

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 1133
TO BE ANSWERED ON FRIDAY, NOVEMBER 22, 2019**

WEATHER FORECASTING ASSISTANCE TO PEOPLE

**1133. SHRI GAJANAN KIRTIKAR:
SHRI SANJAY SADASHIV RAO MANDLIK:
SHRI SUDHEER GUPTA:
SHRI BIDYUT BARAN MAHATO:
SHRI PRATAPRAO JADHAV :**

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether the Government has taken note that some parts of the country including Kerala, North Karnataka, Madhya Pradesh, Maharashtra, Assam, North Bihar, Eastern UP, South Gujarat have received extreme rainfall leading to the condition of floods while some other parts received deficient rainfall leading to drought like conditions and if so, the details thereof;**
- (b) whether the Government has assessed the gravity of the situation caused due to vagaries of climate and extended any assistance to the affected States and if so, the details thereof;**
- (c) whether Indian Meteorological Department (IMD) has conducted any research to study the reasons for extreme rainfall and drought conditions in the various parts of the country;**
- (d) if so, the details thereof and the outcome thereto; and**
- (e) whether the Government/IMD proposes to devise a mechanism where farmers/people are being provided with meteorological assistance to predict rainfall or drought in different parts of the country to save agriculture and human life and if so, the details thereof?**

**ANSWER
MINISTER FOR SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. HARSH VARDHAN)**

- (a) Yes Sir. Monsoon rainfall varies on different spatial and temporal scales. Extreme rainfall events that occur at some places and some other parts receiving deficient rainfall are part of the natural variability of the Indian monsoon system itself. India Meteorological Department (IMD) issues rainfall forecasts and associated warnings well in advance to entire country. The district wise rainfall activity (in all categories) for the entire country during the Monsoon Season 2019 is attached as Annexure.**

(b) India Meteorological Department (IMD) through its State Meteorological Centres issues forecasts & warnings for the impending adverse weather (district-wise) as and when required to support the mitigation measures.

(c) & (d) IMD is mainly associated with the operational weather forecasting services for the country. However, the research institutions such as Indian Institute of Tropical Meteorology (IITM), Pune and National Centre for Medium Range Weather Forecasting (NCMRWF), Noida under the Ministry of Earth Sciences are conducting research studies in relation to the extreme weather events which help to further improve the operational forecasting services of IMD.

Such research studies carried out by these institutions have brought out that global warming is one of the main reasons for the increasing trend in the occurrence of extreme weather events. The studies have also brought out that : (i) the frequency of very light rain and light to moderate rain events during the monsoon season has decreased over most parts of the country (ii) frequency of very heavy and extreme rainfall events over northern parts of the country has increased significantly, and (iii) during the period, 1901-2010, heavy rainfall events (rainfall exceeding 15 cm in 24 hours) over northern parts of the country show an increasing trend of about 6% per decade.

(e) India Meteorological Department (IMD) runs an operational Agrometeorological Advisory Service (AAS) viz., Gramin Krishi Mausam Sewa (GKMS) scheme for the benefit of farming community in the country. Under the scheme, medium range weather forecast at district level is generated and issued. Based on the forecast, Agromet Advisories are being prepared and communicated by the 130 Agromet Field Units (AMFUs) located at State Agricultural Universities, institutes of Indian Council of Agricultural Research (ICAR) and IIT etc., to the farmers on every Tuesday and Friday to take decision on day-to-day agricultural operations. AAS rendered by IMD is a step towards weather-based crop and livestock management strategies and operations dedicated to enhancing crop production and food security besides reducing crop damage and loss due to unusual weather.

Agromet Advisories are communicated to the farming community through multichannel dissemination system like print and electronic media, DoorDarshan, radio, internet etc. including SMS using mobile phones through Kisan Portal launched by Ministry of Agriculture and Farmers' Welfare and also through private companies under Public Private Partnership (PPP) mode. At present, 42 million farmers in the country receive the Agromet Advisories through SMS directly.

In addition, IMD in collaboration with Central Research Institute for Dryland Agriculture (CRIDA) is continuously issuing Agromet Advisories using Extended Range Forecast (ERF) throughout the season particularly during prolonged dry spell / poor rainfall situation for farmers and other users.

Annexure

| CATEGORY | |
|-----------------|---|
| LE | (LARGE EXCESS) (+60% or more) |
| E | (EXCESS) (+20% to +59%) |
| N | (NORMAL) (+19% to -19%) |
| D | (DEFICIENT) (-20% to -59%) |
| LD | (LARGE DEFICIENT) (-60% to -99%) |
| NR | (NO RAIN) -100% |

| DISTRICTWISE RAINFALL DISTRIBUTION | | | | | |
|---|------------------------------|-----------------------------------|---------------|-------------|----------|
| S.No. | MET. SUBDIVISION/ UT | PERIOD : 01.06.2019 TO 30.09.2019 | | | CATEGORY |
| | STATE/DISTRICT (NAME) | ACTUAL (mm) | NORMAL (mm) | % DEPARTURE | |
| 1 | A & N ISLAND | 2331.3 | 1653.8 | 41% | E |
| 1 | NICOBAR | 1124.2 | 1129.3 | 0% | N |
| 2 | NORTH & MIDDLE ANDAMAN | 3283.3 | 1820.4 | 80% | LE |
| 3 | SOUTH ANDAMAN | 2038.3 | 1796.1 | 13% | N |
| 2 | ARUNACHAL PRADESH | 1538.2 | 1726.6 | -11% | N |
| 1 | ANJAW | 1079.0 | 1566.2 | -31% | D |
| 2 | CHANGLANG | 1296.0 | 1547.4 | -16% | N |
| 3 | DIBANG VALLEY | 1300.8 | 1281.1 | 2% | N |
| 4 | EAST KAMENG | 872.0 | 1313.9 | -34% | D |
| 5 | EAST SIANG | 2741.3 | 3187.2 | -14% | N |
| 6 | KURUNG KUMEY | 1492.4 | 1256.1 | 19% | N |
| 7 | LOHIT | 1680.5 | 1560.0 | 8% | N |
| 8 | LOWER DIBANG VALLEY | 2797.0 | 1699.9 | 65% | LE |
| 9 | LOWER SUBANSIRI | 829.2 | 799.7 | 4% | N |
| 10 | PAPUMPORA | 2007.5 | 2213.5 | -9% | N |
| 11 | TAWANG | 831.3 | 1796.1 | -54% | D |
| 12 | TIRAP | 1184.1 | 2309.5 | -49% | D |
| 13 | UPPER SIANG | 1736.5 | 1877.3 | -8% | N |
| 14 | UPPER SUBANSIRI | 1018.6 | 980.6 | 4% | N |
| 15 | WEST KAMENG | 1122.0 | 1796.1 | -38% | D |
| 16 | WEST SIANG | 2019.2 | 2045.5 | -1% | N |
| 3 | ASSAM & MEGHALAYA | 1567.9 | 1773.7 | -12% | N |
| | ASSAM | 1334.3 | 1486.2 | -10% | N |
| 1 | BAKSA | 1824.5 | 1226.6 | 49% | E |
| 2 | BARPETA | 2285.4 | 2381.0 | -4% | N |
| 3 | BONGAIGAON | 2493.6 | 2309.8 | 8% | N |
| 4 | CACHAR | 1788.8 | 1867.4 | -4% | N |
| 5 | CHIRANG | 2682.9 | 2291.7 | 17% | N |
| 6 | DARRANG | 368.9 | 1257.1 | -71% | LD |
| 7 | DHEMAJI | 2315.8 | 1820.6 | 27% | E |
| 8 | DHUBRI | 1664.6 | 2140.1 | -22% | D |
| 9 | DIBRUGARH | 1323.2 | 1611.6 | -18% | N |
| 10 | GOALPARA | 1756.3 | 1818.8 | -3% | N |
| 11 | GOLAGHAT | 934.8 | 1079.3 | -13% | N |
| 12 | HAILAKANDI | 1490.0 | 1554.4 | -4% | N |
| 13 | JORHAT | 1172.5 | 1276.0 | -8% | N |
| 14 | KAMRUP (RURAL) | 940.1 | 1302.3 | -28% | D |
| 15 | KAMRUP METRO. | 926.2 | 978.6 | -5% | N |
| 16 | KARBI ANGLONG | 487.7 | 862.4 | -43% | D |
| 17 | KARIMGANJ | 1878.9 | 2186.7 | -14% | N |
| 18 | KOKRAJHAR | 3050.3 | 2705.9 | 13% | N |
| 19 | LAKHIMPUR | 2066.2 | 2002.9 | 3% | N |
| 20 | MORIGAON | 740.9 | 1148.4 | -35% | D |
| 21 | N. C. HILLS | 868.4 | 1085.7 | -20% | D |
| 22 | NAGAON | 668.3 | 1013.1 | -34% | D |

| | | | | | |
|----|-----------|--------|--------|------|---|
| 23 | NALBARI | 1793.0 | 1586.7 | 13% | N |
| 24 | SHONITPUR | 1172.3 | 1164.5 | 1% | N |
| 25 | SIBSAGAR | 881.6 | 1191.2 | -26% | D |

