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Weather in India

WINTER SEASON (January-February 2000)*

1. Introduction

During the winter season of 2000, rain or snow occurred over northwest India, Assam and adjacent states as a seasonal feature. Excess rain also occurred over peninsular India almost throughout the season. Severe cold wave conditions (departure from normal temperature is –5° C or less for the regions where normal minimum temperature is less than 10° C and –7° C or less elsewhere) prevailed on few days in some parts of north India and also in Gujarat Region. Cold wave conditions (departure from normal temperature –3° C to –4° C for the regions where normal minimum temperature is less than 10° C and –5° to –6° C elsewhere) also prevailed on few days in many parts of north and central India. More than 300 people died due to cold wave conditions in north India. No cyclone / depression formed during the season.

2. Season's rainfall

During the season, the rainfall was excess (percentage departure from normal rainfall is 20% or more) in 13; normal (percentage departure from normal is between –19% to +19%) in 7; deficient (percentage departure from normal is between –20% to –59%) in 6 and scanty (percentage departure from normal is between –60% to –99%) in 8 meteorological sub divisions. There was no rain in only one meteorological sub-division (*viz.* Konkan & Goa).

The season's rainfall was excess in Gangetic West Bengal, Orissa, Haryana, Punjab, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala and Lakshadweep; normal in Nagaland-Manipur-Mizoram-Tripura, plains of west Uttar Pradesh, Hills of west Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Marathwada and Vidarbha; deficient in Andaman & Nicobar Islands, Arunachal Pradesh, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar Plateau and west Rajasthan and scanty in Bihar Plains, east Uttar Pradesh, east Rajasthan, Madhya Pradesh, Gujarat State and Madhya Maharashtra. There was no rain in Konkan & Goa.

The seasonal rainfall departure are given in Fig. 1.

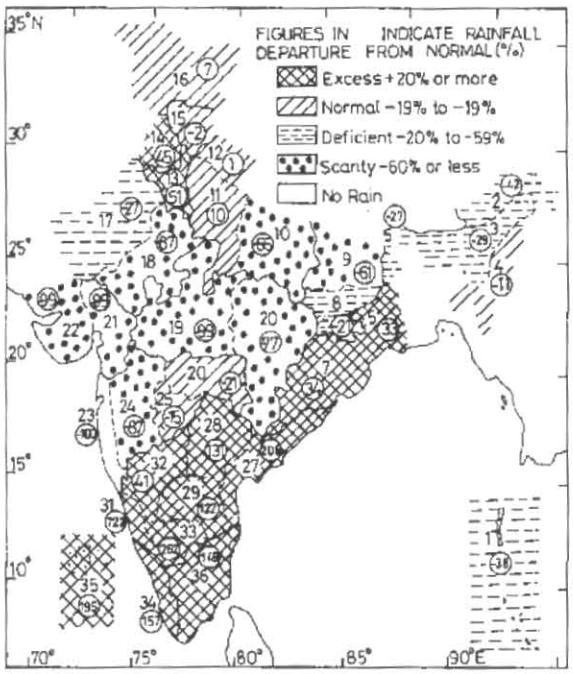

Fig. 1. Seasonal rainfall departures

3. January

3.1. *Weather and associated synoptic features*

There were 2 low pressure areas including 1 induced low pressure area, 4 western disturbances, 1 induced cyclonic circulation, 7 other cyclonic circulations, 2 troughs in upper tropospheric westerlies, 3 troughs in easterlies and 3 other troughs which affected weather in the country during the month. Details of these systems are given in Table 1.

