GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 2371
TO BE ANSWERED ON WEDNESDAY, 21ST DECEMBER, 2022

RISING TEMPERATURE

2371. MS. DIYA KUMARI:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the Ministry has conducted any study on the rise in temperature in the country, especially during the summer season;
(b) if so, the details with respect to the rising temperature in Rajasthan for the last five years;
(c) the reasons for the rise in temperature and the impact of the same on human life; and
(d) whether the Ministry has taken steps to control the rise and if so, the details thereof?

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

(a)-(b) Yes Sir. As per the Climate summary of the summer season [Mar-Apr-May (MAM)] 2022 published by the India Meteorological Department (IMD), [Ref :(https://imdpune.gov.in/Latest_news/Climate_summary_Pre_Monsoon_MAM_2022.pdf)], the observed average maximum, average minimum and mean temperature for the country as a whole during Pre-Monsoon 2022 are 34.49ºC, 22.86ºC and 28.68ºC respectively, against the normal of 33.45ºC, 21.78ºC and 27.61ºC based on period 1981-2010. Thus, the seasonal average maximum, average minimum and mean temperatures are above normal by 1.04ºC, 1.08ºC, 1.06ºC respectively for the country as a whole. Figure-1 shows the time series of mean temperature averaged over India (vertical bars) for the Pre-monsoon (Mar-May) season (1971-2022). There has been an increasing trend in the mean temperatures over the country from 1971 to 2022.

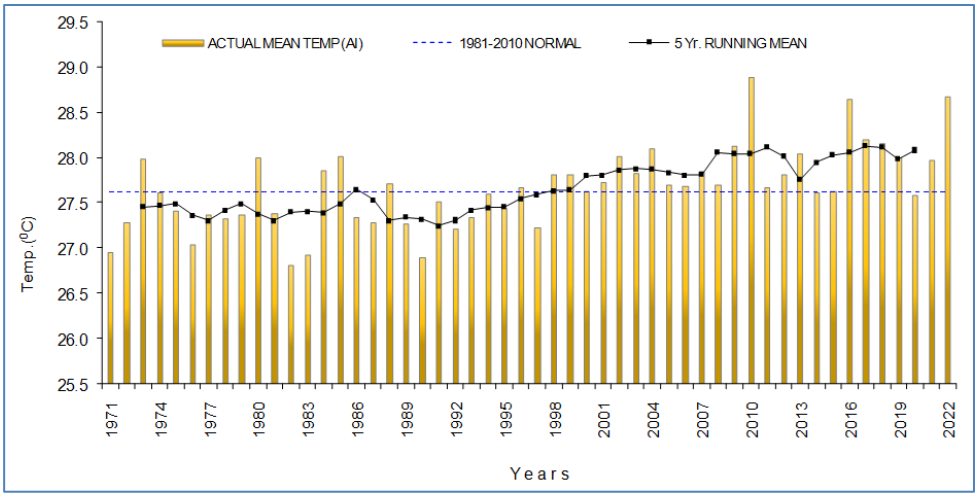

Fig 1. Time series of mean temperature averaged over India (vertical bars) for the pre-monsoon (mar-may) season (1971-2022).

The table below summarizes the mean temperature and anomaly (normal value during the period from 1981 to 2010 minus the actual value) for Rajasthan. There is no increasing trend in mean temperatures in Rajasthan during last 5 years.

	Temperature (Deg. C)	
Year	Actual	Anomaly
2017	28.59	0.91
2018	29.13	1.45
2019	27.64	-0.04
2020	27.25	-0.43
2021	27.96	0.28
1981-2010 Normal Value	27.68	

Maximum temperature & heat wave scenario in Rajasthan during 2022 follow :

- The mean maximum temperatures were above normal by 3.18^{o}C in March, 3.56^{o}C in April & 1.44^{o}C in May
- Total five heat wave spells were observed during the season. First spell of heat wave started from Southwest Rajasthan from 15th March onwards.
- The extreme Maximum temperature of 43.4^{o}C in Barmer, 46.4^{o}C and 48.3^{o}C in Ganganagar reported in the months of March, April & May respectively.

Supporting details are given in **Annexure-I**.

(c) The main cause of the rise in temperature is due to rise in Green House Gases (GHGs), mainly Carbon-di-oxide and Methane concentration in the atmosphere. Rise in temperature causes increase in both duration and intensity of Heatwaves over India.

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.

