GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 1616
TO BE ANSWERED ON WEDNESDAY, 27TH JULY, 2022

EARLY AND ACTIVE MONSOON

1616. SHRI RAVNEET SINGH BITTU:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the country is witnessing an unusually early and active phase of the annual rainy season and if so, the details thereof, State/UT-wise along with the reasons therefor;
(b) whether this unusual rain pattern is not good for agriculture and calls for effective water management system and other measures for use in the agricultural sector and if so, the details thereof;
(c) whether the Government is taking/has taken any measures to conduct a detailed analysis to defuse this unusual trend of early and active monsoon in the future; and
(d) if so, the details thereof and if not, the reasons therefor?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) Early onset of southwest monsoon is an inherent property observed in the inter-annual variability of monsoon behaviour. This year the monsoon onset over Kerala was on 29th May, 2022 against the normal date of 01st June(3 days ahead of normal date) and it has covered the entire country on 2nd July 2022, against the normal date of 8th July i.e. six days ahead of the normal date for monsoon coverage for the entire country. The map related to Advance of Southwest monsoon 2022 is given in **Annexure-I**.

The monsoon rainfall had been normal [92% of the Long Period Average (LPA)] during June 2022, for the country as a whole; the LPA of the rainfall for the month of June being 165.4 mm based on the data of 1971-2020. The rainfall in June is said to be normal if it is within 92% to 108% of LPA.

Rainfall statistics for the month of June 2022 for the country as a whole and four homogeneous regions are given in the table below:

Region	**Rainfall during 1-30 June 2022**		
	Actual	**Normal**	**% Departure**
EAST & NORTHEAST INDIA	400.9	328.4	22%
NORTHWEST INDIA	68.6	78.1	-12%
CENTRAL INDIA	118.9	170.3	-30%
SOUTH PENINSULA INDIA	139	161	-14%
COUNTRY AS A WHOLE	152.3	165.3	-8%

From the above table it is found that there was excess rainfall over East & Northeast India and deficient rainfall over Central India.

Monsoon remained active in July due to formation and movement of low pressure systems across Central India and the monsoon trough lying to the south of its normal position. The details of seasonal rainfall for the country as a whole and for four homogeneous regions till 20th July are given below:

Region	Rainfall during 1 June to 20 July 2022		
	Actual	Normal	% Departure
EAST & NORTHEAST INDIA	525.7	610.7	-14%
NORTHWEST INDIA	187.4	206.0	-9%
CENTRAL INDIA	481.9	369.5	+30%
SOUTH PENINSULA INDIA	389.2	290.0	+34%
COUNTRY AS A WHOLE	380.1	342.1	+11%

The sub divisional rainfall and State/UT wise rainfall distribution for the country as a whole for the period from 01 June to 20 July 2022 are given in **Annexure-II** and **Annexure-III** respectively. Weekly statistics of cumulative rainfall for the country as a whole during monsoon season 2022 is given in **Annexure-IV**.

(b) Changes in rainfall pattern may impact agriculture if it exceeds the critical limit. However, the severity of impact depends upon various factors, such as crop type and variety, location of land and type of soil, stage of crops etc.

Appropriate measures during occurrence of unusual rainfall may save the crops up to a certain extent. IMD runs an operational Agrometeorological Advisory Services (AAS) *viz.*, GraminKrishiMausamSewa (GKMS) scheme for the benefit of farming community in the country. Under the scheme, medium range weather forecast at district and block level is generated for rainfall, temperature, humidity, wind speed, wind direction and cloud cover and based on the forecast, 130 Agromet Field Units (AMFUs), located at State Agricultural Universities, institutes of Indian Council of Agricultural Research (ICAR) and Indian Institute of Technology (IIT) etc. and 199 District Agromet Units (DAMUs) established at KrishiVigyanKendras (KVKs) of ICAR, prepare Agromet Advisories on every Tuesday and Friday for the districts under their jurisdiction and for the blocks of the district of their location and communicate to the farmers to take decision on day-to-day agricultural operations at micro-level.