Rain or snow occurred either at most places (more than 75% of the total stations reporting rainfall 2.5 mm or more in a sub-division) or at many places (51% to 75% stations reporting rainfall more than 2.5 mm) on 2 to 4 days in Hills of west Uttar Pradesh, Himachal Pradesh and Jammu and Kashmir. Heavy rain or snow (Rainfall

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TABLE 1

Details of the weather systems during January 2000

S. No	System	Duration	Place of first location	Direction of movement	Place of dissipation	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A)	*Low pressure areas*					
1.	Induced low pressure area	9 – 11	Southwest Rajasthan and adjoining Pakistan	Northeasterly	Northwest Rajasthan and adjoining parts of Punjab	It was first observed as a cyclonic circulation in the lower levels on 8 over west Rajasthan and neighbourhood. Associated cyclonic circulation extended upto 2.1 kms. a.s.l. System moved away across Hills of west Uttar Pradesh
2.	Low pressure area	11 – 13	Central parts of Rajasthan and neighbourhood	Stationary	*In Situ*	
(B)	*Western disturbances*					
1.	Upper air system	1 – 3	North Pakistan and adjoining Jammu & Kashmir	Northeasterly	Jammu & Kashmir and neighbourhood	Moved away northeastwards
2.	Do	3 – 6	Do	Do	Jammu & Kashmir and neighbourhood	Do
3.	Do	18 – 23	Afghanistan and neighbourhood	Do	North Pakistan and adjoining parts of Jammu & Kashmir	Do
4.	Do	25 – 27	Pakistan and neighbourhood	Do	Do	Do
(C)	*Induced cyclonic circulations*					
1.	Lower levels	21 – 23	West Rajasthan and neighbourhood	Northeasterly	Northeast Rajasthan and adjoining Punjab	Moved away across Himachal Pradesh
(D)	*Other cyclonic circulations*					
1.	Lower levels	11 – 14	Bangla Desh and neighbourhood	Stationary	*In situ*	It moved away eastwards
2.	Lower tropospheric levels	13 – 16	Lakshadweep area and neighbourhood	Do	Do	
3.	Lower tropospheric levels	15 – 17	Madhya Pradesh and adjoining parts of Vidarbha	Quasi-stationary	Southeast Madhya Pradesh	A trough from this system ran to south interior Karnataka in the lower levels on 15 and to southeast Madhya Pradesh and neighbourhood on 16
4.	Lower tropospheric levels	24 – 26	Gangetic West Bengal and neighbourhood	Stationary	*In situ*	
5.	Do	25 – 29	Southwest Rajasthan and neighbourhood	Northeasterly	Hills of west Uttar Pradesh and neighbourhood	Moved away across Hills of west Uttar Pradash

TABLE 1 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
6.	Lower tropo - spheric levels	27 – 28	West Madhya Pradesh	Stationary	*In situ*	
7.	Lower levels	29 – 31	North Bangla Desh and adjoining Meghalaya	Northeasterly	Assam & Meghalaya	
(E)	*Troughs in westerlies*					
1.	Mid and Upper tropospheric levels	4 – 9	Long. 67° E, to the north of Lat. 15° N	Northeasterly	Long. to 93° N, to the north of Lat. 23° N	Moved away northeastwards
2.	Do	29 – 31	Long. 85° E, to the north of Lat. 15° N	Easterly	Long. to 95° N, to the north of Lat. 15° N	
(F)	*Troughs in easterlies*					
1.	Lower levels	31 Dec. 1999 – 11 Jan. 2000	South Maharashtra coast to Lakshadweep area	Westerly	-	Moved away westwards
2.	Do	16 – 19	South Tamil Nadu to north interior Karnataka	Do	Kerala coast to Karnataka coast	
3.	Do	29 – 30	Kerala coast to Karnataka coast	Stationary	*In situ*	
(G)	*Other troughs*					
1.	Trough of low pressure area	1 – 11	Southeast Bay and adjoining southwest Bay	Westerly	Southwest Bay of Tamil Nadu coast	It became well-marked on 3 over southwest Bay and neighbourhood off Tamil Nadu coast It lay as a trough from 6 – 11
2.	Lower tropospheric levels	23 – 26	Southwest Rajasthan to northwest Madhya Pradesh	Stationary	*In situ*	
3.	Lower levels	27 – 28	West Madhya Pradesh to Marathwada	Do	Do	

amounts reported is more than 6.5 cm and less than 12.5 cm) occurred on 1 to 2 days in Himachal Pradesh and Jammu & Kashmir. Rain or thundershowers also occurred either at most places or at many places on 1 to 2 days in Arunachal Pradesh, Haryana, Punjab, coastal Karnataka and Lakshadweep. Very heavy rain (Rainfall amounts reported is 12.5 cms or more) occurred on 1 day in Tamil Nadu and heavy rain also occurred on 2 to 3 days in Tamil Nadu and coastal Karnataka during the season.