| | | | | | |
|----------|--------------------------|---------------|---------------|-------------|----------|
| 26 | TINSUKIA | 1362.6 | 1516.9 | -10% | N |
| 27 | UDALGURI | 1651.7 | 1408.2 | 17% | N |
| | MEGHALAYA | 2431.8 | 2855.8 | -15% | N |
| 1 | EAST GARO HILLS | 2801.6 | 1671.0 | 68% | LE |
| 2 | EAST KHASI HILLS | 5425.0 | 4521.8 | 20% | E |
| 3 | JAINTIA HILLS | 2537.5 | 4959.2 | -49% | D |
| 4 | RI-BHOI | 1275.1 | 1452.7 | -12% | N |
| 5 | SOUTH GARO HILLS | 2333.5 | 1893.7 | 23% | E |
| 6 | WEST GARO HILLS | 1255.6 | 1893.7 | -34% | D |
| 7 | WEST KHASI HILLS | 1992.9 | 2695.1 | -26% | D |
| | | | | | |
| 4 | NMMT | 1114.8 | 1426.7 | -22% | D |
| | NAGALAND | 991.8 | 1143.4 | -13% | N |
| | | | | | |
| 1 | DIMAPUR | 837.5 | 1265.4 | -34% | D |
| 2 | KEPHIRE | 512.3 | 618.7 | -17% | N |
| 3 | KOHIMA | 988.6 | 1265.4 | -22% | D |
| 4 | LONGLENG | 736.8 | 1386.1 | -47% | D |
| 5 | MOKOKCHUNG | 1218.9 | 1386.1 | -12% | N |
| 6 | MON | 1038.7 | 1025.0 | 1% | N |
| 7 | PAREN | 1157.1 | 893.8 | 29% | E |
| 8 | PHEK | 640.3 | 801.8 | -20% | D |
| 9 | TUENSANG | 1282.3 | 1386.1 | -7% | N |
| 10 | WOKHA | 962.7 | 1470.2 | -35% | D |
| 11 | ZUNHEBOTO | 861.0 | 1386.1 | -38% | D |
| | | | | | |
| | MANIPUR | 620.8 | 1404.9 | -56% | D |
| | | | | | |
| 1 | BISHNUPUR | 524.3 | 1365.2 | -62% | LD |
| 2 | CHANDEL | 352.5 | 2004.6 | -82% | LD |
| 3 | CHURACHANDPUR | 673.4 | 1562.3 | -57% | D |
| 4 | IMPHAL EAST | 506.6 | 1254.8 | -60% | LD |
| 5 | IMPHAL WEST | 807.0 | 888.8 | -9% | N |
| 6 | SENAPATI | 716.5 | 1266.9 | -43% | D |
| 7 | TAMENGLONG | 1510.7 | 6852.4 | -78% | LD |
| 8 | THOUBAL | 409.4 | 856.9 | -52% | D |
| 9 | UKHRUL | 725.8 | 1056.9 | -31% | D |
| | | | | | |
| | MIZORAM | 1506.9 | 1655.9 | -9% | N |
| | | | | | |
| 1 | AIZWAL | 1294.7 | 1625.1 | -20% | D |
| 2 | CHAMPHAI | 1113.5 | 1385.6 | -20% | D |
| 4 | KOLASIB | 1885.7 | 1774.4 | 6% | N |
| 5 | LAWNGTLAI | 1873.9 | 1712.3 | 9% | N |
| 6 | LUNGLEI | 2121.2 | 1803.2 | 18% | N |
| 7 | MAMIT | 1002.2 | 1665.5 | -40% | D |
| 8 | SAIHA | 1606.7 | 1759.3 | -9% | N |
| 9 | SERCHHIP | 877.9 | 1523.9 | -42% | D |
| | | | | | |
| | TRIPURA | 1382.9 | 1457.8 | -5% | N |
| | | | | | |
| 1 | DHALAI | 1523.5 | 1406.4 | 8% | N |
| 2 | NORTH TRIPURA | 1455.1 | 1491.9 | -2% | N |
| 3 | SOUTH TRIPURA | 1341.6 | 1608.7 | -17% | N |
| 4 | WEST TRIPURA | 1226.3 | 1360.5 | -10% | N |
| | | | | | |
| 5 | SHWB & SIKKIM | 1884.1 | 1970.8 | -4% | N |
| | | | | | |
| | SIKKIM | 1954.0 | 1606.8 | 22% | E |
| | | | | | |
| 1 | EAST SIKKIM | 1743.3 | 1764.5 | -1% | N |
| 2 | NORTH SIKKIM | 2244.1 | 1492.8 | 50% | E |
| 3 | SOUTH SIKKIM | 1353.3 | 2072.9 | -35% | D |
| 4 | WEST SIKKIM | 1461.5 | 1591.3 | -8% | N |

| | | | | | |
|----------|-----------------------------|---------------|---------------|-------------|----------|
| | WEST BENGAL | 1167.6 | 1405.0 | -17% | N |
| 1 | COOCH BEHAR | 2072.1 | 2573.6 | -19% | N |
| 2 | DARJEELING | 2340.3 | 2474.9 | -5% | N |
| 3 | JALPAIGURI | 2854.3 | 2839.0 | 1% | N |
| 4 | MALDA | 927.8 | 1112.3 | -17% | N |
| 5 | NORTH DINAJPUR | 990.8 | 1500.8 | -34% | D |
| 6 | SOUTH DINAJPUR | 876.8 | 1172.6 | -25% | D |
| 6 | GANGETIC WEST BENGAL | 940.9 | 1181.5 | -20% | D |
| 1 | BANKURA | 919.2 | 1158.2 | -21% | D |
| 2 | BIRBHUM | 772.4 | 1172.7 | -34% | D |
| 3 | BURDWAN | 739.1 | 998.3 | -26% | D |
| 4 | EAST MIDNAPORE | 1138.0 | 1305.7 | -13% | N |
| 5 | HOOGHLY | 750.2 | 1047.0 | -28% | D |
| 6 | HOWRAH | 616.9 | 1196.8 | -48% | D |
| 7 | KOLKATA | 1187.0 | 1326.1 | -10% | N |
| 8 | MURSHIDABAD | 569.9 | 1066.5 | -47% | D |
| 9 | NADIA | 713.1 | 897.9 | -21% | D |
| 10 | NORTH 24 PARGANAS | 1069.9 | 1269.2 | -16% | N |
| 11 | PURULIA | 1006.4 | 1094.6 | -8% | N |
| 12 | SOUTH 24 PARGANAS | 1207.0 | 1504.0 | -20% | D |
| 13 | WEST MIDNAPORE | 1124.9 | 1184.5 | -5% | N |
| 7 | ODISHA | 1232.5 | 1155.3 | 7% | N |
| 1 | ANGUL | 968.5 | 1098.5 | -12% | N |
| 2 | BALASORE | 1006.0 | 1245.1 | -19% | N |
| 3 | BARGARH | 1417.7 | 1182.4 | 20% | E |
| 4 | BHADRAK | 1059.3 | 1051.6 | 1% | N |
| 5 | BOLANGIR | 1383.0 | 1180.4 | 17% | N |
| 6 | BOUDHGARH | 1332.7 | 1098.6 | 21% | E |
| 7 | CUTTACK | 1281.0 | 1196.7 | 7% | N |
| 8 | DEOGARH | 1076.8 | 1284.9 | -16% | N |
| 9 | DHENKANAL | 1168.2 | 1111.6 | 5% | N |
| 10 | GAJAPATI | 881.9 | 995.2 | -11% | N |
| 11 | GANJAM | 1085.8 | 879.9 | 23% | E |
| 12 | JAGATSINGHPUR | 1277.2 | 1112.0 | 15% | N |
| 13 | JAJPUR | 1242.6 | 1421.1 | -13% | N |
| 14 | JHARSUGUDA | 1537.8 | 1152.7 | 33% | E |
| 15 | KALAHANDI | 1365.7 | 1225.8 | 11% | N |
| 16 | KANDHAMAL | 1370.4 | 1216.4 | 13% | N |
| 17 | KENDRAPARA | 1084.6 | 1110.0 | -2% | N |
| 18 | KEONJHARGARH | 1014.6 | 1131.9 | -10% | N |
| 19 | KHURDA | 1176.1 | 1116.9 | 5% | N |
| 20 | KORAPUT | 1633.5 | 1219.8 | 34% | E |
| 21 | MALKANGIRI | 1398.3 | 1221.7 | 14% | N |
| 22 | MAYURBHANJ | 1163.7 | 1253.1 | -7% | N |
| 23 | NAWAPARA | 1034.8 | 999.3 | 4% | N |
| 24 | NAWARANGPUR | 1392.9 | 1346.8 | 3% | N |
| 25 | NAYAGARH | 1257.4 | 1103.8 | 14% | N |
| 26 | PURI | 1280.9 | 1014.7 | 26% | E |
| 27 | RAYAGADA | 1070.2 | 978.2 | 9% | N |
| 28 | SAMBALPUR | 1291.5 | 1284.9 | 1% | N |
| 29 | SONEPUR | 1500.2 | 1239.9 | 21% | E |
| 30 | SUNDARGARH | 1137.9 | 1144.7 | -1% | N |
| 8 | JHARKHAND | 865.6 | 1054.7 | -18% | N |
| 1 | BOKARO | 840.9 | 1019.3 | -18% | N |
| 2 | CHATRA | 696.3 | 976.1 | -29% | D |
| 3 | DEOGHAR | 759.0 | 1021.8 | -26% | D |
| 4 | DHANBAD | 939.2 | 1101.0 | -15% | N |
| 5 | DUMKA | 993.0 | 1072.3 | -7% | N |
| 6 | EAST SINGBHUM | 1146.0 | 1084.8 | 6% | N |
| 7 | GARHWA | 450.0 | 946.7 | -52% | D |
| 8 | GIRIDIH | 810.4 | 984.2 | -18% | N |