IMD also monitors rainfall situation & weather aberrations including heavy rainfall and issues alerts & warnings for extreme weather events along with suitable remedial measures to the farmers time to time using multichannel dissemination system like print and electronic media, Door Darshan, radio, internet, mobile apps etc. including SMS through Kisan Portal and also through private companies under Public Private Partnership (PPP) mode under GKMS scheme. Social media like WhatsApp and Facebook is also used for quicker dissemination of forecast and advisories to the farmers. Such alerts and warnings are also shared with State Department of Agriculture for the effective management of calamity. In addition to that, Impact based forecast (IBFs) for agriculture along with appropriate possible measures are also being prepared by AMFUs and DAMUs based on the severe weather warnings including heavy rainfall.

(c)-(d) Ministry of Earth Sciences (MoES) is continuously undertaking research to conduct a detailed analysis to find out unusual changes in early and active monsoon.

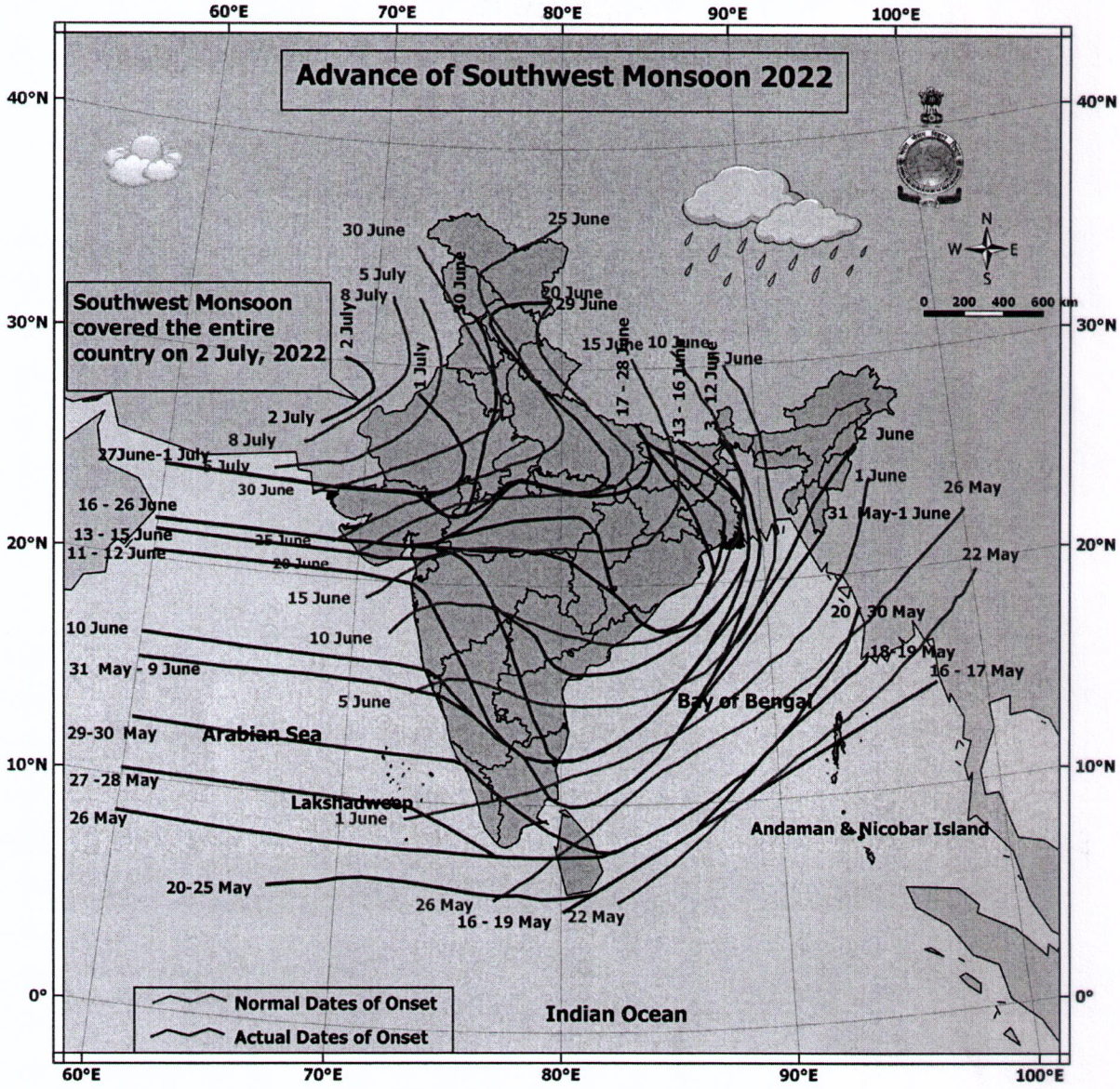
Recently IMD brought out web based online "Climate Hazard & Vulnerability Atlas of India" prepared for the thirteen most hazardous meteorological events, which cause extensive damages, economic, human, and animal losses. The same can be accessed at https://imdpune.gov.in/hazardatlas/abouthazard.html. IMD has studied and investigated the observed changes of rainfall patterns and its extremes in the recent 30 years in different states and districts. 29 Reports of states and UTs on "Observed Rainfall Variability and Changes" have been published by IMD in January 2020. The reports are also available to the public on the IMD Pune website https://imdpune.gov.in/hydrology/rainfall%20variability%20page/rainfall%20trend.html)