3.2. *Month's rainfall*

Accumulated monthly rainfall was excess in 5; normal in 5; deficient in 8 and scanty in 12 meteorological sub-divisions. There was no rain in the remaining 5 meteorological sub-divisions.

During the month, the rainfall was excess in Nagaland-Manipur-Mizoram-Tripura, Punjab, Jammu & Kashmir, coastal Karnataka and Lakshadweep; normal in Arunachal Pradesh, Assam & Meghalaya, Haryana, Tamil Nadu & Kerala; deficient in Andaman & Nicobar Islands, Gangetic West Bengal, plains of west Uttar Pradesh, Hills of west Uttar Pradesh, Himachal Pradesh, west Rajasthan and interior Karnataka and scanty in Sub-Himalayan West Bengal & Sikkim, Orissa, Bihar, east Uttar Pradesh, east Rajasthan, Madhya Pradesh, Marathwada, Vidarbha, Madhya Maharashtra and Telangana. There was no rain in Gujarat State, Konkan & Goa, coastal Andhra Pradesh and Rayalaseema. Principal amounts of rainfall for the month of January are given in Table 4.

TABLE 2

Details of the weather systems during February 2000

S. No (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(A)	*Low pressure area*					
1.	Induced low pressure area	31 Jan – 3 Feb	West Rajasthan and neighbourhood	Easterly	Southwest Uttar Pradesh and neighbourhood	Associated cyclonic circulation extended upto mid tropospheric levels. A trough from this system ran to east Uttar Pradesh in the lower levels. The system lay as a cyclonic circulation on 2 over southwest Uttar Pradesh and neighbourhood
2.	Low pressure area	2 – 7	Southwest Bay off Sri Lanka coast	Northwesterly	Lakshadweep area and neighbourhood	Lay as a trough from 3 - 7
3.	Induced low pressure area	10 – 12	West Rajasthan and neighbourhood	Easterly	North Madhya Pradesh and adjoining Uttar Pradesh	It was first observed as a induced cyclonic circulation on 9 over south Rajasthan and neighbourhood. Associated cyclonic circulation extended upto 1.5 kms a.s.l. It became less marked on 13 A trough from this system runs to west Madhya Pradesh on 10 and less marked over south coastal Tamil Nadu on 13
(B)	*Western disturbances*					
1.	Upper air system	31 Jan – 2 Feb	North Pakistan and neighbourhood	Northeasterly	Jammu & Kashmir and neighbourhood	Moved away northeastwards
2.	Do	7 – 10	Do	Do	Do	Do
3.	Upper air system	14 – 16	North Pakistan and Jammu & Kashmir	Do	Northern parts of Jammu & Kashmir	Do
4.	Do	19 – 26	North Pakistan and neighbourhood	Do	Jammu & Kashmir and neighbourhood	
5.	Do	27 – 29	North Pakistan and adjoining Jammu & Kashmir	Do	Do	Do
(C)	*Cyclonic circulations*					
1.	Lower levels	2 – 8	Southwest Rajasthan and neighbourhood	Eastnortheasterly	Northern parts of Haryana and neighbourhood	It was seen as a low pressure area over northwest Rajasthan and adjoining Punjab on 5. A trough from this system in the lower levels to Bihar Plains across south Uttar Pradesh on 3. It became less marked on 7 over west Uttar Pradesh

