal (1.6°C to 3.0°C) at most places over Telangana; at many places over Uttar Pradesh, Rayalaseema and Vidarbha; at a few places over Himachal Pradesh, Gujarat, West Bengal & Sikkim, Jharkhand, Bihar, Odisha, South Interior Karnataka and at isolated places over Konkan & Goa, Andaman & Nicobar Islands, Assam & Meghalaya and Kerala. They were appreciably below normal (3.1°C to 5.0°C) at a few places over Madhya Pradesh, East Rajasthan, Punjab, Haryana, Chandigarh & Delhi and Arunachal Pradesh; below normal (1.6°C to 3.0°C) at isolated places over Madhya Maharashtra and Chhattisgarh and near normal over the rest of the country. The highest maximum temperature of 41.7°C recorded at Ganganagar (Rajasthan) in the country.
- Maximum temperatures were above normal (1.6°C to 3.0°C) at many places over northeastern states; at a few places over Himachal Pradesh, Jharkhand and Coastal Karnataka and at isolated places over Jammu & Kashmir, Gujarat region, Gangetic West Bengal, coastal Odisha, Coastal Andhra Pradesh, Kerala and Tamil Nadu. They were markedly below normal (5.0°C or less) at many places over East Madhya Pradesh and at a few places over West Madhya Pradesh; appreciably below normal (3.1°C to 5.0°C) at many places over Marathwada and at isolated places over Vidarbha; below normal (1.6°C to 3.0°C) at most places over Chhattisgarh; at many places over south Madhya Maharashtra and at isolated places interior Odisha and Telangana and near normal over the rest of the country. The highest maximum temperature of 42.1°C recorded at Churu (Rajasthan) in the country.
- The axis of monsoon trough at mean sea level now passes through Ferozpur, Delhi, Hamirpur, Daltonganj, Midnapore and thence east-southeastwards to northeast Bay of Bengal and extends upto 0.9 km above mean sea level. The axis of monsoon trough is likely to shift northwards close to foothill of Himalaya during next 24 hours. A fresh upper air cyclonic circulation lies over central parts of Uttar Pradesh and extends between 1.5 km & 3.6 km above mean sea level. The upper air cyclonic circulation over northeast Arabian Sea and adjoining areas of Saurashtra between 3.6 km & 5.8 km above mean sea level persists. The western disturbance as a trough in mid-tropospheric westerlies roughly along Longitude 66°E and north of Latitude 32°N persists. A fresh upper air cyclonic circulation lies over southwest Bay of Bengal & adjoining Sri Lanka between 3.1 km & 5.8 km above mean sea level.
- India's southwest monsoon was around 11 per cent more than normal during the week ended Wednesday, which has pushed the overall rains received so far in this season to four per cent more than normal. However, there were still pockets of distress, particularly in Saurashtra and Kutch regions of Gujarat, where the showers till date were almost 44 per cent less than normal.
- The total sown area as on 15th July, 2016 as per reports received from States, stands at 559.76 lakh hectare as compared to 548.38 lakh hectare at this time last year. It is reported that rice has been sown/transplanted in 123.93 lakh ha, pulses in 71.07 lakh ha, coarse cereals in 105.98 lakh ha, oilseeds in 130.12 lakh ha, sugarcane in 45.78 lakh hectare and cotton in 75.41 lakh ha. The details of the area covered so far and that covered during this time last year are given in the adjacent Table.

**Seasonal Rainfall (in mm) from 1 June to 14 July, 2016**

Region	Actual	Normal	% Departure from Long Period Average
East & Northeast India	424.4	557	-24%
Northwest India	154.2	156.2	-1%
Central India	372	304.2	22%
South Peninsula	276.8	255.4	8%
India	294.7	289.5	2%

Source: IMD, Govt. of India

**Current Sowing Progress (Till 14.07.2016)**

Crop	Area sown in 2016-17	Area sown in 2015-16
Rice	123.93	122.99
Pulses	71.07	51.12
Coarse Cereals	105.98	101.45
Oilseeds	130.12	127.13
Sugarcane	45.78	44.8
Jute & Mesta	7.47	7.67
Cotton	75.41	93.22
<b>Total</b>	<b>559.76</b>	<b>548.38</b>

