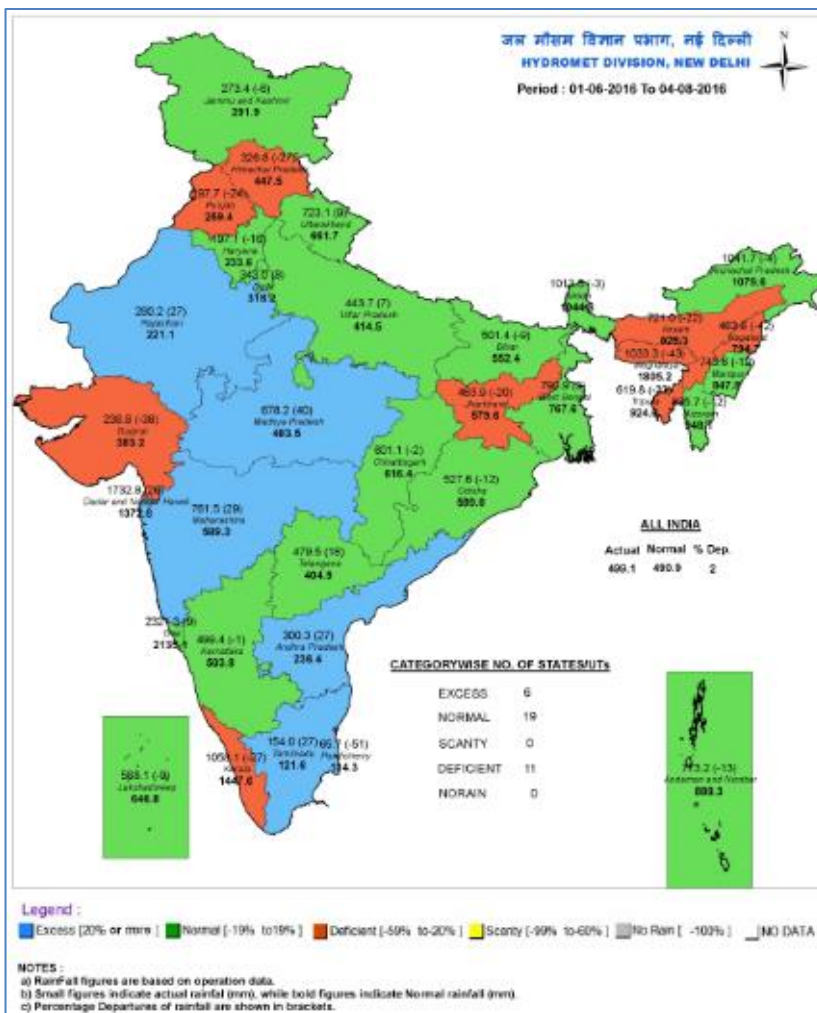


Indian Monsoon Dynamics

Recent Weather Development

- Monsoon rains in India were 6 percent above average in the week ended Aug. 3. The weather office has retained its forecast for an above-average monsoon this year, boosting hopes of a rise in farm output and income after two years of drought. An average or normal monsoon means rainfall between 96 and 104 percent of a 50-year average of 89 centimeters.
- At present, the state of Gujarat is highly rain deficient at 38 percent. Also, while the Saurashtra region is rain deficient by 46 percent, rainfall deficiency stands at 30 percent over the Gujarat region.
- The low pressure area over north Odisha & adjoining areas of Jharkhand & Gangetic West Bengal and northwest Bay of Bengal now lies over north Odisha and adjoining Jharkhand & Gangetic West Bengal. The associated upper air cyclonic circulation extending upto mid-tropospheric levels. The axis of monsoon trough at mean sea level passes through Bikaner, Sawai Madhopur, Satna, Ambikapur, centre of low pressure area and thence southeastwards to east-central Bay of Bengal and extends upto 1.5 Km above mean sea level. The upper air cyclonic circulation over northwest Madhya Pradesh & neighbourhood persists and now extends upto 1.5 Km above mean sea level. The upper air cyclonic circulation over south Rajasthan & neighbourhood extending upto 1.5 Km above mean sea level persists. The western disturbance as a trough in mid-tropospheric westerlies roughly along longitude 65.0°E and north of latitude 30.0°N persists. An upper air cyclonic circulation lies over Assam & Meghalaya and adjoining Nagaland, Manipur, Mizoram & Tripura and extends upto 1.5 Km above mean sea level.
- Rain occurred at most places over Jharkhand, Chhattisgarh, Gangetic West Bengal, Odisha, North Interior Karnataka and Coastal Karnataka; at many places over East Rajasthan, West Madhya Pradesh, Saurashtra & Kutch, Konkan & Goa, Madhya Maharashtra and Kerala; at a few places over East Madhya Pradesh, Gujarat region, South Interior Karnataka and Coastal Andhra Pradesh and at isolated places over Himachal Pradesh,



