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Weather In India

WINTER SEASON (JANUARY-FEBRUARY 2002)*

1. Introduction

During the season, some parts of northwest India and Peninsular India received good amount of rainfall. Rainfall activity was subdued over the rest of the country. Rain/snowfall also occurred over northern parts of India during the season. *Severe cold wave conditions** prevailed in some parts of east Uttar Pradesh, Bihar and Madhya Maharashtra on 1 or 2 days in January. *Cold wave conditions** also prevailed on many days in northwest and central India during first and last week of January and in the first fortnight of February.

2. Season's rainfall

The season's rainfall was *excess** in 12 (east Uttar Pradesh, west Uttar Pradesh, Uttaranchal, Haryana, east Rajasthan, Marathwada, coastal Andhra Pradesh, Telangana, Tamil Nadu, coastal Karnataka, north interior Karnataka and south interior Karnataka); *normal** in 2 (Himachal Pradesh and west Madhya Pradesh); *deficient** in 13 (Arunachal Pradesh, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Orissa, Bihar, Jammu & Kashmir, west Rajasthan, east Madhya Pradesh & Chattisgarh, Vidarbha, Rayalaseema, Kerala and Lakshadweep) and *scanty** in remaining 6 meteorological sub-divisions outside Saurashtra & Kutch and Konkan & Goa where there was no rain.

The seasonal rainfall distribution is shown in Fig. 1. Table 1 gives monthly as well as seasonal rainfall distribution.

3. January

3.1. *Weather and associated synoptic features*

There were 1 well-marked low pressure area, 11 western disturbances including 2 induced low pressure areas, 1 cyclonic circulation, 6 troughs in easterlies 1 trough in westerlies and 5 other troughs which affected weather in the country during the month. Details of these systems are given in Table 2.

*Definitions of the terms given in *Italics* are given in Appendix.

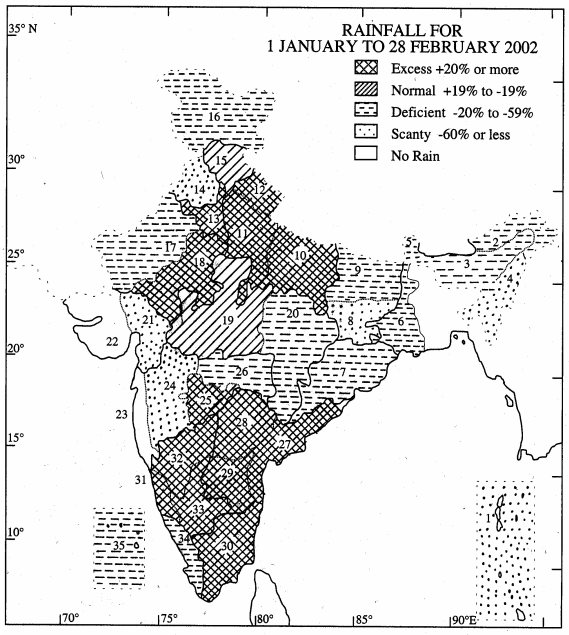

Fig. 1. Rainfall for the month of January to February 2002 as percentage departure from normal. Sub-divisions are indicated by number on the map & bold letters in legend. The rainfall anomaly values for these 35 sub-divisions are indicated below :

1	–82	**8**	–64	**15**	–1	**22**	–100	**29**	–20
2	–28	**9**	–23	**16**	–40	**23**	–100	**30**	41
3	–50	**10**	66	**17**	–35	**24**	–66	**31**	273
4	–63	**11**	67	**18**	93	**25**	61	**32**	241
5	–36	**12**	25	**19**	13	**26**	–34	**33**	133
6	–24	**13**	33	**20**	–30	**27**	108	**34**	–47
7	–45	**14**	–60	**21**	–99	**28**	40	**35**	–20