| | | | | | |
|-----------|---------------------------|---------------|---------------|------------|----------|
| 9 | GODDA | 541.4 | 962.2 | -44% | D |
| 10 | GUMLA | 960.2 | 1122.1 | -14% | N |
| 11 | HAZARIBAG | 911.5 | 1072.8 | -15% | N |
| 12 | JAMTARA | 1004.7 | 1121.0 | -10% | N |
| 13 | KHUNTI | 726.7 | 1182.1 | -39% | D |
| 14 | KODERMA | 900.9 | 875.9 | 3% | N |
| 15 | LATEHAR | 636.7 | 1038.2 | -39% | D |
| 16 | LOHARDAGA | 869.4 | 971.9 | -11% | N |
| 17 | PAKUR | 732.9 | 1267.3 | -42% | D |
| 18 | PALAMU | 871.1 | 886.2 | -2% | N |
| 19 | RAMGARH | 968.5 | 1027.8 | -6% | N |
| 20 | RANCHI | 756.7 | 1074.6 | -30% | D |
| 21 | SAHIBGANJ | 1893.6 | 1301.3 | 46% | E |
| 22 | SERAIKELA-KHARSAWAN | 777.7 | 1053.2 | -26% | D |
| 23 | SIMDEGA | 1253.1 | 1298.7 | -4% | N |
| 24 | WEST SINGBHUM | 885.3 | 1025.7 | -14% | N |
| 9 | BIHAR | 1050.4 | 1017.2 | 3% | N |
| 1 | ARARIA | 1414.5 | 1333.4 | 6% | N |
| 2 | ARWAL | 511.6 | 751.1 | -32% | D |
| 3 | AURANGABAD | 854.3 | 854.8 | 0% | N |
| 4 | BANKA | 823.3 | 912.1 | -10% | N |
| 5 | BEGUSARAI | 769.1 | 1046.3 | -26% | D |
| 6 | BHABUA | 1065.2 | 927.4 | 15% | N |
| 7 | BHAGALPUR | 1073.2 | 972.3 | 10% | N |
| 8 | BHOJPUR | 863.6 | 925.7 | -7% | N |
| 9 | BUXAR | 1084.2 | 828.9 | 31% | E |
| 10 | DARBHANGA | 976.7 | 891.2 | 10% | N |
| 11 | EAST CHAMPARAN | 1155.3 | 1056.4 | 9% | N |
| 12 | GAYA | 849.0 | 857.8 | -1% | N |
| 13 | GOPALGANJ | 1367.5 | 975.4 | 40% | E |
| 14 | JAHANABAD | 835.3 | 818.7 | 2% | N |
| 15 | JAMUI | 812.6 | 930.0 | -13% | N |
| 16 | KATIHAR | 1022.7 | 1106.4 | -8% | N |
| 17 | KHAGARIA | 975.5 | 994.5 | -2% | N |
| 18 | KISHANGANJ | 1738.2 | 1786.2 | -3% | N |
| 19 | LAKHISARAI | 711.2 | 845.7 | -16% | N |
| 20 | MADHEPURA | 1280.2 | 1118.5 | 14% | N |
| 21 | MADHUBANI | 1008.0 | 975.9 | 3% | N |
| 22 | MONGHYR | 848.2 | 1024.2 | -17% | N |
| 23 | MUZAFFARPUR | 1081.6 | 998.8 | 8% | N |
| 24 | NALANDA | 955.0 | 862.3 | 11% | N |
| 25 | NAWADA | 916.8 | 841.5 | 9% | N |
| 26 | PATNA | 860.3 | 920.7 | -7% | N |
| 27 | PURNEA | 1325.5 | 1462.3 | -9% | N |
| 28 | ROHTAS | 781.9 | 863.8 | -9% | N |
| 29 | SAHARSA | 1028.2 | 1257.2 | -18% | N |
| 30 | SAMASTIPUR | 1304.6 | 975.6 | 34% | E |
| 31 | SARAN | 983.2 | 933.1 | 5% | N |
| 32 | SHEIKHPURA | 617.8 | 844.1 | -27% | D |
| 33 | SHEOHAR | 1013.0 | 1042.4 | -3% | N |
| 34 | SITAMARHI | 1068.9 | 1061.4 | 1% | N |
| 35 | SIWAN | 1273.3 | 967.1 | 32% | E |
| 36 | SUPAUL | 1313.2 | 1092.5 | 20% | E |
| 37 | VAISHALI | 978.1 | 959.3 | 2% | N |
| 38 | WEST CHAMPARAN | 1434.1 | 1277.4 | 12% | N |
| | UTTAR PRADESH | 718.0 | 790.2 | -9% | N |
| 10 | EAST UTTAR PRADESH | 846.7 | 839.4 | 1% | N |
| 1 | ALLAHABAD | 989.3 | 798.9 | 24% | E |
| 2 | AMBEDKAR NAGAR | 1234.4 | 859.0 | 44% | E |
| 3 | AMETHI | 805.9 | 732.8 | 10% | N |
| 4 | AZAMGARH | 860.3 | 885.5 | -3% | N |
| 5 | BAHRAICH | 1091.1 | 1010.0 | 8% | N |

| | | | | | |
|-----------|---------------------------|--------------|--------------|-------------|----------|
| 6 | BALLIA | 1117.5 | 789.4 | 42% | E |
| 7 | BALRAMPUR | 1027.7 | 898.6 | 14% | N |
| 8 | BANDA | 954.8 | 843.9 | 13% | N |
| 9 | BARABANKI | 1230.8 | 857.8 | 43% | E |
| 10 | BASTI | 1284.1 | 833.2 | 54% | E |
| 11 | CHANDAULI | 738.4 | 758.1 | -3% | N |
| 12 | CHITRAKOOT | 838.3 | 762.4 | 10% | N |
| 13 | DEORIA | 814.8 | 874.1 | -7% | N |
| 14 | FAIZABAD | 998.7 | 910.4 | 10% | N |
| 15 | FARRUKHABAD | 479.4 | 749.6 | -36% | D |
| 16 | FATEHPUR | 568.4 | 775.1 | -27% | D |
| 17 | GHAZIPUR | 899.7 | 817.1 | 10% | N |
| 18 | GONDA | 864.2 | 934.9 | -8% | N |
| 19 | GORAKHPUR | 1256.6 | 1216.5 | 3% | N |
| 20 | HARDOI | 602.9 | 713.9 | -16% | N |
| 21 | JAUNPUR | 692.9 | 808.2 | -14% | N |
| 22 | KANNAUJ | 732.7 | 695.1 | 5% | N |
| 23 | KANPUR CITY | 624.1 | 617.9 | 1% | N |
| 24 | KANPUR DEHAT | 274.6 | 672.2 | -59% | D |
| 25 | KAUSHAMBI | 669.2 | 614.2 | 9% | N |
| 26 | KHERI | 541.7 | 959.7 | -44% | D |
| 27 | KUSHI NAGAR | 696.8 | 895.8 | -22% | D |
| 28 | LUCKNOW | 856.7 | 704.4 | 22% | E |
| 29 | MAHARAJGANJ | 698.8 | 1121.9 | -38% | D |
| 30 | MAU | 627.1 | 834.9 | -25% | D |
| 31 | MIRZAPUR | 1370.0 | 850.3 | 61% | LE |
| 32 | PRATAPGARH | 1109.5 | 775.4 | 43% | E |
| 33 | RAE BAREILLY | 520.7 | 574.5 | -9% | N |
| 34 | SANT KABIR NAGAR | 957.0 | 993.1 | -4% | N |
| 35 | SANT RAVIDAS NAGAR | 1216.7 | 758.1 | 60% | LE |
| 36 | SHRAWASTI NAGAR | 1258.7 | 1010.0 | 25% | E |
| 37 | SIDDHARTH NAGAR | 966.9 | 1073.1 | -10% | N |
| 38 | SITAPUR | 574.6 | 847.0 | -32% | D |
| 39 | SONBHADRA | 931.1 | 831.0 | 12% | N |
| 40 | SULTANPUR | 886.5 | 852.6 | 4% | N |
| 41 | UNNAO | 549.1 | 738.8 | -26% | D |
| 42 | VARANASI | 1046.1 | 884.3 | 18% | N |
| 11 | WEST UTTAR PRADESH | 527.4 | 721.3 | -27% | D |
| 1 | AGRA | 497.8 | 587.9 | -15% | N |
| 2 | ALIGARH | 372.4 | 615.9 | -40% | D |
| 3 | AURAIYA | 488.3 | 578.4 | -16% | N |
| 4 | BADAUN | 389.8 | 754.3 | -48% | D |
| 5 | BAGHPAT | 310.4 | 560.2 | -45% | D |
| 6 | BAREILLY | 819.0 | 810.4 | 1% | N |
| 7 | BIJNOR | 802.4 | 935.7 | -14% | N |
| 8 | BULANDSHAHR | 311.1 | 602.8 | -48% | D |
| 9 | ETAH | 545.8 | 537.1 | 2% | N |
| 10 | ETAWAH | 466.3 | 614.1 | -24% | D |
| 11 | FIROZABAD | 436.1 | 629.0 | -31% | D |
| 12 | GAUTAM BUDDHA NAGAR | 414.0 | 544.8 | -24% | D |
| 13 | GHAZIABAD | 146.1 | 544.8 | -73% | LD |
| 14 | HAMIRPUR | 917.0 | 723.1 | 27% | E |
| 15 | HAPUR | 396.0 | 730.4 | -46% | D |
| 16 | JALAUN | 594.5 | 726.1 | -18% | N |
| 17 | JHANSI | 610.1 | 757.6 | -19% | N |
| 18 | JYOTIBA PHULE NAGAR | 406.3 | 850.0 | -52% | D |
| 19 | KANSHIRAM NAGAR | 588.3 | 688.4 | -15% | N |
| 20 | LALITPUR | 892.4 | 831.0 | 7% | N |
| 21 | MAHAMAYA NAGAR | 470.6 | 559.2 | -16% | N |
| 22 | MAHOBA | 518.2 | 675.3 | -23% | D |
| 23 | MAINPURI | 347.2 | 669.4 | -48% | D |
| 24 | MATHURA | 303.2 | 538.5 | -44% | D |
| 25 | MEERUT | 496.0 | 743.4 | -33% | D |
| 26 | MORADABAD | 689.4 | 852.6 | -19% | N |