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2.	Lower levels	3 – 6	North Assam & neighbourhood	Stationary	*In situ*	
3.	Lower tropospheric levels	9 – 11	North Vidarbha and adjoining Madhya Pradesh	Eastnortheasterly	Southeast Madhya Pradesh	A trough from this system was observed on 9 and 10 to south Tamil Nadu coast across Rayalaseema. It became less marked on 20 when it was from west Madhya Pradesh to south Tamil Nadu.
4.	Lower tropospheric levels	12 – 13	Haryana and neighbourhood	Stationary	*In situ*	
5.	Lower levels	17 – 18	Punjab and neighbourhood	Northeastwards	Jammu & Kashmir neighbourhood	Moved away northeastwards
6.	Lower levels	20 Feb - 1 Mar	South Tamil Nadu	Westerly	Lakshadweep area and adjoining southeast Arabian Sea	It was first observed as a trough on 19 over southwest Bay off Tamil Nadu coast. It again lay as a trough on 22 over south Tamil Nadu and over south Tamil Nadu and adjoining Kerala and Lakshadweep area from 26-29
7.	Lower tropospheric levels	19 – 23	South Rajasthan and neighbourhood	Southeasterly	Central parts of Madhya Pradesh and adjoining Vidarbha	A trough from this system ran to south Tamil Nadu from 21 to 23
8.	Do	23 – 26	Marathwada and neighbourhood	Westerly	Gujarat and north Konkan	A trough from this system ran northeastwards to northeast Madhya Pradesh on 23. And became less marked on 26
(D)	*Troughs*					
1.	Lower levels	31 Jan-1 Feb	Haryana to east Uttar Pradesh	Stationary	*In situ*	
2.	Do	6 – 8	Orissa to south Tamil Nadu across Rayalaseema	Southwesterly	Telangana to south Tamil Nadu across south interior Karnataka	

3.3. *Temperature*

Severe cold wave conditions prevailed on 3 days in Bihar Plains and on 1 to 2 days in east Uttar Pradesh and Rajasthan. Cold wave conditions also prevailed on 9 to 10 days in Bihar Plains, east Madhya Pradesh and Madhya Maharashtra; on 6 to 7 days in Bihar Plateau, Punjab, west Rajasthan and Gujarat Region; on 3 to 5 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Orissa, plains of Uttar Pradesh, Haryana, Jammu & Kashmir, east Rajasthan, west Madhya Pradesh, Saurashtra & Kutch and Marathwada and on 1 to 2 days in Hills of west Uttar Pradesh, Himachal Pradesh, Vidarbha and interior Karnataka. Night temperatures were appreciably below normal (departure from normal minimum temperature is -3° C to -4° C for regions wherenormal minimum temperatures is 10° C or more) on 15 days in Orissa; on 5 to 8 days in Bihar Plateau, west Madhya Pradesh, Gujarat Region, Madhya Maharashtra, Marathwada, Telangana and north interior Karnataka; on3 to 4 days in Bihar Plains, Saurashtra & Kutch, Vidarbha, coastal Andhra Pradesh and Tamil Nadu and on 1 to 2 days in Nagaland-Manipur-Mizoram-Tripura, west Bengal & Sikkim, east Uttar Pradesh, Hills of west Uttar Pradesh,

TABLE 3

Sub-divisionwise rainfall (mm) for each month and season as a whole (January-February 2000)