Haryana, Chandigarh & Delhi, West Rajasthan, Assam & Meghalaya, Vidarbha, Marathwada, Telangana, Lakshadweep, Tamil Nadu and Andaman & Nicobar Islands.

- Minimum temperatures were appreciably above normal (3.1°C to 5.0°C) at isolated places over Himachal Pradesh; above normal (1.6°C to 3.0°C) at most places over Uttarakhand and Sub-Himalayan West Bengal & Sim; at many places over Punjab and Andaman & Nicobar Islands; at a few places over Haryana, Chandigarh & Delhi and at isolated places over East Rajasthan, West Madhya Pradesh, Nagaland, Manipur, Mizoram & Tripura,

Seasonal Rainfall (in mm) from 1 June to 4 August, 2016

| Region | Actual | Normal | % Departure from Long Period Average |
|------------------------|--------|--------|--------------------------------------|
| East & Northeast India | 712.9 | 835.4 | -15% |
| Northwest India | 334 | 319.8 | 4% |
| Central India | 598.8 | 534.6 | 12% |
| South Peninsula | 413.2 | 404.1 | 2% |
| All India | 499.1 | 490.9 | 2% |

Source: IMD, Govt. of India

State wise Monsoon Season Status (05.08.2016)

| CATEGORY | Day:04-08-2016 | Period:01-06-2016 To 04-08-2016 |
|-----------|----------------|---------------------------------|
| | NO.OF STATES | NO.OF STATES |
| Excess | 7 | 6 |
| Normal | 5 | 19 |
| Deficient | 7 | 11 |
| Scanty | 12 | 0 |
| NoRain | 5 | 0 |
| NoData | 0 | 0 |

Source: IMD, Govt. of India

Coastal Andhra Pradesh, Tamil Nadu and Kerala. They were appreciably below normal (-3.1°C to -5.0°C) at isolated places over Odisha; below normal (-1.6°C to -3.1°C) at isolated places over West Rajasthan and rest of Odisha and near normal over rest of the country.

- Maximum temperatures were markedly above normal (5.1°C or more) at isolated places over Am & Meghalaya; appreciably above normal (3.1°C to 5.0°C) at isolated places over Kerala; above normal (1.6°C to 3.0°C) at most places over Uttarakhand and Punjab; at a few places over Himachal Pradesh, West Uttar Pradesh, Bihar, Sub-Himalayan West Bengal & Sim, Nagaland, Manipur, Mizoram & Tripura; at isolated places over Haryana, Chandigarh & Delhi, East Uttar Pradesh, East Madhya Pradesh, Saurashtra & Kutch and Tamil Nadu. They were appreciably below normal (-3.1°C to -5.0°C) at a few places over West Madhya Pradesh, Vidarbha and Marathwada at isolated places over West Rajasthan, Telangana and Coastal Andhra Pradesh; below normal (-1.6°C to -3.1°C) at most places over North Interior Karnataka; at many places over Madhya Maharashtra and Odisha and at isolated places over Jammu & Kashmir, East Rajasthan, Gujarat region, Gangetic West Bengal and Rayalaseema and near normal over rest of the country.
- Incidence of white fly & jassid on cotton crop has been reported in low to moderate intensity in Gumjal, Panniwalamals, Panjkosi & Killianwali villages under Khuian sarwar block of Fazilka district; Behlewal, Khara, Seda Sing Wala, Kothe Chand Singh, Kothe Narayangarh, Srawan, Lambwali and Kotsukhian villages of Faridkot district of Punjab. The crop stage is vegetative to square formation.
- Water levels in India's main reservoirs were at 45% of their storage capacity in the week to 4 August, down 2 percentage points from a year earlier. The latest levels were lower than the last 10 years' average of 47%, but 7 percentage points higher compared with the previous week.
- As per latest information available on sowing of Kharif crops, around 75% of the normal area under Kharif crops has been sown upto 29.07.2016. Total area sown under Kharif crops in the country as on 29.07.2016 has been reported to be 799.51 lakh hectares as compared to 752.29 lakh hectares last year. This year's area coverage so far is higher by 47.2 lakh ha than normal as on date. Area coverage under rice is higher by 6.2 lakh ha than the last year. Area coverage under wheat is higher by 9.8 lakh ha than the last year. Area coverage under pulses is higher by 32.1 lakh ha than the last year and by 33.6 lakh ha than normal as on date. This is due to higher coverage in Tur, Urad and Moong. Area coverage under Kharif coarse cereals has been higher by 5.9 lakh ha as compared to last year. Area coverage under total Kharif Oilseeds is higher by 11.8 lakh ha than the last year and by 14.7 lakh ha than normal as on date. Area coverage under Cotton is lower by 9.6 lakh ha than the last year. The details of the area covered so far and that covered during this time last year are given in the following page.