| | | | | | |
|-----------|-----------------------------|--------------|---------------|-------------|----------|
| 27 | MUZAFFARNAGAR | 555.7 | 725.6 | -23% | D |
| 28 | PILIBHIT | 371.9 | 926.2 | -60% | LD |
| 29 | RAMPUR | 468.7 | 827.7 | -43% | D |
| 30 | SAHARANPUR | 547.3 | 782.3 | -30% | D |
| 31 | SAMBHAL | 492.5 | 701.7 | -30% | D |
| 32 | SHAHJAHANPUR | 660.5 | 837.1 | -21% | D |
| 33 | SHAMLI | 170.0 | 614.0 | -72% | LD |
| | | | | | |
| 12 | UTTARAKHAND | 960.4 | 1176.9 | -18% | N |
| | | | | | |
| 1 | ALMORA | 700.4 | 842.7 | -17% | N |
| 2 | BAGESHWAR | 1204.5 | 842.7 | 43% | E |
| 3 | CHAMOLI | 840.9 | 776.0 | 8% | N |
| 4 | CHAMPAWAT | 1051.2 | 1338.0 | -21% | D |
| 5 | DEHRADUN | 1092.0 | 1524.6 | -28% | D |
| 6 | GARHWAL PAURI | 711.7 | 1225.1 | -42% | D |
| 7 | GARHWAL TEHRI | 612.6 | 990.2 | -38% | D |
| 8 | HARDWAR | 697.2 | 971.2 | -28% | D |
| 9 | NAINITAL | 1287.8 | 1425.0 | -10% | N |
| 10 | PITHORAGARH | 1411.3 | 1544.9 | -9% | N |
| 11 | RUDRAPRAYAG | 1260.6 | 1484.5 | -15% | N |
| 12 | UDHAM SINGH NAGAR | 962.0 | 1073.6 | -10% | N |
| 13 | UTTARKASHI | 769.5 | 1208.4 | -36% | D |
| | | | | | |
| 13 | HAR. CHD & DELHI | 258.6 | 444.0 | -42% | D |
| | | | | | |
| | HARYANA | 255.2 | 438.6 | -42% | D |
| | | | | | |
| 1 | AMBALA | 628.1 | 850.4 | -26% | D |
| 2 | BHIWANI | 182.5 | 334.4 | -45% | D |
| 3 | FARIDABAD | 339.9 | 578.6 | -41% | D |
| 4 | FATEHABAD | 102.7 | 277.3 | -63% | LD |
| 5 | GURGAON | 284.7 | 503.3 | -43% | D |
| 6 | HISAR | 159.8 | 309.6 | -48% | D |
| 7 | JHAJJAR | 162.3 | 376.4 | -57% | D |
| 8 | JIND | 197.2 | 401.0 | -51% | D |
| 9 | KAITHAL | 172.3 | 345.8 | -50% | D |
| 10 | KARNAL | 418.3 | 546.0 | -23% | D |
| 11 | KURUKSHETRA | 383.5 | 499.6 | -23% | D |
| 12 | MAHENDRAGARH | 207.7 | 407.8 | -49% | D |
| 13 | MEWAT | 273.6 | 504.3 | -46% | D |
| 14 | PALWAL | 250.8 | 426.6 | -41% | D |
| 15 | PANCHKULA | 397.9 | 925.0 | -57% | D |
| 16 | PANIPAT | 184.3 | 480.1 | -62% | LD |
| 17 | REWARI | 318.6 | 432.1 | -26% | D |
| 18 | ROHTAK | 141.7 | 502.0 | -72% | LD |
| 19 | SIRSA | 182.9 | 211.3 | -13% | N |
| 20 | SONEPAT | 228.3 | 524.2 | -56% | D |
| 21 | YAMUNA NAGAR | 700.5 | 822.9 | -15% | N |
| | | | | | |
| | CHANDIGARH (UT) | 716.4 | 846.5 | -15% | N |
| | | | | | |
| | DELHI | 378.1 | 585.8 | -35% | D |
| | | | | | |
| 1 | CENTRAL DELHI | | 674.9 | | * |
| 2 | EAST DELHI | 317.4 | 674.9 | -53% | D |
| 3 | NEW DELHI | 300.2 | 517.7 | -42% | D |
| 4 | NORTH DELHI | 528.1 | 590.8 | -11% | N |
| 5 | NORTH EAST DELHI | 345.5 | 674.9 | -49% | D |
| 6 | NORTH WEST DELHI | | 488.8 | | * |
| 7 | SOUTH DELHI | 454.3 | 674.9 | -33% | D |
| 8 | SOUTH WEST DELHI | 331.7 | 596.6 | -44% | D |
| 9 | WEST DELHI | | 621.7 | | * |
| | | | | | |
| 14 | PUNJAB | 444.3 | 467.3 | -5% | N |
| | | | | | |
| 1 | AMRITSAR | 345.0 | 506.9 | -32% | D |
| 2 | BARNALA | 275.0 | 368.8 | -25% | D |

| | | | | | |
|-----------|----------------------------|--------------|--------------|-------------|----------|
| 3 | BHATINDA | 380.9 | 318.0 | 20% | E |
| 4 | FARIDKOT | 275.8 | 300.6 | -8% | N |
| 5 | FATEHGARH SAHIB | 453.5 | 509.7 | -11% | N |
| 6 | FEROZEPUR | 155.0 | 310.0 | -50% | D |
| 7 | GURDASPUR | 901.2 | 836.9 | 8% | N |
| 8 | HOSHIARPUR | 583.3 | 674.8 | -14% | N |
| 9 | JALANDHAR | 414.2 | 575.1 | -28% | D |
| 10 | KAPURTHALA | 820.9 | 360.7 | 128% | LE |
| 11 | LUDHIANA | 552.1 | 486.2 | 14% | N |
| 12 | MANSA | 218.9 | 301.1 | -27% | D |
| 13 | MOGA | 242.6 | 326.9 | -26% | D |
| 14 | MUKTSAR | 380.9 | 303.5 | 25% | E |
| 15 | NAWANSHAHR | 777.7 | 764.5 | 2% | N |
| 16 | PATIALA | 780.4 | 563.1 | 39% | E |
| 17 | ROPAR | 834.1 | 706.2 | 18% | N |
| 18 | SANGRUR | 265.1 | 414.2 | -36% | D |
| 19 | SAS NAGAR (MOHALI) | 559.5 | 572.3 | -2% | N |
| 20 | TARN TARAN | 318.5 | 315.1 | 1% | N |
| 15 | HIMACHAL PRADESH | 684.2 | 763.5 | -10% | N |
| 1 | BILASPUR | 1099.5 | 873.9 | 26% | E |
| 2 | CHAMBA | 573.4 | 1051.8 | -45% | D |
| 3 | HAMIRPUR | 1154.0 | 1019.0 | 13% | N |
| 4 | KANGRA | 1309.3 | 1595.9 | -18% | N |
| 5 | KINNAUR | 120.4 | 251.7 | -52% | D |
| 6 | KULLU | 562.0 | 504.1 | 11% | N |
| 7 | LAHAUL & SPITI | 175.0 | 394.7 | -56% | D |
| 8 | MANDI | 934.4 | 1061.9 | -12% | N |
| 9 | SHIMLA | 681.5 | 643.6 | 6% | N |
| 10 | SIRMAUR | 1144.5 | 1350.1 | -15% | N |
| 11 | SOLAN | 841.7 | 983.1 | -14% | N |
| 12 | UNA | 871.7 | 820.2 | 6% | N |
| 16 | JAMMU & KASHMIR | 445.8 | 567.5 | -21% | D |
| 1 | ANANTNAG | 204.7 | 296.9 | -31% | D |
| 2 | BADGAM | 135.7 | 185.4 | -27% | D |
| 3 | BANDIPORE | 137.0 | 168.7 | -19% | N |
| 4 | BARAMULA | 381.0 | 234.9 | 62% | LE |
| 5 | DODA | 309.8 | 435.9 | -29% | D |
| 6 | GANDERBAL | 170.7 | 293.7 | -42% | D |
| 7 | JAMMU | 360.1 | 931.3 | -61% | LD |
| 8 | KARGIL | 21.1 | 37.7 | -44% | D |
| 9 | KATHUA | 705.5 | 1362.9 | -48% | D |
| 10 | KISTWAR | | 435.9 | | * |
| 11 | KULGAM | 388.0 | 330.0 | 18% | N |
| 12 | KUPWARA | 188.7 | 262.9 | -28% | D |
| 13 | LADAKH (LEH) | 17.8 | 37.7 | -53% | D |
| 14 | POONCH | 509.0 | 725.4 | -30% | D |
| 15 | PULWAMA | 85.3 | 151.9 | -44% | D |
| 16 | RAJOURI | 283.7 | 830.7 | -66% | LD |
| 17 | RAMBAN | 375.8 | 413.8 | -9% | N |
| 18 | REASI | 1717.0 | 1154.3 | 49% | E |
| 19 | SAMBA | 689.0 | 931.3 | -26% | D |
| 20 | SHOPIAN | | 265.8 | | * |
| 21 | SRINAGAR | 215.1 | 205.9 | 4% | N |
| 22 | UDHAMPUR | 992.0 | 1342.7 | -26% | D |
| | RAJASTHAN | 582.6 | 415.0 | 40% | E |
| 17 | EAST RAJASTHAN | 919.5 | 602.9 | 53% | E |
| 1 | AJMER | 764.3 | 419.5 | 82% | LE |
| 2 | ALWAR | 373.8 | 553.5 | -32% | D |
| 3 | BANSWARA | 1223.7 | 844.6 | 45% | E |
| 4 | BARAN | 1237.4 | 774.5 | 60% | LE |