Rain/snow occurred at *most places* on 1 day in Himachal Pradesh; at *many places* on 5 days in Uttaranchal and on 3 days each in Himachal Pradesh and Jammu & Kashmir; at *a few places* on 3 days each in Himachal Pradesh and Jammu & Kashmir and on 2 days in Uttaranchal and at *isolated places* on 5 days in Himachal Pradesh and on 2 days in Uttaranchal. *Heavy* rain or snow occurred on 1 to 2 days in Himachal Pradesh and Jammu & Kashmir. Rain/thundershowers also occurred at *most places* on 4 days in Arunachal Pradesh and on 1 day each in Sub-Himalayan West Bengal & Sikkim, Orissa and Marathwada; at *many places* on 3 days each in Gangetic West Bengal and Orissa and on 1 to 2 days in Arunachal Pradesh, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim,

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TABLE 1

Sub-divisionwise rainfall (mm) for each month and season as a whole (January-February 2002)

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	21	73	–71	1	48	–98	22	120	–82
2.	Arunachal Pradesh	74	43	72	12	76	–84	86	119	–28
3.	Assam & Meghalaya	19	19	1	5	28	–83	24	47	–50
4.	Naga., Mani., Mizo. and Tri.	14	18	–21	2	26	–92	16	44	–63
5.	Sub-Himalayan West Bengal & Sikkim	25	17	43	1	23	–95	26	41	–36
6.	Gangetic West Bengal	27	14	94	1	23	–95	28	37	–24
7.	Orissa	24	18	29	**	25	–99	24	43	–45
8.	Jharkhand	10	20	–51	6	24	–74	16	44	–64
9.	Bihar	14	16	–12	11	16	–33	24	32	–23
10.	East Uttar Pradesh	21	18	20	34	16	119	56	34	66
11.	West Uttar Pradesh	24	22	10	43	18	134	67	40	67
12.	Uttaranchal	56	67	–17	107	63	69	163	131	25
13.	Haryana, Chandigarh & Delhi	16	22	–27	39	19	101	55	41	33
14.	Punjab	8	30	–75	15	26	–43	22	56	–60
15.	Himachal Pradesh	60	80	–25	93	74	26	153	154	–1
16.	Jammu & Kashmir	45	78	–42	69	110	–38	114	188	–40
17.	West Rajasthan	1	5	–89	6	5	13	6	10	–35
18.	East Rajasthan	2	7	–67	20	5	333	22	12	93
19.	West Madhya Pradesh	2	12	–87	21	8	168	23	20	13
20.	East Madhya Pradesh & Chattisgarh	7	20	–66	22	21	4	29	41	–30
21.	Gujarat Region	0	2	–100	0	1	–98	0	3	–99
22.	Saurashtra & Kutch	0	1	–100	0	1	–100	0	2	–100
23.	Konkan & Goa	0	1	–100	0	1	–100	0	2	–100
24.	Madhya Maharashtra	1	4	–89	2	2	–2	2	6	–66
25.	Marathwada	7	3	130	3	3	0	10	6	61
26.	Vidarbha	3	11	–70	12	13	–2	16	24	–34
27.	Coastal Andhra Pradesh	42	9	344	**	11	–97	42	20	108
28.	Telangana	13	4	210	2	7	–73	15	11	40
29.	Rayalaseema	9	8	15	1	5	–76	10	13	–20
30.	Tamil Nadu	11	34	–67	58	15	288	70	49	41
31.	Coastal Karnataka	**	3	–88	14	1	956	14	4	273
32.	North Interior Karnataka	5	2	176	10	3	287	15	5	241
33.	South interior Karnataka	3	3	7	12	4	225	15	7	133
34.	Kerala	7	15	–55	10	17	–41	16	31	–47
35.	Lakshadweep	11	25	–57	17	9	84	28	35	–20

