

Weather

MONSOON SEASON (JUNE — SEPTEMBER 1971)

CHIEF FEATURES

Advance of monsoon

The southwest monsoon set in over Kerala on 27 May and covered the Peninsula by the end of May. It advanced rapidly into northeast India and the central parts of the country by the first week of June, and into northwest India in the last week of the month. The entire country was under its grip by 2 July. The advance of the monsoon over different parts of the country this year was generally about a week to 10 days ahead of the normal date of onset.

Activity of the monsoon

The monsoon was generally active in north India, leading to an excess of rainfall over most parts. Uttar Pradesh, Bihar and West Bengal were very seriously affected by floods. The monsoon was weak over central and north India in the second week of June and in the second week of July. A prolonged spell of scanty rainfall in July and the first fortnight of August, led to drought conditions in the interior parts of Maharashtra State, Andhra Pradesh and some parts of north Interior Mysore. South Peninsula had normal or excess of rainfall during the southwest monsoon.

Withdrawal of the monsoon

The southwest monsoon withdrew from west Rajasthan on 13 September, from the rest of north-west India, Uttar Pradesh, west Madhya Pradesh and Gujarat State by the 20th, from east Madhya Pradesh and Maharashtra State by 9 October and from northeast India and north Andhra Pradesh

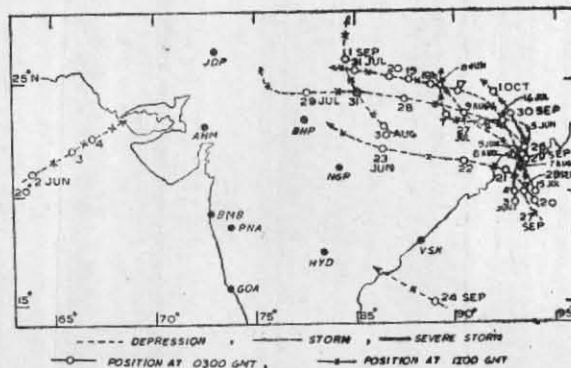


Fig. 1

Tracks of storms/depressions during June-September 1971

by 12 October. While the withdrawal from west Rajasthan was delayed by about a week, the withdrawal from Uttar Pradesh and west Madhya Pradesh was one to two weeks ahead of the normal date of withdrawal from these areas.

Depressions and cyclones

Two cyclonic storms and seven depressions affected the country during the southwest monsoon. The tracks of these systems are shown in Fig. 1.

The total rainfall for the period from 1 June 1971 to 30 September 1971, in terms of departure from the normal is shown in Figs. 2(a) and 2(b). The progress of the monsoon over the various sub-divisions in India month by month is given in Fig. 3. The important features of weather during the different months are given below :

JUNE

The southwest monsoon set in over Kerala on 27 May and covered the Peninsula by the end of May. It advanced rapidly into north India during the 1st week of June. By 8 June, it had covered Gujarat State, southeast Rajasthan, Madhya Pradesh, north-east India and east Uttar Pradesh. The monsoon did not advance further for about a fortnight and a

break in the monsoon prevailed during the second week of June. The monsoon however revived in the third week and advanced into northwest India by the last week. It covered the entire country outside Jammu and Kashmir by 26 June. The advance of the monsoon into various parts of north India was about a week to 10 days ahead of the