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|-----------|----------------------------|---------------|---------------|------------|-----------|
| 5 | BHARATPUR | 486.4 | 545.2 | -11% | N |
| 6 | BHILWARA | 1055.4 | 580.4 | 82% | LE |
| 7 | BUNDI | 1169.0 | 629.7 | 86% | LE |
| 8 | CHITTORGARH | 1177.2 | 699.2 | 68% | LE |
| 9 | DAUSA | 647.1 | 585.9 | 10% | N |
| 10 | DHOLPUR | 692.2 | 605.2 | 14% | N |
| 11 | DUNGARPUR | 1007.2 | 624.6 | 61% | LE |
| 12 | JAIPUR | 695.5 | 502.1 | 39% | E |
| 13 | JHALAWAR | 1716.6 | 841.2 | 104% | LE |
| 14 | JHUNJHUNU | 598.5 | 406.1 | 47% | E |
| 15 | KARAULI | 524.2 | 616.9 | -15% | N |
| 16 | KOTA | 1299.0 | 716.6 | 81% | LE |
| 17 | PRATAPGARH | 1662.8 | 864.1 | 92% | LE |
| 18 | RAJSAMAND | 841.7 | 506.0 | 66% | LE |
| 19 | SAWAI MADHOPUR | 926.6 | 617.4 | 50% | E |
| 20 | SIKAR | 685.3 | 391.2 | 75% | LE |
| 21 | SIROHI | 952.1 | 839.0 | 13% | N |
| 22 | TONK | 836.8 | 557.0 | 50% | E |
| 23 | UDAIPUR | 976.1 | 587.4 | 66% | LE |
| 18 | WEST RAJASTHAN | 315.0 | 265.3 | 19% | N |
| 1 | BARMER | 283.6 | 247.9 | 14% | N |
| 2 | BIKANER | 200.5 | 229.6 | -13% | N |
| 3 | CHURU | 353.1 | 315.5 | 12% | N |
| 4 | HANUMANGARH | 150.3 | 263.5 | -43% | D |
| 5 | JAISALMER | 160.7 | 162.1 | -1% | N |
| 6 | JALORE | 514.6 | 385.7 | 33% | E |
| 7 | JODHPUR | 403.0 | 278.1 | 45% | E |
| 8 | NAGOUR | 532.1 | 350.5 | 52% | E |
| 9 | PALI | 694.8 | 450.3 | 54% | E |
| 10 | SRI GANGANAGAR | 147.8 | 201.8 | -27% | D |
| | MADHYA PRADESH | 1351.1 | 940.6 | 44% | E |
| 19 | EAST MADHYA PRADESH | 1309.7 | 1048.4 | 25% | E |
| 1 | ANUPPUR | 1342.3 | 1099.6 | 22% | E |
| 2 | BALAGHAT | 1284.1 | 1323.0 | -3% | N |
| 3 | CHHATARPUR | 1205.1 | 947.5 | 27% | E |
| 4 | CHHINDWARA | 1275.3 | 1001.3 | 27% | E |
| 5 | DAMOH | 1489.0 | 1046.3 | 42% | E |
| 6 | DINDORI | 1453.4 | 1182.0 | 23% | E |
| 7 | JABALPUR | 1587.0 | 1111.2 | 43% | E |
| 8 | KATNI | 1283.0 | 1011.9 | 27% | E |
| 9 | MANDLA | 1747.2 | 1210.7 | 44% | E |
| 10 | NARSINGHPUR | 1719.4 | 1046.6 | 64% | LE |
| 11 | PANNA | 1115.5 | 1087.4 | 3% | N |
| 12 | REWA | 1199.2 | 950.7 | 26% | E |
| 13 | SAGAR | 1519.9 | 1080.2 | 41% | E |
| 14 | SATNA | 903.0 | 949.2 | -5% | N |
| 15 | SEONI | 1474.7 | 1027.0 | 44% | E |
| 16 | SHAHDOL | 869.0 | 989.5 | -12% | N |
| 17 | SIDHI | 916.0 | 987.5 | -7% | N |
| 18 | SINGRAULI | 1211.3 | 837.0 | 45% | E |
| 19 | TIKAMGARH | 1053.0 | 889.2 | 18% | N |
| 20 | UMARIA | 1334.2 | 1075.0 | 24% | E |
| 20 | WEST MADHYA PRADESH | 1383.0 | 857.7 | 61% | LE |
| 1 | AGAR-MALWA | 1855.0 | 812.1 | 128% | LE |
| 2 | ALIRAJPUR | 1394.5 | 784.3 | 78% | LE |
| 3 | ASHOKNAGAR | 1366.5 | 852.1 | 60% | LE |
| 4 | BARWANI | 1138.2 | 658.7 | 73% | LE |
| 5 | BETUL | 1250.9 | 957.8 | 31% | E |
| 6 | BHIND | 734.2 | 657.7 | 12% | N |
| 7 | BHOPAL | 1756.5 | 962.4 | 83% | LE |

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|-----------|-------------------------------|---------------|--------------|------------|-----------|
| 8 | BURHANPUR | 1206.3 | 741.4 | 63% | LE |
| 9 | DATIA | 719.9 | 755.8 | -5% | N |
| 10 | DEWAS | 1465.2 | 904.4 | 62% | LE |
| 11 | DHAR | 1217.2 | 835.9 | 46% | E |
| 12 | GUNA | 1557.2 | 888.1 | 75% | LE |
| 13 | GWALIOR | 823.0 | 747.9 | 10% | N |
| 14 | HARDA | 1591.5 | 1042.1 | 53% | E |
| 15 | HOSHANGABAD | 1934.1 | 1308.7 | 48% | E |
| 16 | INDORE | 1434.6 | 827.0 | 73% | LE |
| 17 | JHABUA | 1424.7 | 774.7 | 84% | LE |
| 18 | KHANDWA | 1311.3 | 790.9 | 66% | LE |
| 19 | KHARGONE | 1016.5 | 714.4 | 42% | E |
| 20 | MANDSAUR | 2018.6 | 786.5 | 157% | LE |
| 21 | MORENA | 731.1 | 651.5 | 12% | N |
| 22 | NEEMUCH | 1711.7 | 742.3 | 131% | LE |
| 23 | RAISEN | 1863.2 | 1074.9 | 73% | LE |
| 24 | RAJGARH | 1631.0 | 833.2 | 96% | LE |
| 25 | RATLAM | 1563.5 | 867.5 | 80% | LE |
| 26 | SEHORE | 1774.4 | 1043.3 | 70% | LE |
| 27 | SHAJAPUR | 1712.9 | 886.7 | 93% | LE |
| 28 | SHEOPUR | 849.2 | 670.7 | 27% | E |
| 29 | SHIVPURI | 895.0 | 779.8 | 15% | N |
| 30 | UJJAIN | 1477.3 | 844.3 | 75% | LE |
| 31 | VIDISHA | 1603.8 | 982.2 | 63% | LE |
| | | | | | |
| | GUJARAT | 993.3 | 692.4 | 43% | E |
| | | | | | |
| 21 | GUJARAT REGION | 1193.4 | 922.9 | 29% | E |
| | | | | | |
| 1 | AHMEDABAD | 725.9 | 692.2 | 5% | N |
| 2 | ANAND | 1004.2 | 786.8 | 28% | E |
| 3 | ARAVALLI | 998.2 | 817.6 | 22% | E |
| 4 | BANASKANTHA | 599.8 | 559.1 | 7% | N |
| 5 | BHARUCH | 1238.6 | 763.9 | 62% | LE |
| 6 | CHHOTA UDEPUR | 1759.2 | 1015.7 | 73% | LE |
| 7 | DADARA & NAGAR HAVELI | 3622.8 | 2161.9 | 68% | LE |
| 8 | DAHOD | 848.5 | 808.0 | 5% | N |
| 9 | DAMAN | 2916.8 | 2161.9 | 35% | E |
| 10 | DANGS | 3039.3 | 2229.8 | 36% | E |
| 11 | GANDHINAGAR | 847.6 | 714.7 | 19% | N |
| 12 | KHEDA | 1013.2 | 838.0 | 21% | E |
| 13 | MAHISAGAR | 881.3 | 786.3 | 12% | N |
| 14 | MEHSANA | 737.5 | 687.4 | 7% | N |
| 15 | NARMADA | 1600.9 | 1081.0 | 48% | E |
| 16 | NAVSARI | 2363.8 | 1834.0 | 29% | E |
| 17 | PANCHMAHAL | 1218.6 | 920.2 | 32% | E |
| 18 | PATAN | 663.2 | 505.5 | 31% | E |
| 19 | SABARKANTHA | 935.3 | 777.4 | 20% | E |
| 20 | SURAT | 1858.2 | 1309.5 | 42% | E |
| 21 | TAPI | 1759.4 | 1424.4 | 24% | E |
| 22 | VADODARA | 1070.5 | 904.6 | 18% | N |
| 23 | VALSAD | 3089.0 | 2164.5 | 43% | E |
| | | | | | |
| 22 | SAURASHTRA & KUTCH | 839.7 | 507.2 | 66% | LE |
| | | | | | |
| 1 | AMRELI | 803.2 | 560.1 | 43% | E |
| 2 | BHAVNAGAR | 760.2 | 567.6 | 34% | E |
| 3 | BOTAD | 921.0 | 523.1 | 76% | LE |
| 4 | DEVBHOO MI DWARKA | 985.8 | 502.2 | 96% | LE |
| 5 | DIU | 802.4 | 619.9 | 29% | E |
| 6 | GIR SOMNATH | 1115.4 | 842.7 | 32% | E |
| 7 | JAMNAGAR | 1112.8 | 561.1 | 98% | LE |
| 8 | JUNAGADH | 1340.9 | 839.5 | 60% | LE |
| 9 | KUTCH | 681.6 | 376.3 | 81% | LE |
| 10 | MORBI | 844.6 | 514.8 | 64% | LE |