Note : ** indicates rainfall amount 0.1 to 0.4 mm

TABLE 2

Details of the weather systems during January 2002

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.	Well-marked low pressure area	30 Jan - 3 Feb	North Indian Ocean and adjoining south Bay	Westerly	Maldives area and neighbourhood	It became well marked on1 February Subsequently lay as a lopar over Commorin and adjoining areas of Sri-Lanka on 2. It was seen as a trough in easterly from 4 to 10
(**B**)	*Western disturbances*					
	(*i*) *Upper air systems*					
1.	Lower tropospheric levels	1 – 3	North Pakistan and adjoining Jammu & Kashmir	Easterly	Haryana and neighbourhood	Moved away eastwards
2.	Do	4 – 5	North Pakistan and adjoining Jammu & Kashmir	Northeasterly		Moved away northeastwards
3.	Do	6 – 9	North Pakistan and adjoining Jammu & Kashmir	Do		Moved away northeastwards
4.	Mid tropospheric levels	10 – 15	North Pakistan and adjoining Jammu & Kashmir	Eastnortheasterly		Moved away eastnortheastwards
5.	Lower tropospheric levels	16 – 19	Central Pakistan and adjoining areas of Punjab and Jammu & Kashmir	Do		Do
6.	Do	23 – 25	North Pakistan and adjoining areas of Punjab and Jammu & Kashmir	Do		Lay over Haryana and neighbourhood on 25. Moved away eastnortheastwards on 26
7.	Mid tropospheric levels	25 – 29	North Pakistan and adjoining Jammu & Kashmir	Easterly		Lay over west Uttar Pradesh and neighbourhood on 29 and moved away northeastwards on 30
8.	Lower tropospheric levels	31 Jan - 3 Feb	North Pakistan and adjoining Jammu & Kashmir	Do		Lay over Uttaranchal and neighbourhood 3 Feb and moved away northeastwards on 4
	(*ii*) *Induced systems*					
1.	Induced well-marked low pressure area	13 – 15	Central Pakistan and neighbourhood	Easterly	Central parts of Rajasthan	It became well marked on 14. Even after the lopar becoming less marked on 16 the associated cyclonic circulation in the lower tropospheric levels lay over west Madhya Pradesh and neighbourhood till 20
2.	Induced low pressure area	26 – 27	East Rajasthan and neighbourhood	Eastnortheasterly	South Uttar Pradesh and adjoining north Madhya Pradesh	It lay as a trough of low over east Uttar Pradesh and neighbourhood on 28, over northern parts of Bihar and neighbourhood on 29 and became less marked on 30

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3.	Induced cyclonic circulation	20 – 22	Central Pakistan and adjoining west Rajasthan	Northeasterly		Lay over Haryana and neighbourhood on 22 and moved away northeastwards on 23
(**C**)	*Other cyclonic circulations*					
1.	Lower tropospheric levels	10 – 11	Haryana and neighbourhood	Northeasterly		Moved away northeastwards
(**D**)	*Trough in easterlies*					
1.	Sea level	8 – 21	Southwest Bay to west-central Bay off north Tamil Nadu – Andhra coasts	Quasi-stationary	Sri Lanka-to south Andhra coasts	
2.	Do	5 – 8	Southwest Arabian Sea to south Gujarat coast	Stationary	*In situ*	
3.	Do	11 – 14	Southeast Arabian Sea off west coast	Do	Do	
4.	Do	22 – 23	South Andaman Sea	Do	Do	
5.	Do	25 – 29	Southwest Bay off Sri-Lanka-south Tamil Nadu coasts	Do	Do	
6.	Do	30	South Bay to north Bay	Do	Do	
(**E**)	*Troughs in westerlies*					
1.	Lower tropospheric levels	24 – 25	Sub-Himalayan West Bengal & Sikkim to north Bay	Easterly	Along Long. 90° E, north of Lat. 25° N	
(**F**)	*Other troughs*					
1.	Sea level	6 – 8	East-central Arabian Sea to Chattisgarh	Stationary	*In situ*	Passed through interior Karnataka and Telangana
2.	0.9 km a.s.l.	16 – 20	West Madhya Pradesh and neighbourhood to Bihar	Do	Do	It extended from west Madhya Pradesh and neighbourhood to northeast India on most of the days
3.	Sea level	21 – 23	Southeast Arabian Sea to Sub-Himalayan West Bengal & Sikkim	Do	Do	Passed through north interior Karnataka, Vidarbha and east Madhya Pradesh & Chattisgarh on 21 and 22, through north interior Karnataka, Orissa and Gangetic West Bengal on 23
4.	Lower levels	26 – 28	East Rajasthan to northeast Arabian Sea	Easterly	East Uttar Pradesh and neighbourhood to Rayalaseema	Extended from south Uttar Pradesh to Konkan & Goa on 27
5.	Sea level	30	South interior Karnataka to Orissa	Stationary	*In situ*	Passed through Rayalaseema and Telangana