Four Common heat health impacts resulting from excessive exposure to heat waves include dehydration, cramps, exhaustion and heatstroke. It is also learnt that there is a sharp rise in number of cases of acute gastroenteritis and food poisoning due to spoilage of food and reduction of its shelf life due to high temperatures. There is also rise in number of cases of anxiety, palpitations, nervousness and behavioural change linked to extreme temperature rise. The occupational profile of most of the victims was ascertained as agricultural labourers, coastal community dwellers, and people living below poverty level (BPL) category with mostly outdoor occupations.

(d) 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 since 2013 to forewarn people about the heat waves and also advising action to be taken during such occasions.

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.

While issuing the warning suitable colour code is used to bring out the impact of the severe weather expected and to signal the Disaster Management about the course of action to be taken with respect to impending disaster weather event. Green color corresponds to no warning hence no action is needed, yellow color corresponds to be watchful and get updated information, orange color to be alert and be prepared to take action whereas red color signals to take action.

Annexure-I

Table 1: Month wise mean maximum temperatures in 2022.

Sr. No.	Station	March 2022		April 2022		May 2022	
		Mean Max °C	Departure from normal	Mean Max °C	Departure from normal	Mean Max °C	Departure from normal
1	Ajmer	35.2	2.6	40.8	3.0	41.6	1.2
2	Bhilwara	35.3	2.1	41.0	3.0	42.0	0.7
3	Jaipur	34.7	3.1	40.6	3.2	41.8	1.1
4	Pilani	35.8	4.5	42.4	5.3	43.2	2.5
5	Sikar	33.7	2.8	39.8	3.0	41.0	1.2
6	Kota	35.3	2.1	42.4	3.3	43.5	1.2
7	Chittorgarh	36.4	2.7	41.2	2.8	41.7	0.5
8	Dabaok	34.7	1.3	40.0	2.2	40.1	-0.1
9	Barmer	38.6	3.9	43.2	3.9	43.8	1.8
10	Er. Road	37.3	2.6	42.4	3.9	42.7	2.6
11	Jaisalmer	36.7	3.4	42.4	3.3	44.0	2.1
12	Jodhpur City	36.8	3.4	41.6	3.2	42.1	0.9
13	Phalodi	38.0	4.0	42.9	3.6	44.2	1.8
14	Bikaner	36.7	4.3	42.5	4.1	43.9	1.9
15	Churu	36.0	3.3	42.5	3.5	43.7	1.5
16	Ganganagar	34.5	4.8	42.7	5.7	43.7	2.2

Table 2: Monthwise Extreme Maximum Temperature in 2022

Sr. No.	Station	Extreme Temperature (°C)		
		March	April	May
1	Ajmer	40.5	43.3	45.2
2	Bhilwara	40.6	43.0	45.6
3	Jaipur	40.2	43.1	45.6
4	Pilani	43.1	45.2	47.7
5	Sikar	39.5	42.2	44.5
6	Kota	41.6	44.6	47.2
7	Chittorgarh	41	42.7	46.8
8	Dabaok	39.6	42.1	44.0
9	Barmer	43.4	45.1	48.1
10	Er. Road	41.8	44.8	46.6
11	Jaisalmer	42.7	44.4	47.5
12	Jodhpur City	41.6	43.6	46.3
13	Phalodi	43	45.2	47.6
14	Bikaner	42.5	45.2	48.2
15	Churu	43	45.5	47.9
16	Ganganagar	42.2	46.4	48.3

Table-3:Monthwiseheatwave and severe heatwave days in 2022

Sr. No.	Station	March		April		May	
		Heat wave days	Severe Heat wave days	Heat wave days	Severe Heat wave days	Heat wave days	Severe Heat wave days
1	Ajmer	1	1	5	0	2	0
2	Bhilwara	1	0	4	0	2	0
3	Jaipur	2	1	5	2	4	0
4	Pilani	0	11	11	9	8	4
5	Sikar	0	0	5	2	2	0
6	Kota	4	0	9	0	8	0
7	Chittorgarh	3	0	3	0	5	0
8	Dabaok	0	0	0	0	0	0
9	Barmer	10	5	13	1	11	0
10	Er. Road	5	0	8	1	10	0
11	Jaisalmer	4	6	9	1	11	0
12	Jodhpur City	6	1	5	0	6	0
13	Phalodi	6	6	10	2	12	1
14	Bikaner	1	11	11	4	12	0
15	Churu	1	7	11	2	14	0
16	Ganganagar	0	5	10	11	12	3

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