S. No.	Meteorological sub – divisions	January			February			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	A & N Islands	37	73	-50	38	48	- 20	74	120	- 38
2.	Arunachal Pradesh	40	43	- 6	30	79	-62	70	122	- 42
3.	Assam & Meghalaya	22	19	16	13	29	- 57	34	48	- 29
4.	Naga., Mani, Mizo and Tri.	24	18	35	16	27	- 40	40	45	- 11
5.	Sub-Himalayan West Bengal & Sikkim	6	17	- 62	23	23	- 1	29	40	- 27
6.	Gangetic West Bengal	7	14	- 49	42	23	83	49	37	33
7.	Orissa	1	12	- 92	50	26	93	51	38	34
8.	Bihar Plateau	4	19	- 78	31	24	25	35	44	- 21
9.	Bihar Plains	1	15	- 95	11	16	- 30	12	31	- 61
10.	East Uttar Pradesh	4	18	- 79	8	16	- 51	12	34	- 66
11.	Plains of west Uttar Pradesh	15	22	- 30	29	18	58	44	40	10
12.	Hills of west Uttar Pradesh	32	67	- 52	100	63	58	132	131	1
13.	Haryana, Chandigarh & Delhi	21	22	- 3	41	19	112	62	41	51
14.	Punjab	39	29	33	41	26	58	80	55	45
15.	Himachal Pradesh	61	80	- 23	89	74	21	151	154	- 2
16.	Jammu & Kashmir	122	78	56	80	110	- 27	202	188	7
17.	West Rajasthan	3	4	- 32	4	5	- 22	7	10	- 27
18.	East Rajasthan	0	7	- 99	2	5	- 68	2	12	- 87
19.	West Madhya Pradesh	0	13	- 99	0	8	- 99	0	21	- 99
20.	East Madhya Pradesh	1	20	- 93	8	22	- 61	10	42	- 77
21.	Gujarat Region	0	2	- 100	0	1	- 99	0	3	- 99
22.	Saurashtra & Kutch	0	1	- 100	0	1	- 98	0	2	- 99
23.	Konkan & Goa	0	1	- 100	0	1	- 100	0	2	-100
24.	Madhya Maharashtra	0	4	- 95	1	2	- 65	1	6	- 87
25.	Marathwada	0	3	- 93	5	4	48	6	7	- 15
26.	Vidarbha	0	11	- 98	23	13	84	23	24	- 2
27.	Coastal Andhra Pradesh	0	9	- 100	63	11	465	63	21	206
28.	Telangana	0	4	- 90	25	7	272	26	11	131
29.	Rayalaseema	0	8	- 100	28	5	469	28	13	122
30.	Tamil Nadu	31	34	- 9	93	16	496	124	50	149
31.	Coastal Karnataka	30	2	1132	1	1	- 44	31	4	722
32.	North Interior Karnataka	1	2	- 35	5	3	93	6	5	41
33.	South interior Karnataka	2	3	- 40	22	4	481	24	7	262
34.	Kerala	14	15	- 2	67	17	293	82	32	157
35.	Lakshadweep	83	25	230	19	9	101	102	35	195

TABLE 4

Principal amounts of rainfall over different stations in cm for the month of January and February 2000