Jharkhand, east Uttar Pradesh, Haryana, Marathwada, coastal Andhra Pradesh and Telangana; at *a few places* on 3 to 4 days in Arunachal Pradesh and east Uttar Pradesh and on 1 to 2 days in Andaman & Nicobar Islands, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal,. Orissa, Jharkhand, Bihar, west Uttar Pradesh, Haryana, Punjab, Madhya Maharashtra, Telangana, Rayalaseema and Lakshadweep and at *isolated places* on 8 to 12 days in Andaman & Nicobar Islands, Assam & Meghalaya, coastal Andhra Pradesh and Tamil Nadu, on 4 to 7 days in Sub-Himalayan West Bengal & Sikkim, Orissa, Jharkhand, Bihar, east Uttar Pradesh, west Uttar Pradesh, Haryana, Punjab, Vidarbha, Telangana, Rayalaseema and Kerala and on 1 to 3 days in Arunachal Pradesh, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Uttaranchal, west Rajasthan, east Rajasthan, east Madhya Pradesh & Chattisgarh, Madhya Maharashtra, north interior Karnataka and south interior Karnataka. *Very heavy rain* occurred on 2 days in coastal Andhra Pradesh and *heavy rain* also occurred on 1 to 2 days in coastal Andhra Pradesh, south interior Karnataka and Kerala.

3.2. *Monthly rainfall*

Accumulated monthly rainfall was *excess* in 9 (Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Orissa, east Uttar Pradesh, Marathwada, coastal Andhra Pradesh, Telangana and north interior Karnataka); *normal* in 6 (Assam & Meghalaya, Bihar, west Uttar Pradesh, Uttaranchal, Rayalaseema and south interior Karnataka) and *deficient* in 7 (Nagaland-Manipur-Mizoram-Tripura, Jharkhand, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala and Lakshadweep) meteorological sub-divisions. It was scanty over the rest of the meteorological sub-divisions except Gujarat Region, Saurashtra & Kutch and Konkan & Goa where there was no rain.

Principal amounts of rainfall for the month of January are given in Table 4.

3.3. *Temperature*

Severe cold wave conditions prevailed on 1 day each in Bihar, east Uttar Pradesh and Madhya Maharashtra. *Cold wave conditions* also prevailed on 7 to 10 days in Punjab, Jammu & Kashmir, west Rajasthan, east Rajasthan and east Madhya Pradesh & Chattisgarh; on 4 to 6 days in Orissa, Jharkhand, east Uttar Pradesh, west Uttar Pradesh, Haryana, west Madhya Pradesh and Madhya Maharashtra and on 1 to 3 days in Bihar, Uttaranchal, Himachal Pradesh, Gujarat Region, Marathwada, Vidarbha and Telangana. Night temperatures were *appreciably* to *markedly below normal* on 8 to 12 days in Orissa, Saurashtra & Kutch, Madhya Maharashtra, Vidarbha and north interior Karnataka; on 4 to 7 days in Jharkhand, Bihar, east Uttar Pradesh, west Madhya Pradesh, east Madhya Pradesh & Chattisgarh, Gujarat Region, Konkan & Goa, Marathwada, Telangana, Rayalaseema, Tamil Nadu and south interior Karnataka and on 1 to 3 days in Gangetic West Bengal, west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Rajasthan, coastal Andhra Pradesh and Kerala.

During the month, the lowest minimum temperature over plains of the country was 0.2° C recorded at Pilani (Rajasthan) on 8 January 2002.

3.4. *Disastrous natural events and damages*

During first week of the month, cold wave took a toll of 88 persons in Uttar Pradesh. Also 11 persons lost their lives due to heavy rains in Tamil Nadu. Many parts of Sikkim experienced snowfall. Sandakhpu village in Sikkim reported heavy snowfall on 28 and 29 of the month.

