

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION No. 1312
TO BE ANSWERED ON TUESDAY, MARCH 03, 2020**

DEVELOPMENT OF WEATHER PREDICTION INFRASTRUCTURE

1312. DR. VIKAS MAHATME:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether Government is aware of the extensive damage of crops due to heavy, unpredictable rains in States like Karnataka and Madhya Pradesh;**
- (b) whether any studies have been conducted to assess the damage of crops by these unseasonal rains, if so, the details thereof;**
- (c) whether the Ministry has any plans to improve the weather prediction infrastructure in order to predict such unseasonal weather changes more accurately; and**
- (d) whether Government has any plans to improve information dissemination and communication to farmers in order to allow them to prepare for such circumstances, if so, the details thereof?**

ANSWER

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

- (a) As per the information available with Ministry of Home Affairs (MHA), damage of crops due to floods/hydro-meteorological hazards/landslides during the southwest monsoon and post monsoon seasons (provisional 1/6/2019 to 14/11/2019) in the State of Madhya Pradesh is 6.04 lakh hectares and in Karnataka it is 9.35 lakh hectares.**
- (b) The Ministry of Home Affairs deutes an Inter-Ministerial Central Team (IMCT) to the States on receipt of memorandum from the States for an on-the-spot assessment of the damage and requirement of assistance for relief operations in the wake of natural calamities as per the existing terms and norms of SDRF/NDRF. The Central team is required to give its recommendations/report. The rainfall statistics (State/UT wise) for the country along with rainfall statistics (district wise) for Madhya Pradesh & Karnataka for Monsoon & Post-monsoon seasons, 2019 is given in Annexure-I.**

- (c) **Yes Sir. 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 based on the forecast, Agromet Advisories are prepared and communicated by the 130 Agromet Field Units (AMFUs) located at State Agricultural Universities, institutes of ICAR and IITs 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.**

IMD is planning to implement block level Agromet Advisory Services shortly in collaboration with Indian Council of Agriculture Research (ICAR) in the country. District Agromet Units (DAMUs) are being established in Krishi Vikas Kendras (KVKs) under ICAR network. Implementation of block level AAS would address the micro-level variation in weather and climate and hence more numbers of farmers will be benefitted.

- (d) **Agromet Advisories are communicated to the farmers through multichannel dissemination systems like print and electronic media, Doordarshan, radio, internet etc. as well as by SMS using mobile phones through Kisan Portal launched by Ministry of Agriculture and Farmers' Welfare and through private companies under Public Private Partnership (PPP) mode. At present, 42 million farmers in the country receive the Agromet Advisories through SMS directly. Krishi Vigyan Kendras(KVKs) of Indian Council of Agricultural Research(ICAR) have also given link to the respective district level advisory in their web portal. A mobile App viz., 'Meghdoot' has been launched by Ministry of Earth Sciences, Government of India recently to help the farmers to get the weather information and related Agromet Advisories specific to their districts.**