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|-----------|----------------------------------|---------------|---------------|-------------|-----------|
| 11 | PORBANDAR | 967.2 | 656.4 | 47% | E |
| 12 | RAJKOT | 942.8 | 591.1 | 59% | E |
| 13 | SURENDRANAGAR | 835.5 | 523.7 | 60% | LE |
| | DADARA & NAGAR HAVELI | 3622.8 | 2161.9 | 68% | LE |
| | DAMAN & DIU | 2161.6 | 1611.2 | 34% | E |
| 1 | DAMAN | 2916.8 | 2161.9 | 35% | E |
| 2 | DIU | 802.4 | 619.9 | 29% | E |
| 23 | KONKAN & GOA | 4385.8 | 2875.3 | 53% | E |
| | GOA | 3917.6 | 2974.7 | 32% | E |
| 1 | NORTH GOA | 4127.9 | 3073.1 | 34% | E |
| 2 | SOUTH GOA | 3731.9 | 2887.9 | 29% | E |
| | MAHARASHTRA | 1328.5 | 1004.2 | 32% | E |
| 1 | MUMBAI CITY | 2730.8 | 2021.4 | 35% | E |
| 2 | MUMBAI SUBURBAN | 3670.2 | 2205.8 | 66% | LE |
| 3 | PALGHAR | 3883.4 | 2305.4 | 68% | LE |
| 4 | RAIGAD | 4945.6 | 3148.7 | 57% | E |
| 5 | RATNAGIRI | 4684.9 | 3195.1 | 47% | E |
| 6 | SINDHUDURG | 4270.0 | 2940.5 | 45% | E |
| 7 | THANE | 4084.9 | 2433.4 | 68% | LE |
| 24 | MADHYA MAHARASHTRA | 1166.9 | 751.2 | 55% | E |
| 1 | AHMEDNAGAR | 525.2 | 448.1 | 17% | N |
| 2 | DHULE | 967.8 | 535.1 | 81% | LE |
| 3 | JALGAON | 870.1 | 632.6 | 38% | E |
| 4 | KOLHAPUR | 2927.5 | 1733.1 | 69% | LE |
| 5 | NANDURBAR | 1344.9 | 860.4 | 56% | E |
| 6 | NASHIK | 1554.6 | 933.8 | 66% | LE |
| 7 | PUNE | 1803.5 | 861.5 | 109% | LE |
| 8 | SANGLI | 650.4 | 514.5 | 26% | E |
| 9 | SATARA | 1418.7 | 886.2 | 60% | LE |
| 10 | SHOLAPUR | 299.6 | 481.1 | -38% | D |
| 25 | MARATHWADA | 590.7 | 668.8 | -12% | N |
| 1 | AURANGABAD | 607.3 | 581.8 | 4% | N |
| 2 | BEED | 412.2 | 566.1 | -27% | D |
| 3 | HINGOLI | 667.4 | 795.3 | -16% | N |
| 4 | JALNA | 526.2 | 603.1 | -13% | N |
| 5 | LATUR | 550.9 | 706.0 | -22% | D |
| 6 | NANDED | 814.4 | 814.3 | 0% | N |
| 7 | OSMANABAD | 514.1 | 603.1 | -15% | N |
| 8 | PARBHANI | 649.8 | 761.3 | -15% | N |
| 26 | VIDARBHA | 1054.6 | 943.1 | 12% | N |
| 1 | AKOLA | 820.0 | 693.8 | 18% | N |
| 2 | AMRAOTI | 892.1 | 862.0 | 3% | N |
| 3 | BHANDARA | 1222.9 | 1157.0 | 6% | N |
| 4 | BULDHANA | 669.8 | 659.4 | 2% | N |
| 5 | CHANDRAPUR | 1269.0 | 1083.9 | 17% | N |
| 6 | GADCHIROLI | 1850.5 | 1254.2 | 48% | E |
| 7 | GONDIA | 1183.9 | 1220.2 | -3% | N |
| 8 | NAGPUR | 1169.8 | 920.4 | 27% | E |
| 9 | WARDHA | 953.1 | 874.5 | 9% | N |
| 10 | WASHIM | 634.0 | 789.0 | -20% | D |
| 11 | YEOTMAL | 563.8 | 805.0 | -30% | D |
| 27 | CHHATTISGARH | 1255.6 | 1142.1 | 10% | N |
| 1 | BALOD | 1044.1 | 1013.5 | 3% | N |
| 2 | BALODA BAZAR | 953.7 | 946.1 | 1% | N |

| | | | | | |
|-----------|----------------------------------|--------------|--------------|------------|----------|
| 3 | BALRAMPUR | 1010.0 | 1165.6 | -13% | N |
| 4 | BASTAR | 1802.0 | 1171.0 | 54% | E |
| 5 | BEMETARA | 942.8 | 1008.9 | -7% | N |
| 6 | BIJAPUR | 2229.1 | 1323.4 | 68% | LE |
| 7 | BILASPUR | 1120.3 | 1090.8 | 3% | N |
| 8 | DANTEWADA | 1669.8 | 1290.2 | 29% | E |
| 9 | DHAMTARI | 1122.3 | 1031.3 | 9% | N |
| 10 | DURG | 878.5 | 984.0 | -11% | N |
| 11 | GARIABAND | 1195.4 | 1079.1 | 11% | N |
| 12 | JANJGIR | 1039.6 | 1174.3 | -11% | N |
| 13 | JASHPUR | 1129.2 | 1405.7 | -20% | D |
| 14 | KABIRDHAM | 863.5 | 858.5 | 1% | N |
| 15 | KANKER | 1341.4 | 1291.4 | 4% | N |
| 16 | KONDAGAON | 1614.5 | 1174.1 | 38% | E |
| 17 | KORBA | 1246.6 | 1310.5 | -5% | N |
| 18 | KORIYA | 1067.6 | 1132.1 | -6% | N |
| 19 | MAHASAMUND | 1171.8 | 1048.3 | 12% | N |
| 20 | MUNGELI | 776.9 | 967.7 | -20% | D |
| 21 | NARAYANPUR | 1789.6 | 1202.4 | 49% | E |
| 22 | RAIGARH | 1263.1 | 1202.7 | 5% | N |
| 23 | RAIPUR | 999.4 | 1051.5 | -5% | N |
| 24 | RAJNANDGAON | 904.3 | 976.8 | -7% | N |
| 25 | SUKMA | 1701.6 | 1124.0 | 51% | E |
| 26 | SURAJPUR | 1214.9 | 1116.6 | 9% | N |
| 27 | SURGUJA | 830.5 | 1223.2 | -32% | D |
| | ANDHRA PRADESH | 564.7 | 514.4 | 10% | N |
| 28 | COASTAL A. P. & YANAM | 640.6 | 586.9 | 9% | N |
| 1 | EAST GODAVARI | 872.4 | 728.9 | 20% | E |
| 2 | GUNTUR | 675.4 | 556.1 | 21% | E |
| 3 | KRISHNA | 730.9 | 683.0 | 7% | N |
| 4 | NELLORE | 364.6 | 350.9 | 4% | N |
| 5 | PRAKASAM | 403.9 | 391.2 | 3% | N |
| 6 | SRIKAKULAM | 817.5 | 742.4 | 10% | N |
| 7 | VISHAKHAPATNAM | 701.1 | 648.6 | 8% | N |
| 8 | VIZIANAGARAM | 806.5 | 718.8 | 12% | N |
| 9 | WEST GODAVARI | 808.2 | 787.5 | 3% | N |
| 10 | YANAM | 629.8 | 752.1 | -16% | N |
| 29 | RAYALASEEMA | 459.9 | 411.6 | 12% | N |
| 1 | ANANTAPUR | 382.4 | 339.5 | 13% | N |
| 2 | CHITTOOR | 516.5 | 441.0 | 17% | N |
| 3 | CUDDAPAH | 413.8 | 401.3 | 3% | N |
| 4 | KURNOOL | 535.6 | 473.5 | 13% | N |
| 30 | TELANGANA | 805.0 | 759.6 | 6% | N |
| 1 | ADILABAD | 1016.3 | 995.1 | 2% | N |
| 2 | B. KOTHAGUDEM | 1073.5 | 902.6 | 19% | N |
| 3 | HYDERABAD | 700.4 | 621.2 | 13% | N |
| 4 | J. BHUPALPALLY | 1285.3 | 1131.2 | 14% | N |
| 5 | JAGTIAL | 1009.6 | 831.0 | 21% | E |
| 6 | JANGAON | 801.3 | 730.7 | 10% | N |
| 7 | JOGULAMBA GADWAL | 386.2 | 480.3 | -20% | D |
| 8 | KAMAREDDY | 985.8 | 856.2 | 15% | N |
| 9 | KARIMNAGAR | 1005.9 | 722.4 | 39% | E |
| 10 | KHAMMAM | 707.7 | 808.8 | -12% | N |
| 11 | KUMARAM BHEEM | 1213.3 | 939.2 | 29% | E |
| 12 | M. MALKAJGIRI | 633.7 | 666.9 | -5% | N |
| 13 | MAHABUBABAD | 881.1 | 808.5 | 9% | N |
| 14 | MAHABUBNAGAR | 533.1 | 566.9 | -6% | N |
| 15 | MANCHERIAL | 1039.0 | 944.0 | 10% | N |
| 16 | MEDAK | 775.7 | 751.5 | 3% | N |
| 17 | NAGARKURNOOL | 515.8 | 539.5 | -4% | N |