Hailstorm was experienced in Raichur and Tumkur districts of Karnataka which damaged standing crops in hundreds of acres of land.

4. February

4.1. *Weather and associated synoptic features*

There were 17 western disturbances, including one induced low pressure area, 3 other cyclonic circulations, 1 embedded cyclonic circulation and 5 troughs in easterlies. These systems affected weather in India during the month of February. Details of these systems are given in Table 3.

Rain/snow occurred *at most places* on 4 days in Himachal Pradesh, and on 1 to 2 days in Uttaranchal and Jammu & Kashmir; *at many places* on 6 days in Uttaranchal, and on 1 to 2 days in Himachal Pradesh and Jammu & Kashmir; *at a few places* on 2 to 4 days in Uttaranchal, Himachal Pradesh and Jammu & Kashmir and at isolated places on 5 to 7 days in Himachal Pradesh and Jammu & Kashmir and on 3 days in Uttaranchal. *Heavy rain* or snow also occurred on 1 to 3 days in Uttaranchal, Himachal Pradesh and Jammu & Kashmir. Rain or thundershowers occurred *at most places* on 1 day each in east Uttar Pradesh, west Uttar Pradesh, Haryana, west Madhya Pradesh and Marathwada; *at many places* on 1 to 3 days in Arunachal Pradesh, Gangetic West Bengal, Bihar, east Uttar Pradesh, west Uttar Pradesh, Haryana, east Rajasthan and Marathwada; *at a few places* on 3 to 4

TABLE 3

Details of the weather systems during February 2002

S. No (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(**A**)	*Western disturbances*					
	(*i*) *Upper air systems*					
1.	Mid tropospheric levels	1 – 5	North Pakistan and adjoining areas of Jammu & Kashmir	Northeasterly		Moved away northeastwards
2.	Do	11 – 13	North Pakistan and adjoining areas of Jammu & Kashmir	Easterly		Do
3.	Lower tropospheric levels	14 – 15	North Pakistan and adjoining Jammu & Kashmir	Northeasterly		Do
4.	Do	16 – 17	North Pakistan and adjoining Jammu & Kashmir	Do		Do
5.	Do	18 – 20	North Pakistan and adjoining Jammu & Kashmir	Do		Do
6.	Mid tropospheric levels	21 – 25	North Pakistan and adjoining Jammu & Kashmir	Eastnortheasterly		Extending upto 1.5 kms a.s.l. it lay over Uttaranchal and neighbourhood on 25 and moved away north-eastwards on 26
7.	Do	24 – 28	North Pakistan and adjoining Jammu & Kashmir	Do		Moved away northeastwards
8.	Lower tropospheric levels	27 Feb - 3 Mar	North Pakistan and adjoining parts of Punjab and Jammu & Kashmir	Do		Do
	(*ii*) *Induced lows*					
1.	Induced low pressure area	22	Central Pakistan and adjoining areas of west Rajasthan	Stationary	*In situ*	Associated cyclonic circulation extending upto 2.1 kms a.s.l. lay over central parts of Rajasthan on 23, over west Madhya Pradesh and neighbourhood on 24 and over central parts of Madhya Pradesh on 25 and became less marked on 26
	(*iii*) *Induced cyclonic circulations*					
1.	Lower tropospheric levels	5 – 9	Central Pakistan and adjoining areas of west Rajasthan	Northeasterly	West Uttar Pradesh and neighbourhood	
2.	Lower levels	5 – 8	East Rajasthan and adjoining areas of northwest Madhya Pradesh	Do	East Uttar Pradesh and adjoining east Madhya Pradesh & Chattisgarh	
3.	Mid tropospheric levels	7 – 10	Central Pakistan and adjoining west Rajasthan	Do		It lay over Haryana and neighbourhood on 10 and moved away northeastwards on 11