Date	January	February
1	Nil	Jammu 4, Dahanu 2, Nangal 1
2	Nil	Nadaun 6, Srinagar 3, Diana 2, Nancowry & Dasuya 1
3	Kondul & Pamban 1 each	Car Nicobar & Tondi 2 each, Pasighat, North Lakhimpur & Fatehpur 1 each
4	Nil	Tuticorin 3, Malerkota 2, Thiruvananthapuram 1
5	Car Nicobar 3, Kondul 1	Deoband & Thanesar 7 each, Bhuntar 6, Mukteswar 5, Madurai 4, Patiala, Cochi & Minicoy 3 each, Krishnanagar 2, Malda, Gangtok, Kathua & Ganganagar 1 each
6	Vedaranyam 3, Adirampattinam 1	Midnapore 3, Agartala & Jamshedpur 2, Malda, Dehra Dun, Dehragopipur & Batote 1 each
7	Karaikal 7, Car Nicobar 5, Nagapatnam 3	Palakkad 10, Adirampattinam 7, Digha, Balasore 4, Visakhapatnam 2, Cooch Behar, Gohar & Jammu 1 each
8	Nagapattinam 15, Karaikal 9	Jalpaiguri 3, North Lakhimpur 2, Adirampattinam & Minicoy 1 each
9	Nagapattinam 6, Tondi 5, Karaikal 3	Gannavaram 3, Guwahati, Puri & Cuddalore 1 each
10	Cuddalore & Nagapattinam 4 each, Car Nicobar, Kayamkulam 1 each	Chamba 6, Bhubaneswar, Kalka & Dasuya 3 each, Srinagar & Kodaikanal 1 each
11	Kodaikanal 3, Quazi Gund 1	Jhajjar, Chamba & Udhampur 6 each, Dehra Dun, Dasuya & Visakhapatnam 3 each, Tuticorin 2
12	Banihal 8, Chandigarh, Amritsar& Solan 1each	Balasore 4, Dehra Dun, Ghamroor & Alapuzha 3 each, Shantiniketan 2, Ludhiana 1
13	Katra 9, Guler & Jammu 8 each, Nagarkata, Surian, Nadaun, Banihal & Amini Divi 7 each, Malakpur, Nangal & Mangalore 5 each, Bareilly 3, Dehra Dun, Guhla & Kochi 2 each, Ganganagar 1	Balasore 4, Sandheads, Kangra & Kalingapatnam 2 each, Jagdalpur & Chandigarh 1 each
14	Banihal 5, Dehra Dun & Kangra 3 each, Car Nicobar, Ambala & Agumbe 1 each	Kochi 3, Gopalpur & Ramgundam 2 each, Jagdalpur & Kalingapatnam 1 each
15	Hamirpur & Belthangady 3 each, Pahalgam & Agumbe 1 each	Nil
16	Purulia & Ranchi 1 each	Nil
17	Nil	Raipur & Gondia 2 each, Titlagarh 1
18	Nil	Sandheads 25, Akhuapada 9, Madhabarida 8
19	Udaipur 1	Port Blair 4, Gunapur 3, North Lakhimpur & Visakhapatnam 2 each
20	Nil	Nalgonda 5, Port Blair & Visakhapatnam 1 each
21	Dibrugarh 3, North Lakhimpur 2	Chamba 4, Sambalpur & Port Blair 3 each, Raipur 2, Banihal & Ongole 1 each
22	Nil	Ongole 19, Machilipatnam 8, Madhabarida 2
23	Dibrugarh 1	Kodaikanal & Punalur 5 each, Ongole 3
24	Silchar 1	Coimbatore 2, Jharsuguda 1
25	Mogra & Sriganganagar 1 each	Pondicherry 8, Mohana & Kavali 4 each, Nagpur & Chitradurga 2 each
26	Nancowary 3, Jagadhari & Bhuntar 2 each, Dehra Dun, Ludhiana & Kathua 1 each	Nellore 9, Hyderabad 8, Valparai & Bidar 4 each, Bangalore 3, Mahendragarh 2, Jagdalpur, Nanded & Palakkad 1 each
27	Anandpursahib & Barsar 3 each, Car Nicobar & Kaithal 1 each	Pondicherry 12, Kavali 11, Kochi 9, Arogyavaram 7, Mandya 5, Hut Bay, Khammam & Gadag 1 each
28	Port Blair 2, Namsai & Dhollabazar 1 each	Karaikal 6, Nellore & Bangalore 1 each
29	Chouldhowaghat 3, Daporijo 2, Kohima 1	Tondi 7, Kochi 3, Nellore 1
30	Daporijo 3, Jowai & Imphal 2 each	-
31	Nil	-

Haryana, Kashmir, Rajasthan, east Madhya Pradesh, Konkan & Goa and south interior Karnataka. They were markedly above normal (departure from normal minimum temperature is 5° C to 6° C) on 14 to 17 days in west Rajasthan and Gujarat State; on 6 to 9 days in Gangetic West Bengal, Orissa, Haryana, east Rajasthan and Madhya Pradesh and on 1 to 3 days in east Uttar Pradesh and Punjab.

The season's lowest minimum temperature over plains of the country was minus 1.8°C recorded at Churu (Rajasthan) on 15 January.