Source: Ministry of Agriculture, Govt. of India

## State wise Development in Rainfall Activity

S NO	MET. SUBDIVISION/UT/STATE/DISTRICT	Day:14-07-2016				Period:01-06-2016 To 14-07-2016			
		ACTUAL (mm)	NORMAL (mm)	%DEP.	CAT.	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT.
<b>REGION : EAST AND NORTH EAST INDIA</b>									
1	ARUNACHAL PRADESH	20.3	18.1	12%	N	656.0	753.9	-13%	N
2	ASSAM	4.8	12.1	-61%	S	478.5	649.6	-26%	D
3	MEGHALAYA	31.4	22.6	39%	E	514.9	1262.2	-59%	D
4	NAGALAND	17.6	14.5	21%	E	340.4	541.3	-37%	D
5	MANIPUR	0.0	11.5	-100%	NR	162.6	594.1	-73%	S
6	MIZORAM	2.3	14.5	-84%	S	649.8	642.4	1%	N
7	TRIPURA	0.4	12.7	-97%	S	386.6	657.4	-41%	D
8	SIKKIM	8.4	13.0	-35%	D	665.6	707.5	-6%	N
9	WEST BENGAL	6.4	14.1	-55%	D	460.2	497.9	-8%	N
10	JHARKHAND	1.9	10.0	-81%	S	276.0	346.2	-20%	D
11	BIHAR	2.6	12.9	-80%	S	246.1	329.0	-25%	D
<b>REGION : NORTH WEST INDIA</b>									
1	UTTAR PRADESH	3.6	10.1	-64%	S	198.5	212.0	-6%	N
2	UTTARAKHAND	16.5	14.5	14%	N	353.6	342.7	3%	N
3	HARYANA	5.6	5.7	-2%	N	93.5	112.3	-17%	N
4	CHANDIGARH (UT)	11.0	9.4	17%	N	159.0	249.4	-36%	D
5	DELHI (UT)	16.5	8.3	99%	E	136.3	145.8	-6%	N
6	PUNJAB	1.8	6.4	-71%	S	121.2	124.2	-2%	N
7	HIMACHAL PRADESH	3.0	9.7	-70%	S	178.7	208.8	-14%	N
8	JAMMU & KASHMIR	3.4	7.8	-56%	D	107.2	137.2	-22%	D
9	RAJASTHAN	7.7	6.0	28%	E	134.2	104.6	28%	E
<b>REGION : CENTRAL INDIA</b>									
1	ODISHA	4.6	10.1	-54%	D	291.9	355.6	-18%	N
2	MADHYA PRADESH	3.5	10.3	-66%	S	449.5	250.7	79%	E
3	GUJARAT	8.2	9.8	-16%	N	119.5	213.3	-44%	D
4	DADAR & NAGAR HAVELI (UT)	32.4	23.1	40%	E	780.0	760.5	3%	N
5	DAMAN & DIU (UT)	7.8	17.6	-56%	D	484.1	600.3	-19%	N
6	GOA	14.1	37.7	-63%	S	1619.6	1383.5	17%	N
7	MAHARASHTRA	4.3	10.5	-59%	D	485.9	354.2	37%	E
8	CHHATTISGARH	2.4	11.6	-80%	S	359.8	347.4	4%	N
<b>REGION : SOUTH PENINSULA</b>									
1	ANDAMAN & NICOBAR (UT)	1.7	13.4	-87%	S	556.8	613.1	-9%	N
2	ANDHRA PRADESH	0.0	3.8	-99%	S	183.9	142.0	30%	E
3	TELANGANA	1.1	6.4	-83%	S	298.5	231.8	29%	E
4	TAMIL NADU	0.2	1.8	-91%	S	75.0	73.3	2%	N
5	PONDICHERRY (UT)	0.0	0.9	-100%	NR	47.5	69.4	-32%	D
6	KARNATAKA	3.7	8.5	-56%	D	347.7	319.9	9%	N
7	KERALA	12.6	21.7	-42%	D	869.5	1012.5	-14%	N
8	LAKSHADWEEP (UT)	0.8	10.6	-92%	S	434.7	464.7	-6%	N
<b>COUNTRY :</b>		<b>4.9</b>	<b>9.5</b>	<b>-49%</b>		<b>294.7</b>	<b>289.5</b>	<b>2%</b>	

Source: IMD, Govt. of India

For the country as a whole, cumulative rainfall during this year's from 1st June 2016 to 14<sup>th</sup> July 2016 has been surplus by 2 % (Below Normal). The details are given in the table above.

**Major Updates & Forecast for the Coming Week and Ahead**

- Backed by acreage for pulses that recorded a substantial jump this week, the total sown area under kharif (summer) crops has for the first time this season crossed the mark of the overall acreage of these crops during the corresponding period last year.
- Area under pulses increased from 45.94 lakh hectare as on July 8 to 71.07 lakh hectare on Friday. As compared to the corresponding period last year, the acreage for pulses shows a substantial jump. The acreage was 51.12 lakh hectare at this time last year.
- Sown area under pulses increased in Karnataka, Madhya Pradesh, Rajasthan and Maharashtra. Though there was a marginal increase in area under paddy, coarse cereals, oilseeds and sugarcane during the week, area under cotton crop was down by 24% during the said period.
- A total of 31 meteorological sub-divisions, accounting for 86 per cent of the geographical area of the country, have received normal-to-excess rains, whereas only five sub-divisions received deficient rains for the period.
- Among the sub-divisions that received deficient rains are Gujarat, Saurashtra, Kutch, Bihar, Assam & Meghalaya and NMMT (Nagaland, Manipur, Mizoram and Tripura). The pick-up in rains across the country has also resulted in an improvement of water levels in reservoirs.
- July has performed extremely well so far. July is the rainiest month of the season which on an average records 289 mm of rain. With still two more days to go for reaching half of the month, country has also already recorded 145 mm of rain and is excess by 24%.

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