TABLE 3 (*Contd*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
4.	Lower tropospheric levels	12 – 13	North Rajasthan and adjoining Haryana and Punjab	Do		Moved away northeastwards
5.	Do	16 – 20	Central Pakistan and adjoining west Rajasthan	Eastnortheasterly		Do
6.	Do	18 – 21	Central Pakistan and adjoining west Rajasthan	Do		Lay over Uttaranchal and neighbourhood on 21 and moved away eastnortheastwards on 22
7.	Do	26 Feb – 3 Mar	Central Pakistan and adjoining west Rajasthan	Do		Moved away northeastwards
8.	Do	28 Feb	Central Pakistan and adjoining west Rajasthan			It lay as an induced low pressure area over west Rajasthan and adjoining areas on 1 March. Details will be given in the Hot weather seasonal summary
(**B**)	*Other cyclonic circulation*					
1.	Lower tropospheric levels	25	Bihar & adjoining areas of east Uttar Pradesh & Jharkhand	Stationary	*In situ*	
2.	Do	21 – 25	Assam & Meghalaya			It lay as a trough in the lower tropospheric westerlies over the same area till 28 February
3.	Do	28 Feb-1 Mar	Sub-Himalayan West Bengal & Sikkim and neighbourhood	Stationary	*In situ*	
(**C**)	*Embedded cyclonic circulation*					
1.	Lower tropospheric levels	10 – 12	North Maharashtra coast and adjoining land areas	Northnortheasterly		Moved rapidly in a Northnorth-easterly direction and moved away northeastwards from west Uttar Pradesh and adjoining areas of north Madhya Pradesh on 13
(**D**)	*Troughs in easterlies*					
1.	Sea level	5 – 11	Southwest Bay off Sri-Lanka-south Tamil Nadu coasts	Westerly	Southeast Arabian Sea to Haryana, Punjab	
2.	Do	10 – 11	Commorin area to north Tamil Nadu coast	Stationary	*In situ*	
3.	Do	14 – 17	Southwest Bay off south Tamil Nadu-Sri Lanka coasts	Do	Do	
4.	Lower levels	19 – 20	Kerala to west Rajasthan through interior Karnataka, Vidarbha and west Madhya Pradesh	Quasi-stationary	Kerala to Gujarat through coastal Karnataka and Madhya Maharashtra	
5.	Sea Level	28 Feb-8 Mar	Andaman Sea	Westerly	Maldives – Commorin areas	

TABLE 4

Principal amounts of rainfall in cm over different stations for the month of January and February 2002