Annexure-I**STATE-WISE RAINFALL (MM) DISTRIBUTION FOR MONSOON 2019**

No.	STATES	PERIOD 01.06.2019		TO	30.09.2019
		ACTUAL	NORMAL	% DEPARTURE	CATEGORY
EAST & NORTH EAST INDIA					
1	ARUNACHAL PRADESH	1538.2	1726.6	-11%	N
2	ASSAM	1334.3	1486.2	-10%	N
3	MEGHALAYA	2431.8	2855.8	-15%	N
4	NAGALAND	991.8	1143.4	-13%	N
5	MANIPUR	620.8	1404.9	-56%	D
6	MIZORAM	1506.9	1655.9	-9%	N
7	TRIPURA	1382.9	1457.8	-5%	N
8	SIKKIM	1954.0	1606.8	22%	E
9	WEST BENGAL	1167.6	1405.0	-17%	N
10	JHARKHAND	865.6	1054.7	-18%	N
11	BIHAR	1050.4	1017.2	3%	N
NORTH WEST INDIA					
1	UTTAR PRADESH	718.0	790.2	-9%	N
2	UTTARAKHAND	960.4	1176.9	-18%	N
3	HARYANA	255.2	438.6	-42%	D
4	CHANDIGARH (UT)	716.4	846.5	-15%	N
5	DELHI	378.1	585.8	-35%	D
6	PUNJAB	444.3	467.3	-5%	N
7	HIMACHAL PRADESH	684.2	763.5	-10%	N
8	JAMMU & KASHMIR	445.8	567.5	-21%	D
9	RAJASTHAN	582.6	415.0	40%	E
CENTRAL INDIA					
1	ODISHA	1232.5	1155.3	7%	N
2	MADHYA PRADESH	1351.1	940.6	44%	E
3	GUJARAT	993.3	692.4	43%	E
4	DADRA & NAGAR HAVELI (UT)	3622.8	2161.9	68%	LE
5	DAMAN & DIU (UT)	2161.6	1611.2	34%	E
6	GOA	3917.6	2974.7	32%	E
7	MAHARASHTRA	1328.5	1004.2	32%	E
8	CHHATISGARH	1255.6	1142.1	10%	N

SOUTH PENINSULA					
1	A & N ISLAND (UT)	2331.3	1653.8	41%	E
2	ANDHRA PRADESH	564.7	514.4	10%	N
3	TELANGANA	805.0	759.6	6%	N
4	TAMILNADU	401.6	341.9	17%	N
5	PUDUCHERRY (UT)	553.2	425.6	30%	E
6	KARNATAKA	1033.3	840.7	23%	E
7	KERALA	2310.0	2049.3	13%	N
8	LAKSHADWEEP (UT)	1231.7	1013.1	22%	E
COUNTRY AS A WHOLE		968.3	880.6	+10%	

CATEGORYWISE DISTRIBUTION OF NO. OF STATES

CATEGORY	PERIOD	01.06.2019	TO	30.09.2019
	NO. OF STATES			
LE (LARGE EXCESS) (+60% or more)		1		
E (EXCESS) (+20% to +59%)		11		
N (NORMAL) (+19% to -19%)		20		
D (DEFICIENT) (-20% to -59%)		4		
LD (LARGE DEFICIENT) (-60% to -99%)		0		
NR (NO RAIN) -100%)		0		

STATE-WISE RAINFALL (MM) DISTRIBUTION FOR POSTMONSOON 2019

S. NO.	STATES	PERIOD: 01.10.2019		TO	31.12.2019
		ACTUAL	NORMAL	% DEPARTURE	CATEGORY
EAST & NORTH EAST INDIA					
1	ARUNACHAL PRADESH	145.4	267.4	-46%	D
2	ASSAM	161.1	161.5	0%	N
3	MEGHALAYA	365.6	328.0	11%	N
4	NAGALAND	213.5	160.8	33%	E
5	MANIPUR	151.2	226.4	-33%	D
6	MIZORAM	166.6	264.1	-37%	D
7	TRIPURA	239.7	221.8	8%	N
8	SIKKIM	110.0	216.3	-49%	D
9	WEST BENGAL	215.5	159.1	35%	E
10	JHARKHAND	141.3	90.3	56%	E
11	BIHAR	42.2	73.0	-42%	D
NORTH WEST INDIA					
1	UTTAR PRADESH	48.6	41.5	17%	N
2	UTTARAKHAND	114.6	60.5	89%	LE
3	HARYANA	27.9	20.1	39%	E
4	CHANDIGARH (UT)	65.5	55.5	18%	N
5	DELHI	41.6	22.7	83%	LE
6	PUNJAB	62.4	26.3	137%	LE
7	HIMACHAL PRADESH	121.4	91.6	33%	E
8	JAMMU & KASHMIR	253.3	134.4	88%	LE
9	RAJASTHAN	42.2	17.9	136%	LE
CENTRAL INDIA					
1	ODISHA	188.6	131.3	44%	E
2	MADHYA PRADESH	64.8	53.7	21%	E
3	GUJARAT	72.8	28.5	156%	LE
4	DADRA & NAGAR HAVELI (UT)	128.2	54.8	134%	LE
5	DAMAN & DIU (UT)	104.4	50.0	109%	LE
6	GOA	568.5	202.9	180%	LE
7	MAHARASHTRA	184.9	98.5	88%	LE
8	CHHATISGARH	106.2	76.7	39%	E