Kharif Sowing Progress (up to 05.08.2016)

| (In lakh hectares) | | | | | | | |
|----------------------|-------------------------------------|------------------------|--------------------|------------------------------|----------------|----------------------------|-----------|
| Crop Name | Normal Area for whole Kharif Season | Normal Area as on date | Area sown reported | | | Absolute Change over (+/-) | |
| | | | This Year 2016 | % of Normal for whole season | Last Year 2015 | Normal as on date | Last Year |
| Rice | 392.67 | 226.11 | 231.92 | 59.1 | 225.68 | 5.8 | 6.2 |
| Jowar | 25.33 | 17.73 | 16.34 | 64.5 | 15.08 | -1.4 | 1.3 |
| Bajra | 81.63 | 55.19 | 52.23 | 64.0 | 58.07 | -3.0 | -5.8 |
| Maize | 73.50 | 65.87 | 75.94 | 103.3 | 68.12 | 10.1 | 9.8 |
| Total Coarse Cereals | 199.70 | 147.09 | 150.76 | 75.5 | 144.84 | 3.7 | 5.9 |
| Total Cereals | 592.37 | 373.20 | 382.68 | 64.6 | 370.52 | 9.5 | 12.2 |
| Tur | 40.05 | 27.99 | 42.93 | 107.2 | 25.61 | 14.9 | 17.3 |
| Urad | 24.39 | 18.57 | 26.77 | 109.8 | 19.78 | 8.2 | 7.0 |
| Moong | 23.59 | 17.29 | 26.14 | 110.8 | 18.88 | 8.9 | 7.3 |
| Kulthi | 2.51 | 0.15 | 0.48 | 18.3 | 0.19 | 0.3 | 0.3 |
| Others | 17.06 | 12.76 | 14.05 | 82.4 | 13.78 | 1.3 | 0.3 |
| Total Pulses | 107.59 | 76.75 | 110.35 | 102.6 | 78.25 | 33.6 | 32.1 |
| Total Foodgrains | 699.96 | 449.95 | 493.03 | 70.4 | 448.77 | 43.1 | 44.3 |
| Groundnut | 43.77 | 27.90 | 38.57 | 88.1 | 28.70 | 10.7 | 9.9 |
| Soyabean | 106.36 | 103.43 | 109.16 | 102.6 | 106.27 | 5.7 | 2.9 |
| Sunflower | 2.61 | 1.05 | 1.28 | 49.0 | 0.56 | 0.2 | 0.7 |
| Sesamum | 18.24 | 10.27 | 9.42 | 51.7 | 10.90 | -0.9 | -1.5 |
| Nigerseed | 3.15 | 0.43 | 0.32 | 10.1 | 0.35 | -0.1 | 0.0 |
| Castorseed | 11.48 | 1.99 | 1.04 | 9.1 | 1.21 | -0.9 | -0.2 |
| Total Oilseeds | 185.60 | 145.06 | 159.78 | 86.08 | 147.98 | 14.7 | 11.8 |
| Cotton | 120.34 | 104.19 | 92.33 | 76.7 | 101.91 | -11.9 | -9.6 |
| Sugarcane | 49.96 | 46.21 | 46.83 | 93.7 | 45.91 | 0.6 | 0.9 |
| Jute & Mesta | 8.57 | 8.12 | 7.54 | 88.0 | 7.72 | -0.6 | -0.2 |
| All- Crops | 1064.42 | 753.53 | 799.51 | 75.1 | 752.29 | 46.0 | 47.2 |