Date	January	February
1	Nancowry 3	Tondi & Pamban 6 each, Cuddalore & Vedarnniyam 4 each, Adirampattinam 3
2	Nil	Nagapattinam 23, Karaikal 19, Adirampattinam 18, Manmelkudi 13, Tondi 12, Punalur & Thiruvananthapuram 2 each
3	Kondul 2	Cuddalore & Nagapattinam 5 each, Kodaikanal 3, Madurai 2
4	Nil	Pamban 8, Adirampattinam 4, Kodaikanal & Tondi 3 each, Madurai 1
5	Nellore 4, Cuddalore 3	Nil
6	Ongole & Nizamabad 2 each, Machilipatnam, Chennai & Kodaikanal 1 each	Karaikal 3, Bhuntar, Nagapattinam & Kanyakumari 1 each
7	Kavali 12, Kalingapatnam 6, Pamban 5, Ramgundam, Nizamabad & Jagdalpur 3 each, Chennai 2	Kanjirappally 12, Pahalgam 2, Bhuntar, Srinagar, Jabalpur & Palayamkottai 1 each
8	Kavali 9, Chennai 3, Tiruvallur & Jagdalpur 2 each	Batote 6, Rampurbushar & Srinagar 4 each, Shimla 3, Gorakhpur 2, Gaya, Dehra Dun, Jabalpur, Tiwsa & Chitradurga 1 each
9	Nellore 13, Kodavasal 7, Covalong & Kavali 6 each, Chennai 2, Jamshedpur & Cochi 1 each	Dehra Dun 5, Shimla, Khajuraho, Nanded & Minicoy 2 each, Patna, Banihal & Yeotmal 1 each
10	Nellore 2, Chennai & Tondi 1 each	Manora 4, Mangrulpir 3, Shegaon 2, Rampurbushar 1
11	Nil	Kota 7, Gwalior 5, Khajuraho, Jalgaon & Paratada 4 each, Agra, Indore, Bhopal & Buldhana 2 each, Bareilly, Rohtak & Jaipur 1 each
12	Awantipur 1	Renuka 9, Varanasi, Jagadhari & Shimla 5 each, Bareilly, Dehra Dun & Patiala 4 each, Jhansi, Ambala & Chandigarh 3 each, Lucknow, Khajuraho, Jabalpur & Mohadi 2 each, Pilani, Bhopal & Nagpur 1 each
13	Pahalgam 2, Banihal 1	Pandoh & Bhuntar 1 each
14	Bhuntar, Pahalgam & Banihal 1 each	Nil
15	Batote 3, Mukteshwar, Guhla, Bhuntar & Katra 1 each	Nil
16	Una 8, Barsar 6, Bareilly, Ayanagar (DLH) & Rewari 4 each, Mukteshwar, Nangal & Batote 3 each, Mainpuri 2, Dehra Dun & Gwalior 1 each	Nil
17	Srinagar (IAF) 4, Cooch Behar 3, Jalpaiguri 2, Jammu & Guwahati 1 each	Nil
18	Kalpa 2, Bhuntar & Batote 1 each	Nil
19	Bareilly 2, Dibrugarh 1	Nil
20	Dibrugarh, Allahabad, Varanasi, Shimla, Satna & Khajuraho 1 each	Nil
21	Kanyakumari & Sultanpur 2 each, Cuddalore, Gorakhpur & Varanasi 1 each	Nil
22	Pendra 2, Ongole 1	North Lakhimpur 1
23	Jamshedpur 3, Raipur & Minicoy 2 each, Dibrugarh & Krishnanagar 1 each	Bhuntar 2, Bhiwani, Panipat, Nangal, Shimla & Pendra 1 each
24	North Lakhimpur 1	Sarsawa, Dehra Dun, Jagadhari & Batote 1 each
25	Dibrugarh & North Lakhimpur 1 each	Tohana & Kumarsain 2 each, Chandigarh, Bhuntar, Shimla & Pendra 1 each
26	Tadong & Gangtok 1 each	Dibrugarh 2, Batote 1
27	Panipat 3, Rampur Bushar 2, Gopalpur, Sarsawa, Bhuntar, Shimla & Mukteswar 1 each	Nil
28	Jamshedpur & Chenganoor 3 each, Sriniketan, Keonjhargarh, Ranchi, Bahraich & Dehra Dun 2 each, Tadong, Gangtok & Bhubaneswar 1 each	North Lakhimpur 1
29	Diamond Harbour, Kolkata & Bhubaneswar 2 each, Tadong & Kothagudem 1 each	–
30	Cuttack 3, Kolkata, Bhubaneswar & Rentachintala 1 each	–
31	Kondul 7, Karaikal 3, North Lakhimpur 1	–

days in Arunachal Pradesh, Jharkhand, west Uttar Pradesh, Marathwada, Tamil Nadu and Lakshadweep and on 1 to 2 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar, east Uttar Pradesh, Haryana, Punjab, west Madhya Pradesh, east Madhya Pradesh & Chattisgarh, Madhya Maharashtra, Vidarbha and south interior Karnataka and at *isolated places* on 7 to 10 days in west Uttar Pradesh, west Madhya Pradesh, Tamil Nadu, north interior Karnataka and Kerala, on 4 to 6 days in Assam & Meghalaya, Bihar, east Uttar Pradesh, east Madhya Pradesh & Chattisgarh, Vidarbha, Rayalaseema, coastal Karnataka and south interior Karnataka and on 1 to 3 days in Andaman & Nicobar Islands, Arunachal Pradesh, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Orissa, Jharkhand, Haryana, Punjab, west Rajasthan, east Rajasthan, Madhya Maharashtra, Marathwada, coastal Andhra Pradesh and Telangana. *Heavy rain* occurred on 1 day each in coastal & south interior Karnataka.