SOUTH PENINSULA					
1	A & N ISLAND (UT)	293.0	675.8	-57%	D
2	ANDHRA PRADESH	269.0	290.7	-7%	N
3	TELANGANA	172.6	123.7	40%	E
4	TAMILNADU	452.0	445.7	1%	N
5	PUDUCHERRY (UT)	780.0	895.6	-13%	N
6	KARNATAKA	308.4	181.7	70%	LE
7	KERALA	625.0	491.6	27%	E
8	LAKSHADWEEP (UT)	874.3	321.8	172%	LE

COUNTRY AS A WHOLE	160.0	123.8	+29%
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CATEGORYWISE DISTRIBUTION OF NO. OF STATES

CATEGORY	PERIOD: 01.10.2019 TO 31.12.2019
	NO. OF STATES
LE (LARGE EXCESS) (+60% or more)	12
E (EXCESS) (+20% to +59%)	10
N (NORMAL) (+19% to -19%)	8
D (DEFICIENT) (-20% to -59%)	6
LD (LARGE DEFICIENT) (-60% to -99%)	0
NR (NO RAIN) -100%)	0

**District wise RF statistics of Madhya Pradesh & Karnataka
for Monsoon 2019**

District S.No.	MET. STATE/UT/ SUBDIVISION/ DISTRICT (NAME)	PERIOD	01.06.2019	TO	30.09.2019
		ACTUAL (mm)	NORMAL (mm)	% DEPARTURE	CATEGORY
	MADHYA PRADESH	1351.1	940.6	44%	E
	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
	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
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
	KARNATAKA	1033.3	840.7	23%	E
	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
	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
	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

**District wise RF statistics of Madhya Pradesh & Karnataka
for Post-monsoon 2019**

District No.	MET. STATE/UT/ SUBDIVISION/ DISTRICT (NAME)	01.10.2019 TO 31.12.2019			CATEGORY
		ACTUAL (mm)	NORMAL (mm)	% DEPARTURE	
	MADHYA PRADESH	64.8	53.7	21%	E
	EAST MADHYA PRADESH	59.9	57.4	4%	N
1	ANUPPUR	29.2	72.7	-60%	LD
2	BALAGHAT	29.2	80.4	-64%	LD
3	CHHATARPUR	62.3	50.4	24%	E
4	CHHINDWARA	84.9	77.0	10%	N
5	DAMOH	35.0	45.3	-23%	D
6	DINDORI	114.7	59.5	93%	LE
7	JABALPUR	39.4	50.8	-23%	D
8	KATNI	66.4	34.6	92%	LE
9	MANDLA	67.0	59.0	14%	N
10	NARSINGHPUR	14.4	43.9	-67%	LD
11	PANNA	81.6	47.1	73%	LE
12	REWA	71.0	50.5	41%	E
13	SAGAR	19.5	54.7	-64%	LD
14	SATNA	24.1	47.5	-49%	D
15	SEONI	90.9	76.7	18%	N
16	SHAHDOL	55.0	45.5	21%	E
17	SIDHI	96.4	49.8	94%	LE
18	SINGRAULI	91.0	56.8	60%	LE
19	TIKAMGARH	108.7	43.5	150%	LE
20	UMARIA	31.3	70.4	-56%	D
	WEST MADHYA PRADESH	68.5	50.9	35%	E
1	AGAR-MALWA	62.2	44.5	40%	E