Source: Crops & TMOP Divisions, DAC

Note: Area figures are as per eye assessment of State Agriculture Departments

State wise Development in Rainfall Activity

| S NO | MET. SUBDIVISION/UT/STATE/DISTRICT | Day:04-08-2016 | | | | Period:01-06-2016 To 04-08-2016 | | | |
|---|------------------------------------|----------------|-------------|------------|------|---------------------------------|--------------|-----------|------|
| | | ACTUAL (mm) | NORMAL (mm) | %DEP. | CAT. | ACTUAL (mm) | NORMAL (mm) | % DEP. | CAT. |
| REGION : EAST AND NORTH EAST INDIA | | | | | | | | | |
| 1 | ARUNACHAL PRADESH | 3.6 | 9.4 | -61% | S | 1041.7 | 1079.6 | -4% | N |
| 2 | ASSAM | 6.2 | 11.3 | -45% | D | 721.0 | 925.3 | -22% | D |
| 3 | MEGHALAYA | 2.4 | 38.1 | -94% | S | 1033.3 | 1805.2 | -43% | D |
| 4 | NAGALAND | 0.0 | 14.1 | -100% | NR | 463.6 | 794.7 | -42% | D |
| 5 | MANIPUR | 0.0 | 10.6 | -100% | NR | 743.6 | 847.8 | -12% | N |
| 6 | MIZORAM | 18.5 | 13.6 | 36% | E | 835.7 | 948.1 | -12% | N |
| 7 | TRIPURA | 10.2 | 11.6 | -12% | N | 619.8 | 924.6 | -33% | D |
| 8 | SIKKIM | 3.2 | 14.3 | -77% | S | 1013.5 | 1044.6 | -3% | N |
| 9 | WEST BENGAL | 8.7 | 13.6 | -36% | D | 790.9 | 767.6 | 3% | N |
| 10 | JHARKHAND | 5.6 | 13.2 | -58% | D | 463.9 | 579.6 | -20% | D |
| 11 | BIHAR | 2.9 | 8.7 | -67% | S | 501.4 | 552.4 | -9% | N |
| REGION : NORTH WEST INDIA | | | | | | | | | |
| 1 | UTTAR PRADESH | 1.7 | 9.0 | -81% | S | 443.7 | 414.5 | 7% | N |
| 2 | UTTARAKHAND | 6.7 | 15.3 | -56% | D | 723.1 | 661.7 | 9% | N |
| 3 | HARYANA | 0.6 | 7.1 | -92% | S | 197.1 | 233.6 | -16% | N |
| 4 | CHANDIGARH (UT) | 0.0 | 12.4 | -100% | NR | 268.9 | 449.0 | -40% | D |
| 5 | DELHI (UT) | 0.0 | 8.8 | -100% | NR | 343.0 | 318.2 | 8% | N |
| 6 | PUNJAB | 0.3 | 6.3 | -96% | S | 197.7 | 259.4 | -24% | D |
| 7 | HIMACHAL PRADESH | 0.5 | 10.8 | -96% | S | 326.8 | 447.5 | -27% | D |
| 8 | JAMMU & KASHMIR | 1.0 | 6.6 | -85% | S | 273.4 | 291.9 | -6% | N |
| 9 | RAJASTHAN | 14.8 | 6.4 | 132% | E | 280.2 | 221.1 | 27% | E |
| REGION : CENTRAL INDIA | | | | | | | | | |
| 1 | ODISHA | 31.5 | 12.4 | 154% | E | 527.6 | 599.8 | -12% | N |
| 2 | MADHYA PRADESH | 25.9 | 13.9 | 87% | E | 678.2 | 483.5 | 40% | E |
| 3 | GUJARAT | 7.8 | 7.6 | 2% | N | 238.8 | 363.2 | -36% | D |
| 4 | DADAR & NAGAR HAVELI (UT) | 32.8 | 32.9 | 0% | N | 1732.8 | 1372.6 | 26% | E |
| 5 | DAMAN & DIU (UT) | 2.5 | 23.3 | -89% | S | 1099.3 | 1052.6 | 4% | N |
| 6 | GOA | 45.1 | 27.4 | 65% | E | 2321.3 | 2135.1 | 9% | N |
| 7 | MAHARASHTRA | 16.7 | 10.9 | 54% | E | 761.5 | 589.3 | 29% | E |
| 8 | CHHATTISGARH | 18.4 | 16.5 | 12% | N | 601.1 | 616.4 | -2% | N |
| REGION : SOUTH PENINSULA | | | | | | | | | |
| 1 | ANDAMAN & NICOBAR (UT) | 1.4 | 9.4 | -85% | S | 773.2 | 888.3 | -13% | N |
| 2 | ANDHRA PRADESH | 2.1 | 3.9 | -47% | D | 300.3 | 236.4 | 27% | E |
| 3 | TELANGANA | 15.4 | 7.7 | 100% | E | 479.5 | 404.9 | 18% | N |
| 4 | TAMIL NADU | 0.2 | 2.1 | -90% | S | 154.0 | 121.6 | 27% | E |
| 5 | PONDICHERRY (UT) | 0.0 | 5.3 | -100% | NR | 65.7 | 134.3 | -51% | D |
| 6 | KARNATAKA | 7.9 | 7.1 | 11% | N | 499.4 | 503.8 | -1% | N |
| 7 | KERALA | 6.5 | 15.3 | -58% | D | 1058.1 | 1447.6 | -27% | D |
| 8 | LAKSHADWEEP (UT) | 3.0 | 6.4 | -53% | D | 588.1 | 646.8 | -9% | N |
| COUNTRY : | | 10.7 | 9.6 | 12% | | 499.1 | 490.9 | 2% | |