4.2. *Monthly rainfall*

Rainfall during the month of February was *excess* in 12 (east Uttar Pradesh, west Uttar Pradesh, Uttaranchal, Haryana, Himachal Pradesh, east Rajasthan, west Madhya Pradesh, Tamil Nadu, coastal Karnataka, north interior Karnataka, south interior Karnataka and Lakshadweep), *normal* in 5 (west Rajasthan, east Madhya Pradesh & Chattisgarh, Madhya Maharashtra, Marathwada and Vidarbha), *deficient* in 4 (Bihar, Punjab, Jammu & Kashmir and Kerala) and *scanty* in remaining 12 meteorological sub-divisions except Saurashtra & Kutch and Konkan & Goa, where there was no rain.

Principal amounts of rainfall for the month of February are given in Table 4.

4.3. *Temperature*

Severe cold wave conditions prevailed on 1 to 2 days in Punjab, Himachal Pradesh and Rajasthan. *Cold wave* conditions also prevailed on 5 to 6 days in Jammu & Kashmir and Rajasthan and on 1 to 3 days in Jharkhand, Bihar, Uttar Pradesh, Uttaranchal, Haryana, Punjab, Himachal Pradesh, Madhya Pradesh & Chattisgarh, Gujarat Region and Madhya Maharashtra. Night temperatures were *appreciably* to *markedly* below normal on 6 to 8 days in Orissa, Jharkhand, Gujarat Region, Saurashtra & Kutch and Rayalaseema; on 3 to 5 days in Nagaland-Manipur-Mizoram-Tripura, west Uttar Pradesh, Himachal Pradesh, west Madhya Pradesh, Vidarbha and south interior Karnataka and on 1 to 2 days in Gangetic West Bengal, Bihar, Haryana, Punjab, Jammu & Kashmir, east Rajasthan, east Madhya Pradesh & Chattisgarh, Madhya Maharashtra, coastal Andhra Pradesh, Telangana, Tamil Nadu, coastal & north interior Karnataka and Kerala. On rest of days of the month, the night temperatures were generally *appreciably* to *markedly* above normal on many days over most parts of the country.

During the month, the lowest temperature of –0.8° C was recorded at Pilani (Rajasthan) on 10 February 2002.

4.4. *Disastrous weather events and damages*

According to press reports, crops worth lakhs of rupees were damaged due to heavy rain/hail storm/squall in Vidarbha during first fortnight of the month.

Appendix

Definitions of the terms given in *'Italics'*

Rainfall

Excess	-	percentage departure from normal rainfall is + 20 % or more.
Normal	-	percentage departure from normal rainfall is between –19 % to + 19 %.
Deficient	-	percentage departure from normal rainfall is between – 20 % to – 59 %.
Scanty	-	percentage departure from normal rainfall is between – 60 % to – 99 %.

Rainfall distribution

At most places	-	75 % or more stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At many places	-	51% to 74 % stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At a few places	-	26 % to 50 % stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At isolated places	-	25 % or less stations of a meteorological sub-division reporting at least 2.5 mm rainfall.

Heavy rainfall

Very heavy rain	-	rainfall amount 12.5 cm or more over one or two stations in the sub-division.
Heavy rain	-	rainfall amount from 6.5 cm to 12.4 cm over one or two stations in the sub-division.

Temperature (Minimum / Night temperature)

Severe cold wave conditions - departure from normal minimum temperature is –5° C or less for the regions where normal minimum temperature is less than 10° C and –7° C or less elsewhere.

Cold wave Conditions - departure of minimum temperature from normal is –3° C to –4° C where normal minimum temperature is less than 10° C.

Markedly below Normal - departure of minimum temperature from normal is –5° C to –6° C for the regions where the normal minimum temperature is 10° C or more.

Appreciably below normal - departure of minimum temperature from normal is between –3° C to –4° C for the regions where the normal minimum temperature is 10° C or more.

Below normal - departure of minimum temperature from normal is –2° C.

Markedly above Normal - departure of minimum temperature from normal is +5° C to +6° C.

Appreciably above normal - departure of minimum temperature from normal is between +3° C to +4° C.

Above normal - departure of minimum temperature from normal is +2° C.