The **highlights of the report** are given below:

- Five states viz., Uttar Pradesh, Bihar, West Bengal, Meghalaya and Nagaland have shown significant decreasing trends in southwest monsoon rainfall during the recent 30 years period (1989-2018).
- The annual rainfall over these five states along with the states of Arunachal Pradesh and Himachal Pradesh also show significant decreasing trends.
- Other states do not show any significant changes in southwest monsoon rainfall during the same period.
- Considering district-wise rainfall, there are many districts in the country, which show significant changes in southwest monsoon and annual rainfall during the recent 30 years period (1989-2018). With regard to the frequency of heavy rainfall days, significant increasing trend is observed over Saurashtra& Kutch, Southeastern parts of Rajasthan, Northern parts of Tamil Nadu, Northern parts of Andhra Pradesh and adjoining areas of Southwest Odisha, many parts of Chhattisgarh, Southwest Madhya Pradesh, West Bengal, Manipur & Mizoram, Konkan& Goa and Uttarakhand.

IMD is dedicated to monitoring, detecting, and forecasting weather and climate, including early warning for severe weather events. IMD issue forecast/outlook for rainfall in different spatial and time scales during different season, which will help to take appropriate/anticipatory action to overcome the weather and climate risks.

Annexure-I


Advance of Southwest Monsoon 2022
Southwest Monsoon covered the entire country on 2 July, 2022
60°E
70°E
80°E
90°E
100°E
40°N
30°N
20°N
10°N
0°
30 June
25 June
5 July
8 July
2 July
30 June
29 June
1 July
15 June
10 June
17 - 28 June
13 - 16 June
3 - 12 June
2 July
8 July
27June-1 July
5 July
30 June
16 - 26 June
13 - 15 June
11 - 12 June
25 June
20 June
15 June
10 June
10 June
31 May - 9 June
5 June
29-30 May
Arabian Sea
27 -28 May
26 May
Lakshadweep
1 June
20-25 May
26 May
16 - 19 May
22 May
2 June
1 June
26 May
31 May-1 June
22 May
20 - 30 May
18-19 May
16 - 17 May
Bay of Bengal
Andaman & Nicobar Island
Indian Ocean
Normal Dates of Onset
Actual Dates of Onset
N
W
E
S
0 200 400 600 km