| | | | | | |
|-----------|-----------------------------------|---------------|---------------|------------|----------|
| 18 | NALGONDA | 455.2 | 528.2 | -14% | N |
| 19 | NIRMAL | 910.3 | 902.1 | 1% | N |
| 20 | NIZAMABAD | 1122.2 | 921.3 | 22% | E |
| 21 | PEDDAPALLE | 1065.6 | 908.4 | 17% | N |
| 22 | RAJANNA SIRCILLA | 903.3 | 710.7 | 27% | E |
| 23 | RANGAREDDY | 449.4 | 547.6 | -18% | N |
| 24 | SANGAREDDY | 570.9 | 717.0 | -20% | D |
| 25 | SIDDIPET | 696.6 | 620.8 | 12% | N |
| 26 | SURYAPET | 576.9 | 617.5 | -7% | N |
| 27 | VIKARABAD | 544.0 | 705.9 | -23% | D |
| 28 | WANAPARTHY | 592.0 | 560.1 | 6% | N |
| 29 | WARANGAL_RURAL | 927.7 | 901.0 | 3% | N |
| 30 | WARANGAL_URBAN | 915.9 | 668.2 | 37% | E |
| 31 | Y. BHUVANAGIRI | 575.0 | 527.2 | 9% | N |
| | | | | | |
| 31 | TAMIL. PUDU.& KARAICAL | 401.9 | 342.0 | 18% | N |
| | | | | | |
| | TAMILNADU | 401.6 | 341.9 | 17% | N |
| | | | | | |
| | | | | | |
| 1 | ARIYALUR | 587.8 | 376.9 | 56% | E |
| 2 | CHENNAI | 587.8 | 439.6 | 34% | E |
| 3 | COIMBATORE | 766.2 | 686.8 | 12% | N |
| 4 | CUDDALORE | 394.0 | 356.7 | 10% | N |
| 5 | DHARMAPURI | 431.2 | 392.3 | 10% | N |
| 6 | DINDIGUL | 250.4 | 308.4 | -19% | N |
| 7 | ERODE | 252.1 | 259.9 | -3% | N |
| 8 | KANCHEEPURAM | 429.7 | 479.4 | -10% | N |
| 9 | KANYAKUMARI | 629.8 | 490.6 | 28% | E |
| 10 | KARUR | 209.8 | 199.4 | 5% | N |
| 11 | KRISHNAGIRI | 301.5 | 375.2 | -20% | D |
| 12 | MADURAI | 303.1 | 325.2 | -7% | N |
| 13 | NAGAPATTINAM | 390.8 | 279.0 | 40% | E |
| 14 | NAMAKKAL | 271.5 | 336.4 | -19% | N |
| 15 | NILGIRIS | 1221.3 | 874.9 | 40% | E |
| 16 | PERAMBALUR | 357.0 | 278.7 | 28% | E |
| 17 | PUDUKKOTTAI | 345.0 | 330.2 | 4% | N |
| 18 | RAMANATHAPURAM | 153.1 | 135.0 | 13% | N |
| 19 | SALEM | 492.0 | 421.0 | 17% | N |
| 20 | SIVAGANGA | 454.1 | 301.9 | 50% | E |
| 21 | THANJAVUR | 379.4 | 313.7 | 21% | E |
| 22 | THENI | 351.5 | 215.4 | 63% | LE |
| 23 | TIRUNELVELI | 269.0 | 128.4 | 110% | LE |
| 24 | TIRUPPUR | 181.7 | 151.3 | 20% | E |
| 25 | TIRUVALLUR | 589.5 | 455.9 | 29% | E |
| 26 | TIRUVANNAMALAI | 683.7 | 449.4 | 52% | E |
| 27 | TIRUVARUR | 434.9 | 302.3 | 44% | E |
| 28 | TOOTHUKUDI | 89.8 | 64.7 | 39% | E |
| 29 | TRICHY | 273.5 | 276.8 | -1% | N |
| 30 | VELLORE | 523.7 | 453.4 | 16% | N |
| 31 | VILLUPURAM | 452.8 | 405.0 | 12% | N |
| 32 | VIRUDHUNAGAR | 310.6 | 189.6 | 64% | LE |
| | | | | | |
| | PUDUCHERRY (UT) | 553.2 | 425.6 | 30% | E |
| | | | | | |
| | | | | | |
| 1 | KARAICAL | 365.8 | 308.6 | 19% | N |
| 2 | MAHE | 2971.8 | 2503.4 | 19% | N |
| 3 | PUDUCHERRY | 574.1 | 392.7 | 46% | E |
| 4 | YANAM | 629.8 | 752.1 | -16% | N |
| | | | | | |
| | KARNATAKA | 1033.3 | 840.7 | 23% | E |
| | | | | | |
| 32 | COASTAL KARNATAKA | 3796.5 | 3095.1 | 23% | E |
| | | | | | |
| 1 | DAKSHINA KANNADA | 3515.5 | 3354.3 | 5% | N |
| 2 | UDUPI | 4536.3 | 3742.3 | 21% | E |
| 3 | UTTARA KANNADA | 3670.1 | 2753.7 | 33% | E |

| | | | | | |
|-----------|--------------------------|---------------|---------------|------------|----------|
| 33 | N. I. KARNATAKA | 612.3 | 497.1 | 23% | E |
| 1 | BAGALKOTE | 441.5 | 353.8 | 25% | E |
| 2 | BELAGAVI | 1088.4 | 572.1 | 90% | LE |
| 3 | BIDAR | 643.3 | 680.5 | -5% | N |
| 4 | DHARWAD | 746.5 | 524.1 | 42% | E |
| 5 | GADAG | 444.7 | 367.4 | 21% | E |
| 6 | HAVERI | 772.9 | 507.1 | 52% | E |
| 7 | KALABURGI | 594.2 | 588.0 | 1% | N |
| 8 | KOPPAL | 424.2 | 388.2 | 9% | N |
| 9 | RAICHUR | 441.7 | 464.1 | -5% | N |
| 10 | VIJAYAPURA | 370.0 | 416.3 | -11% | N |
| 11 | YADGIR | 473.8 | 560.8 | -16% | N |
| 34 | S. I. KARNATAKA | 839.2 | 681.8 | 23% | E |
| 1 | BALLARI | 439.0 | 388.6 | 13% | N |
| 2 | BENGALURU RURAL | 433.0 | 469.6 | -8% | N |
| 3 | BENGALURU URBAN | 453.5 | 476.5 | -5% | N |
| 4 | CHAMARAJANAGAR | 383.1 | 330.8 | 16% | N |
| 5 | CHIKABALLAPURA | 386.7 | 422.0 | -8% | N |
| 6 | CHIKKAMAGALURU | 2091.5 | 1591.3 | 31% | E |
| 7 | CHITRADURGA | 371.0 | 276.9 | 34% | E |
| 8 | DAVANGERE | 485.4 | 388.5 | 25% | E |
| 9 | HASSAN | 825.8 | 673.9 | 23% | E |
| 10 | KODAGU | 2628.9 | 2257.4 | 16% | N |
| 11 | KOLAR | 317.2 | 393.4 | -19% | N |
| 12 | MANDYA | 418.9 | 305.1 | 37% | E |
| 13 | MYSURU | 612.2 | 366.7 | 67% | LE |
| 14 | RAMANAGARA | 436.9 | 465.9 | -6% | N |
| 15 | SHIVAMOGGA | 2124.3 | 1600.3 | 33% | E |
| 16 | TUMAKURU | 428.9 | 372.7 | 15% | N |
| 35 | KERALA & MAHE | 2310.2 | 2049.3 | 13% | N |
| | KERALA | 2310.0 | 2049.3 | 0.1 | N |
| 1 | ALAPUZHA | 1799.2 | 1722.3 | 4% | N |
| 2 | CANNUR | 3135.6 | 2638.1 | 19% | N |
| 3 | ERNAKULAM | 2377.4 | 2038.0 | 17% | N |
| 4 | IDUKKI | 2328.2 | 2615.0 | -11% | N |
| 5 | KASARGOD | 3417.7 | 2971.4 | 15% | N |
| 6 | KOLLAM | 1423.9 | 1280.9 | 11% | N |
| 7 | KOTTAYAM | 2133.2 | 1871.9 | 14% | N |
| 8 | KOZHICODE | 3466.6 | 2577.4 | 34% | E |
| 9 | MALAPPURAM | 2368.3 | 2005.5 | 18% | N |
| 10 | PALAKKAD | 2125.9 | 1531.6 | 39% | E |
| 11 | PATHANAMTHITTA | 1716.8 | 1618.7 | 6% | N |
| 12 | THIRUVANANTHAPURAM | 1039.9 | 865.1 | 20% | E |
| 13 | THRISSUR | 2499.2 | 2280.8 | 10% | N |
| 14 | WYNAD | 2378.0 | 2525.5 | -6% | N |
| 1 | MAHE | 2971.8 | 2503.4 | 0.1871 | N |
| 36 | LAKSHADWEEP | 1231.7 | 1013.1 | 22% | E |