2	ALIRAJPUR	123.5	36.2	241%	LE
3	ASHOKNAGAR	63.5	39.8	60%	LE
4	BARWANI	62.4	48.3	29%	E
5	BETUL	127.3	70.4	81%	LE
6	BHIND	19.8	43.9	-55%	D
7	BHOPAL	154.8	57.5	169%	LE
8	BURHANPUR	127.2	72.2	76%	LE
9	DATIA	22.7	42.5	-47%	D
10	DEWAS	39.7	51.5	-23%	D
11	DHAR	68.0	53.1	28%	E
12	GUNA	35.4	48.8	-27%	D
13	GWALIOR	12.0	47.5	-75%	LD
14	HARDA	101.9	64.5	58%	E
15	HOSHANGABAD	88.5	62.3	42%	E
16	INDORE	63.6	56.1	13%	N
17	JHABUA	120.4	47.6	153%	LE
18	KHANDWA	90.8	54.9	65%	LE
19	KHARGONE	47.3	49.4	-4%	N
20	MANDSAUR	83.5	46.5	80%	LE
21	MORENA	38.9	30.4	28%	E
22	NEEMUCH	70.0	35.7	96%	LE
23	RAISEN	61.0	55.3	10%	N
24	RAJGARH	85.6	53.9	59%	E
25	RATLAM	80.7	55.8	45%	E
26	SEHORE	55.2	57.9	-5%	N
27	SHAJAPUR	88.1	51.6	71%	LE
28	SHEOPUR	25.0	33.4	-25%	D
29	SHIVPURI	44.4	43.6	2%	N
30	UJJAIN	90.1	52.0	73%	LE
31	VIDISHA	47.0	49.4	-5%	N
	KARNATAKA	308.4	181.7	70%	LE
	COASTAL KARNATAKA	582.3	256.8	127%	LE
1	DAKSHINA KANNADA	619.4	369.5	68%	LE
2	UDUPI	688.2	272.8	152%	LE
3	UTTARA KANNADA	527.9	197.7	167%	LE
	N. I. KARNATAKA	245.1	138.1	77%	LE
1	BAGALKOTE	292.9	140.1	109%	LE
2	BELAGAVI	346.0	132.5	161%	LE
3	BIDAR	217.6	118.8	83%	LE
4	DHARWAD	300.7	150.6	100%	LE
5	GADAG	279.7	145.9	92%	LE
6	HAVERI	441.6	163.1	171%	LE
7	KALABURGI	173.9	125.2	39%	E

8	KOPPAL	251.2	141.6	77%	LE
9	RAICHUR	98.9	141.3	-30%	D
10	VIJAYAPURA	201.4	144.3	40%	E
11	YADGIR	77.9	134.6	-42%	D
	S. I. KARNATAKA	307.7	204.1	51%	E
1	BALLARI	241.2	160.1	51%	E
2	BENGALURU RURAL	262.0	230.3	14%	N
3	BENGALURU URBAN	300.8	213.8	41%	E
4	CHAMARAJANAGAR	249.3	260.2	-4%	N
5	CHIKABALLAPURA	223.9	210.0	7%	N
6	CHIKKAMAGALURU	464.4	224.7	107%	LE
7	CHITRADURGA	295.9	153.6	93%	LE
8	DAVANGERE	354.4	163.0	117%	LE
9	HASSAN	305.9	214.0	43%	E
10	KODAGU	405.2	306.3	32%	E
11	KOLAR	214.1	216.9	-1%	N
12	MANDYA	349.5	214.4	63%	LE
13	MYSURU	255.3	209.9	22%	E
14	RAMANAGARA	284.3	232.7	22%	E
15	SHIVAMOGGA	387.5	190.5	103%	LE
16	TUMAKURU	267.7	190.4	41%	E

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%)