Annexure-II

SUB-DIVISIONWISE RAINFALL DISTRIBUTION

S NO	Period:01-06-2022 To 20-07-2022				
	MET. SUBDIVISION	ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT.
	REGION : EAST AND NORTH EAST INDIA	525.7	610.7	-14%	N
1	ARUNACHAL PRADESH	814.8	815.3	0%	N
2	ASSAM & MEGHALAYA	1014.9	863.1	18%	N
3	N M M T	421.8	581.7	-27%	D
4	SHWB & SIKKIM	863.6	852.6	1%	N
5	GANGETIC WEST BENGAL	242.1	461.4	-48%	D
6	JHARKHAND	191.3	391.8	-51%	D
7	BIHAR	200.7	395.7	-49%	D
	REGION : NORTH WEST INDIA	187.4	206	-9%	N
1	EAST UTTAR PRADESH	81.5	294.3	-72%	LD
2	WEST UTTAR PRADESH	93.3	226.8	-59%	D
3	UTTARAKHAND	367.4	438.5	-16%	N
4	HAR. CHD & DELHI	147.9	148.9	-1%	N
5	PUNJAB	157	156.5	0%	N
6	HIMACHAL PRADESH	240.6	256.8	-6%	N
7	JAMMU & KASHMIR AND LADAKH	201	185.5	8%	N
8	WEST RAJASTHAN	184.2	103	79%	LE
9	EAST RAJASTHAN	278.3	206.8	35%	E
	REGION : CENTRAL INDIA	481.9	369.5	30%	E
1	ODISHA	435.6	417.5	4%	N
2	WEST MADHYA PRADESH	426.7	290.8	47%	E
3	EAST MADHYA PRADESH	339.7	365.3	-7%	N
4	GUJARAT REGION	532.7	340.7	56%	E
5	SAURASHTRA & KUTCH	405.9	217.4	87%	LE
6	KONKAN & GOA	1741.6	1384.1	26%	E
7	MADHYA MAHARASHTRA	432.8	300.5	44%	E
8	MARATHWADA	424.3	236.7	79%	LE
9	VIDARBHA	573.2	372.3	54%	E
10	CHHATTISGARH	461.9	421.6	10%	N
	REGION : SOUTH PENINSULA	389.2	290	34%	E
1	A & N ISLAND	702.1	663.3	6%	N
2	COASTAL AP and YANAM	254.8	206.9	23%	E
3	TELANGANA	569.7	261.4	118%	LE
4	RAYALASEEMA	150.1	128.4	17%	N
5	TN PUDU and KARAIKAL	134.1	92.7	45%	E
6	COASTAL KARNATAKA	2009.2	1578.1	27%	E
7	N. I. KARNATAKA	233.9	176.8	32%	E
8	S. I. KARNATAKA	402.3	277.4	45%	E
9	KERALA & MAHE	901.3	1086.4	-17%	N
10	LAKSHADWEEP	594.2	535.1	11%	N
	COUNTRY : INDIA	380.1	342.1	11%	N

LEGENDS

Large Excess: (+60% or more)	Large Deficient: (-60% to -99%)	A: Actual Rainfall (mm)
Excess: (+20% to +59%)	Deficient: (-20% to -59%)	N: Normal Rainfall (mm)
Normal: (+19% to -19%)	No Rain (-100%)	D: Departure from normal (%)
Data Inadequate: **	Rainfall upto 0.4 mm : *	