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 1145
TO BE ANSWERED ON FRIDAY, NOVEMBER 22, 2019**

RISE IN TEMPERATURE

**1145. DR. UMESH G. JADHAV:
SHRI RAMDAS C. TADAS:
SHRI SANGAM LAL GUPTA:
SHRI CHANDRA PRAKASH JOSHI:**

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) the details of the rise in temperature taking place in the country during the summer season along with the names of places in the country having seen the highest increase in temperature;**
- (b) the diseases caused by the rise in temperature during the summer season;**
- (c) the factors responsible for rise/ increase in temperature; and**
- (d) whether the Government has formulated any scheme/plans or alternative to control the rise in temperature and curb diseases caused therefrom and if so, the details thereof?**

**ANSWER
MINISTER FOR SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. HARSH VARDHAN)**

- (a) The time series of temperature anomaly for the country during summer season (March to May) is given in figure 1 and the spatial temperature trend over the country is given in figure 2. The maximum increase in temperature (around 3 Degree Celsius) is observed over Uttarakhand, whereas an increase of the order of about 2 Deg. C is observed over the parts of East Rajasthan and East Madhya Pradesh.**

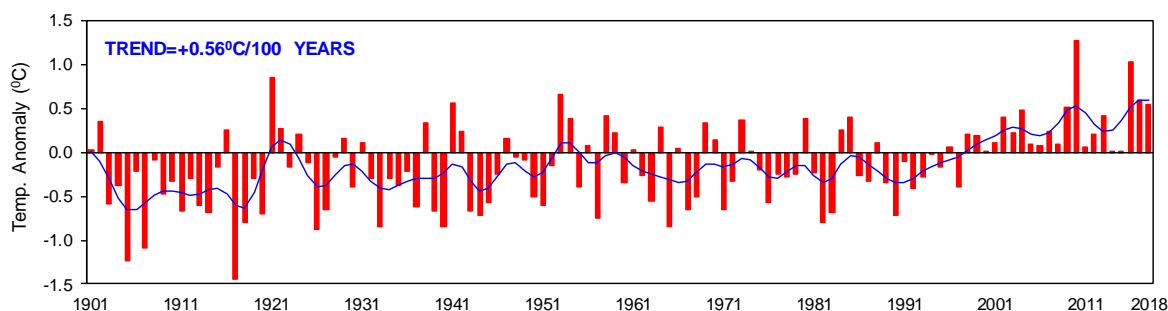


Figure 1. Temperature anomaly for the country during Summer Season (March to May) for the period 1901 to 2018.

MAR—MAY MEAN TEMP ANOM TREND (1901—2018)

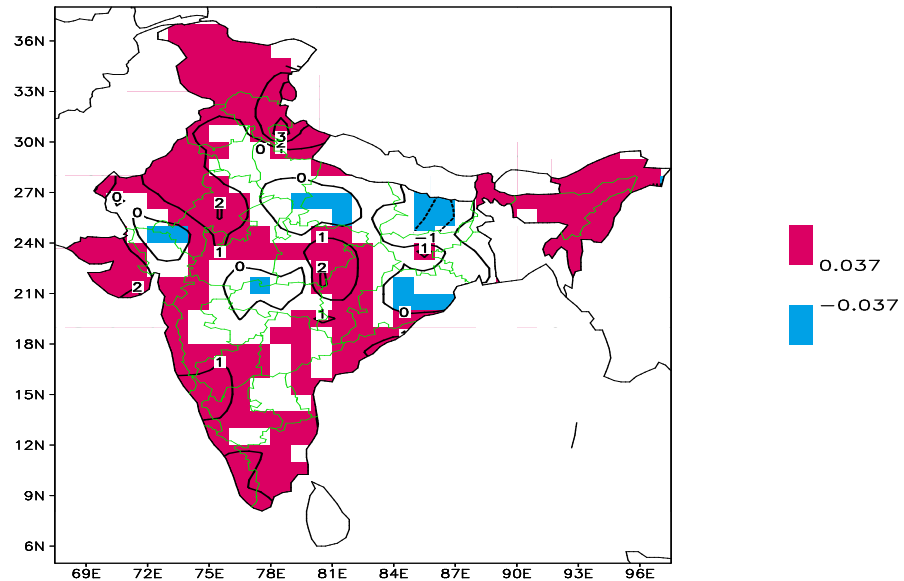


Figure 2. Temperature anomaly trend during Summer Season (March to May) for the period 1901 to 2018.

(b) Abnormal temperature events can impose severe physiological stress on the human body as the body operates best within a fairly normal temperature range. There is a marked relationship between human mortality and thermal stress. During unusually hot episodes, deaths from different causes can rise significantly with the elderly at greater risk than others. India has experienced manifold increase in the human deaths during various heat waves of years like 1971, 1987, 1997, 2001, 2002, 2013 & 2015. Recent years (2001-2015) have registered the highest number of deaths due to heat wave events compared to previous 3 decades.

(c) & (d) One of the reasons for the increasing temperature is global warming associated with the increase in greenhouse gasses like Carbon dioxide, Methane etc. in the atmosphere. As an adaptive measure, India Meteorological Department (IMD) in collaboration with local health departments have started heat action plan in many parts of the country to forewarn about the heat waves and also advising action to be taken during such occasions. Heat action plan became operational since 2013.

The Heat Action Plan is a comprehensive early warning system and preparedness plan for extreme heat events. The Plan presents immediate as well as longer-term actions to increase preparedness, information-sharing, and response coordination to reduce the health impacts of extreme heat on vulnerable populations.

The main aims of the Heat Action Plan are:

- **Establish Early Warning System and Inter-Agency Coordination to alert residents on predicted high and extreme temperatures. Who will do what, when, and how is made clear to individuals and units of key departments, especially health department.**
- **Capacity building / training programme for health care professionals at local level to recognize and respond to heat-related illnesses, particularly during extreme heat events. These training programmes focus on medical officers, paramedical staff and community health staff so that they can effectively prevent and manage heat-related medical issues to reduce mortality and morbidity.**
- **Public Awareness and community outreach: Disseminating public awareness messages on how to protect against the extreme heat-wave through print, electronic and social media and Information, Education and Communication (IEC) materials such as pamphlets, posters and advertisements and Television Commercials (TVCs) on Do and Don't and treatment measures for heat related illnesses.**
- **Collaboration with non government and civil society: Collaboration with non-governmental organizations and civil society organizations to improve bus stands, building temporary shelters, wherever necessary, improved water delivery systems in public areas and other innovative measures to tackle Heat wave conditions.**
- **Identifying vulnerable populations and the health risks specific to each group.**
- **Developing effective strategies, agency coordination and response planning that addresses heat-health risks.**
- **Heat Health Information Surveillance System (HHISS) to monitor and assess the impact of heat waves on human health.**
- **Reducing Heat Exposure and Promoting Adaptive Measures by launching new efforts including mapping of high-risk areas, access to potable drinking water and cooling spaces during extreme heat days.**
- **Evaluating and updating the Heat Action Plan regularly.**

NDMA and IMD are working with 23 states prone to high temperatures leading to heat-wave conditions to develop heat action plans. Till May 2019 following States are already under Heat Action Plan:

- | | | |
|-----------------------------|------------------------------|--------------------------|
| 1. Andhra Pradesh | 9. Himachal Pradesh | 17. Punjab |
| 2. Arunachal Pradesh | 10. Jharkhand | 18. Rajasthan |
| 3. Bihar | 11. Jammu and Kashmir | 19. Tamil Nadu |
| 4. Chhattisgarh | 12. Karnataka | 20. Telangana |
| 5. Delhi | 13. Kerala | 21. Uttarakhand |
| 6. Gujarat | 14. Maharashtra | 22. Uttar Pradesh |
| 7. Goa | 15. Madhya Pradesh | 23. West Bengal |
| 8. Haryana | 16. Odisha | |

For supporting the cause, IMD has started Forecast Demonstration Project (FDP) on heat waves from April 2017 for the hot weather season under which a detailed daily report including realized data of heat waves, synoptic situation leading to the occurrence of heat waves, diagnosis on the basis of Numerical Model outputs and forecast and warnings for five days is prepared. This bulletin is disseminated to all concerned including health departments. From April 2018 onwards, IMD started issuing an additional bulletin on heat wave in the morning (8 a.m.) valid for 24 hours for supporting the planning of activities for the day and this bulletin is also disseminated to all concerned.

Both these bulletins are posted to IMD website also, on a special page created for heat waves.
