GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 358
ANSWERED ON 25/07/2024

TRACKING OF INTENSE RAIN AND CLOUD BURSTS

358. DR. V. SIVADASAN:

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a) the number of 'extreme rain events' in the country since 2019, the details thereof, year-wise and State-wise;
(b) the number of cloud bursts in the country since 2019, the details thereof, year-wise and State-wise; and
(c) whether there is any official scientific study undertaken regarding the increasing frequency of extreme weather events like the intense rain fall occurring in a very short duration?

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

(a) The details are provided in Annexure-1.

(b) Cloud bursts are highly localized, of very short duration, and most cloudbursts occur over hilly regions. Most of them are unreported due to a lackof sufficient information. IMD and WMO define a rain event as a cloudburst when the rainfall occurs at 10 cm/hour or more over a geographical area of approximately 20-30 square km. A few studies haveused limited datasets before 2019 and found that the southern rim of the Indian Himalayas, especially over Uttarakhand, Himachal Pradesh, and hilly northeast India, are prone tocloudburst. The west coast of India, covering a windward side of the Western Ghats Hills from Goa to Gujarat, is also prone to cloudbursts. These events generally occur in the early morning along the west coast and foothills of the Himalayas, whereas over interior land mass, occurrences occur mostly in the afternoon.

The record of such cloudburst rainfall for longer periodsisnot available in India and also worldwide. These events mostly occur in very remote areas within the hilly region over India covering the Himalayas and Western Ghats, which are still sparse data regions.

(c) Yes. The ministry has done a detailed assessment and made available a report to the Public“Assessment of Climate Change over the Indian Region” (https://link.springer.com/book/10.1007/978-981-15-4327-2). This report summarizes the present status and future projection of climate change over India. It finds more intense wet spells during the summer monsoon season in recent years. The frequency of localized heavy precipitation occurrences has increased worldwide in response to increased atmospheric moisture content. Over central India, the frequency of daily precipitation extremes with rainfall intensities exceeding 150 mm per day increased by about 75% during 1950–2015.

Annexure-1

The State-wise number of rainfall events since 2019 is given in the table below:

S. No.	State Name	2019			2020		
		HV	VH	XH	HV	VH	XH
1	Andhra Pradesh	327	70	5	520	122	5
2	Arunachal Pradesh	99	22	0	111	35	5
3	Assam	387	98	12	445	115	16
4	Bihar	1508	497	81	1802	383	31
5	Gujarat	806	276	75	835	197	42
6	Haryana	45	14	0	81	13	0
7	Himachal Pradesh	213	41	10	129	24	2
8	Jammu & Kashmir				38	8	0
9	Karnataka	908	300	60	925	274	41
10	Kerala	528	117	33	484	110	8
11	Madhya Pradesh	1062	244	25	368	105	26
12	Maharashtra	1405	516	110	1017	269	27
13	Manipur	3	1	0	12	1	0
14	Meghalaya	142	80	54	180	121	113
15	Mizoram	21	2	1	17	2	0
16	Nagaland	25	2	0	22	1	0
17	Orrisa	1836	541	73	1473	466	44
18	Punjab	95	25	5	52	9	0
19	Rajasthan	711	169	18	363	69	10
20	Tamilnadu	1045	204	38	1183	246	51
21	Tripura	118	25	3	105	21	0
22	Union Territory	36	27	11	51	11	4
23	Uttar Pradesh	489	125	16	358	80	9
24	West Bengal	412	123	30	552	151	41
25	Indian Islands	74	17	4	32	14	0
28	Sikkim	40	7	3	64	6	2
29	Jharkhand	454	51	7	379	27	2
30	Uttaranchal	147	25	2	178	26	2
31	Chhattisgarh	283	65	8	411	106	18
32	Goa	191	65	9	206	70	1
33	Delhi	2	0	0	22	4	0
34	Telangana	406	50	3	710	144	10

S. No.	State Name	2021			2022			2023		
		HV	VH	XH	HV	VH	XH	HV	VH	XH
1	Andhra Pradesh	478	87	9	399	52	5	300	70	13
2	Arunachal Pradesh	83	14	0	140	27	7	92	9	1
3	Assam	286	41	2	504	136	32	353	82	9
4	Bihar	2045	391	41	778	109	4	952	260	43
5	Gujarat	634	174	18	663	204	54	635	264	49
6	Haryana	149	41	4	123	26	1	122	30	10
7	Himachal Pradesh	145	28	3	195	27	6	292	130	12
8	Jammu & Kashmir	35	7	1	59	12	0	37	5	3
9	Karnataka	873	188	23	1217	286	19	539	157	18
10	Kerala	567	113	11	449	69	5	419	79	3
11	Madhya Pradesh	533	115	22	921	239	27	653	197	43
12	Maharashtra	1138	401	87	1245	368	28	1073	301	25
13	Manipur	8	0	0	24	2	0	4	1	0
14	Meghalaya	156	54	44	218	127	101	187	97	38
15	Mizoram	21	2	0	11	2	0	36	2	0
16	Nagaland	22	1	1	45	3	0	50	6	0
17	Orrisa	1088	310	109	1364	268	24	1169	246	38
18	Punjab	82	21	0	117	17	0	88	32	7
19	Rajasthan	461	119	13	518	107	12	360	74	37
20	Tamilnadu	1579	311	37	813	141	14	703	147	42
21	Tripura	77	18	0	57	12	0	64	15	1
22	Union Territory	58	20	8	69	29	8	62	26	9
23	Uttar Pradesh	689	169	28	458	127	25	435	107	22
24	West Bengal	516	179	37	411	119	16	530	153	22
25	Indian Islands	67	15	1	60	16	0	51	17	4
28	Sikkim	54	11	0	58	12	0	45	7	2
29	Jharkhand	613	162	29	346	45	1	166	25	0
30	Uttaranchal	239	77	17	283	66	4	198	41	8
31	Chhattisgarh	317	28	0	338	82	5	322	57	3
32	Goa	134	67	3	127	37	3	151	49	0
33	Delhi	64	12	0	27	1	0	25	6	0
34	Telangana	760	177	19	770	211	37	641	146	37

Heavy Rainfall (HV) = 64.5 mm to 115.5 mm; Very Heavy Rainfall (VH) = 115.6 mm to 204.4 mm; Extremely Heavy Rainfall (XH)= 204.5 mm and above

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