3.4. *Disastrous weather events and damages*

According to press reports, in all 387 persons (204 in Bihar, 164 Uttar Pradesh, 16 in Himachal Pradesh and 3 in Orissa) died due to cold. 7 persons died in Orissa due to Tornado and 1 person died in Kerala due to lightning during the month. Road and rail communication affected due to heavy snowfall in Himachal Pradesh.

4. February

4.1. *Weather and associated synoptic features*

Three low pressure areas (including two induced low pressure areas), 5 western disturbances , 8 cyclonic circulations and 2 troughs affected weather in India during the month of February. Details of these systems are given in Table 2.

Rain or snow occurred either at most places or at many places on 4 to 6 days in Hills of west Uttar Pradesh, Himachal Pradesh and Jammu & Kashmir. Heavy rain or snow occurred on 3 days in Jammu & Kashmir and on 1 day in Himachal Pradesh. Rain or thundershowers occurred either at most places or at many places on 7 days in Orissa and on 1 to 3 days in Arunachal Pradesh, Assam & Meghalaya, West Bengal & Sikkim, Bihar Plateau, Haryana, Punjab, Marathwada, Vidarbha, coastal Andhra Pradesh and Tamil Nadu. Very heavy rain occurred on 1 to 2 days in Gangetic West Bengal, coastal Andhra Pradesh, Tamil Nadu and Kerala. Heavy rain also occurred on 10 days in Tamil Nadu and on 1 to 3 days in Orissa, Haryana, coastal Andhra Pradesh, Telangana, south interior Karnataka and Kerala.

4.2. *Month's rainfall*

Rainfall during the month of February was excess in 18, normal in 1, deficient in 8 and scanty in 7 meteorological sub-divisions. There was no rain in only one meteorological sub-division.

During the month, the rainfall was excess in Gangetic West Bengal, Orissa, Bihar Plateau, plains of west Uttar Pradesh, Hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Marathwada, Vidarbha, Andhra Pradesh, Tamil Nadu, interior Karnataka, Kerala and Lakshadweep; normal in Sub-Himalayan West Bengal & Sikkim, deficient in Andaman & Nicobar Islands, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Bihar Plains, east Uttar Pradesh, Jammu & Kashmir, west Rajasthan and coastal Karnataka and scanty in Arunachal Pradesh, east Rajasthan, Madhya Pradesh, Gujarat State and Madhya Maharashtra. There was no rain in Konkan & Goa.

4.3. *Temperature*

Severe cold wave conditions prevailed on 4 days in Punjab and on 1 day each in Himachal Pradesh and Gujarat Region. Cold wave conditions also prevailed on 7 to 10 days in Hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, west Rajasthan and west Madhya Pradesh; on 3 to 6 days in plains of Uttar Pradesh, east Rajasthan and Gujarat State and on 1 to 2 days in Sub-Himalayan West Bengal & Sikkim, Bihar Plains, Kashmir and Madhya Maharashtra. Night temperatures were appreciably below normal on 16 days in Gujarat Region, on 7 to 10 days in Bihar, east Uttar Pradesh, west Madhya Pradesh, Saurashtra & Kutch, Madhya Maharashtra and north interior Karnataka; on 3 to 6 days in Assam & Meghalaya, Tripura, plains of west Uttar Pradesh, Rajasthan, east Madhya Pradesh, Marathwada, Vidarbha and Telangana and on 1 to 2 days in Manipur, West Bengal & Sikkim, Orissa, Hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Konkan & Goa, Tamil Nadu and coastal & south interior Karnataka. They were generally appreciably above normal (departure from normal minimum temperature is 3° C to 4° C) over the rest of the country during the month.

During the month, the lowest temperature of 1.5° C was recorded at Chittorgarh (Rajasthan) on 15 February.

4.4. *Disastrous weather events and damages*

According to press reports, in all 18 persons (7 in Bihar, 6 in Tamil Nadu, 4 in West Bengal and 1 in Orissa) died due to heavy rains accompanied by hailstorm or thunder squall during the month.