Source: IMD, Govt. of India

For the country as a whole, cumulative rainfall during this year's from 1st June 2016 to 22nd July 2016 has been at par with normal. The details are given in the table above.

Major Updates & Forecast for the Coming Week and Ahead

- Rainfall over the country as a whole during second half of southwest monsoon season (August to September) is most likely to be above normal (>106% of LPA) with a probability of 55%. Quantitatively, the rainfall for the country as a whole during second half of the season is likely to be 107% of LPA with a model error of $\pm 8\%$. The rainfall during August is likely to be $104 \pm 9\%$ of LPA as was forecasted in June. The season (June to September) rainfall over the country as a whole is likely to be $106\% \pm 4\%$ of LPA as was forecasted in June.
- The cyclonic circulation over South Rajasthan and its adjoining areas along with the off shore trough running from Gujarat to Karnataka coast have been responsible for giving good rains over the state. In fact, widespread rains have occurred over the region after a long time. Almost all the areas have witnessed some rains during this period.
- Several states like Gujarat, Kerala, Jharkhand, Himachal Pradesh and Odisha are witnessing deficient rains. While rainfall deficit is as high as 39%-49% in Gujarat, it is 19% in Odisha and 21% in Jharkhand. These three states had declared a drought due to sub-par rains in 2015.
- Monsoon will be on the lower side in Kerala, Tamil Nadu and southern interior Karnataka. Normally, Kerala is the rainiest during Southwest monsoon, but the low pressure systems that were supposed to have formed in the Arabian Sea have not formed, hence monsoon is not active in the region.

Disclaimer:

This report has been prepared by National Bulk Handling Corporation (NBHC) for the sole benefit of the addressee. Neither the report nor any part of the report shall be provided to third parties without the written consent of NBHC. Any third party in possession of the report may not rely on its conclusions without the written consent of NBHC.

NBHC has exercised reasonable care and skill in preparation of this advisory report but has not independently verified information provided by various primary & secondary sources. No other warranty, express or implied, is made in relation to this report. Therefore NBHC assumes no liability for any loss resulting from errors, omissions or misrepresentations made by others.

Any recommendations, opinions and findings stated in this report are based on circumstances and facts as they existed at the time of preparation of this report. Any change in circumstances and facts on which this report is based may adversely affect any recommendations, opinions or findings contained in this report.

© National Bulk Handling Corporation (NBHC) 2016