Annexure-III

STATE-WISE RAINFALL DISTRIBUTION

S NO	STATE/UT	Period:01-06-2022 To 20-07-2022			
		ACTUAL (mm)	NORMAL (mm)	% DEP.	CAT.
	REGION : EAST AND NORTH EAST INDIA	525.7	610.7	-14%	N
1	ARUNACHAL PRADESH	814.8	815.3	0%	N
2	ASSAM	817.5	721.4	13%	N
3	MEGHALAYA	1679.6	1330.3	26%	E
4	NAGALAND	376.5	457.7	-18%	N
5	MANIPUR	287.9	482.9	-40%	D
6	MIZORAM	552.3	696.3	-21%	D
7	TRIPURA	466.2	669.7	-30%	D
8	SIKKIM	747.7	744.5	0%	N
9	WEST BENGAL	404.4	556.7	-27%	D
10	JHARKHAND	191.3	391.8	-51%	D
11	BIHAR	200.7	395.7	-49%	D
	REGION : NORTH WEST INDIA	187.4	206	-9%	N
1	UTTAR PRADESH	86.4	266.2	-68%	LD
2	UTTARAKHAND	367.4	438.5	-16%	N
3	HARYANA	147.5	147.5	0%	N
4	CHANDIGARH (UT)	429.3	324.3	32%	E
5	DELHI (UT)	140.8	179.7	-22%	D
6	PUNJAB	157	156.5	0%	N
7	HIMACHAL PRADESH	240.6	256.8	-6%	N
8	JAMMU & KASHMIR (UT)	201	185.5	8%	N
9	LADAKH (UT)	7.5	9	-17%	N
10	RAJASTHAN	225.9	149	52%	E
	REGION : CENTRAL INDIA	481.9	369.5	30%	E
1	ODISHA	435.6	417.5	4%	N
2	MADHYA PRADESH	388.9	323.2	20%	E
3	GUJARAT	459.5	271.5	69%	LE
4	DADRA & NAGAR HAVELI AND DAMAN & DIU (UT)	1749.2	943.6	85%	LE
5	GOA	1972	1601.9	23%	E
6	MAHARASHTRA	600.2	414.7	45%	E
7	CHHATTISGARH	461.9	421.6	10%	N
	REGION : SOUTH PENINSULA	389.2	290	34%	E
1	ANDAMAN & NICOBAR (UT)	702.1	663.3	6%	N
2	ANDHRA PRADESH	210.8	174.4	21%	E
3	TELANGANA	569.7	261.4	118%	LE
4	TAMIL NADU	134.4	92.7	45%	E

5	PUDUCHERRY (UT)	102	118.7	-14%	N
6	KARNATAKA	489	362.4	35%	E
7	KERALA	901.2	1086.3	-17%	N
8	LAKSHADWEEP (UT)	594.2	535.1	11%	N
	COUNTRY AS A WHOLE	**380.1**	**342.1**	**11%**	**N**

LEGENDS

Large Excess: (+60% or more)	Large Deficient: (-60% to -99%)	A: Actual Rainfall (mm)
Excess: (+20% to +59%)	Deficient: (-20% to -59%)	N: Normal Rainfall (mm)
Normal: (+19% to -19%)	No Rain (-100%)	D: Departure from normal (%)
Data Inadequate: **	Rainfall upto 0.4 mm : *	

Annexure-IV

Cumulative rainfall (in mm) for the Country as a whole from *1st June to 20 July 2022*

Cumulative rainfall (in mm) for the Country as a whole from *1st June to 20 July 2022*		
1st June to 8 June	**Actual** **Normal** **%Departure**	**15.8** **27.2** **-42**
1st June to 15June	**Actual** **Normal** **%Departure**	**42.3** **62.1** **-32**
1st June to 22 June	**Actual** **Normal** **%Departure**	**105.8** **106.0** **0**
1st June to 29 June	**Actual** **Normal** **%Departure**	**141.7** **157.7** **-10**
1st June to 06 July	**Actual** **Normal** **%Departure**	**213.0** **213.3** **0**
1st June to 13 July	**Actual** **Normal** **%Departure**	**306.6** **275.7** **+11**
1st June to 20 July	**Actual** **Normal** **%Departure**	**380.1** **342.1** **+11**

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