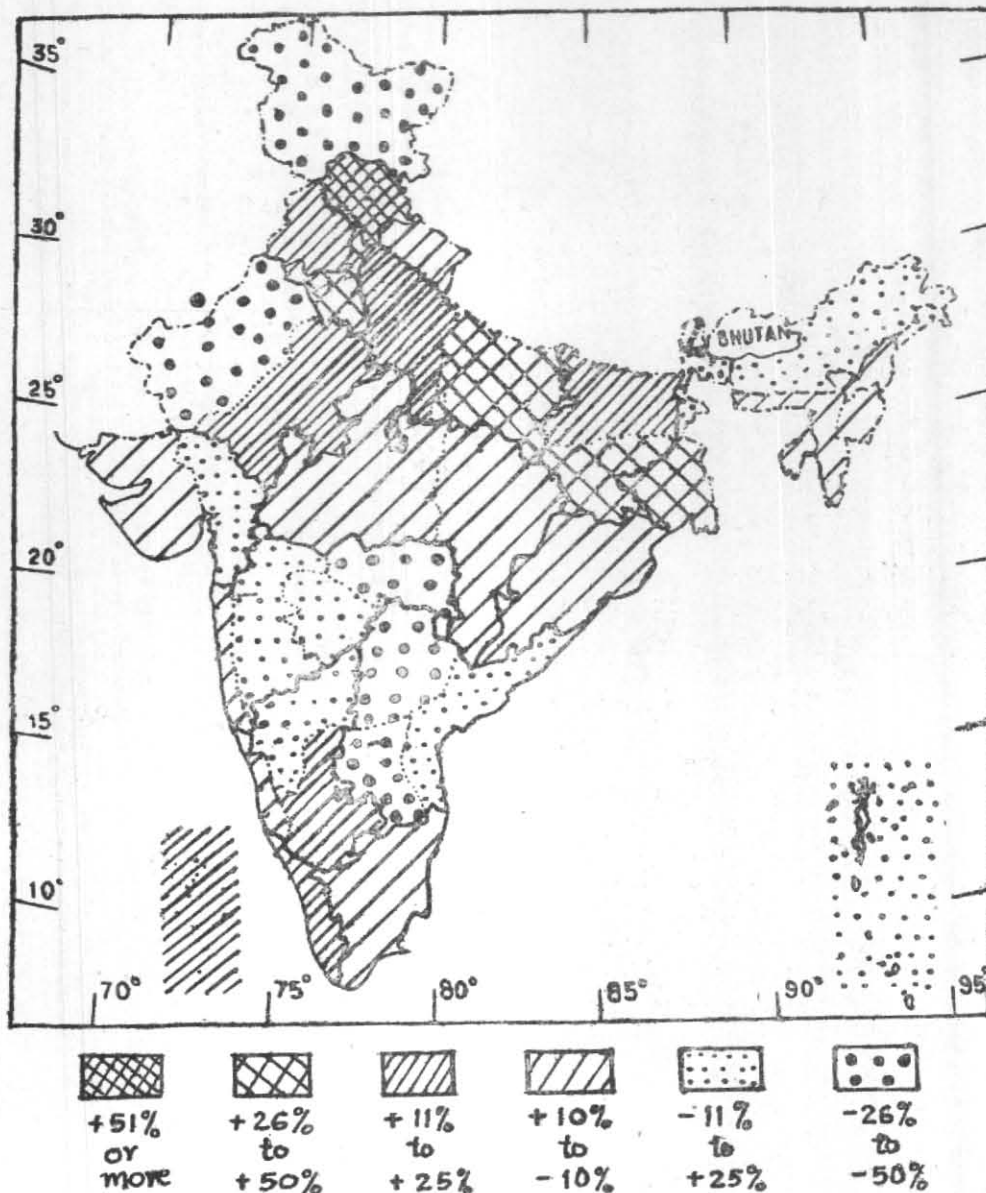


Fig. 2(a)

Rainfall for the period 1 June to 30 September 1971 (Percentage departure from normal)

normal date. Over the Bay of Bengal, the monsoon set in over south Andaman Sea and the adjoining southeast Bay on 18 May. It advanced into north Andaman Sea by the 21st and covered southwest, east central and northeast Bay by the end of May, and west central and northwest Bay by 2 June. Over the Arabian Sea, the monsoon set in over Comorin-Maldiva area on 26 May, and advanced over the Arabian Sea upto 18°N by the end of May. It covered the rest of the Arabian Sea by the 1st week of June.

The advance of the monsoon into north India and the good rainfall activity was influenced by (a) a severe cyclonic storm in the first week and a depression in the last week in the Bay of Bengal, (b) a depression in the northeast Arabian Sea in the first week, and (c) two low pressure areas that moved westnorthwestwards across north India during the second half of the month. In addition, six western disturbances moved eastwards across the Western Himalayas during the month, causing good rainfall in that area.

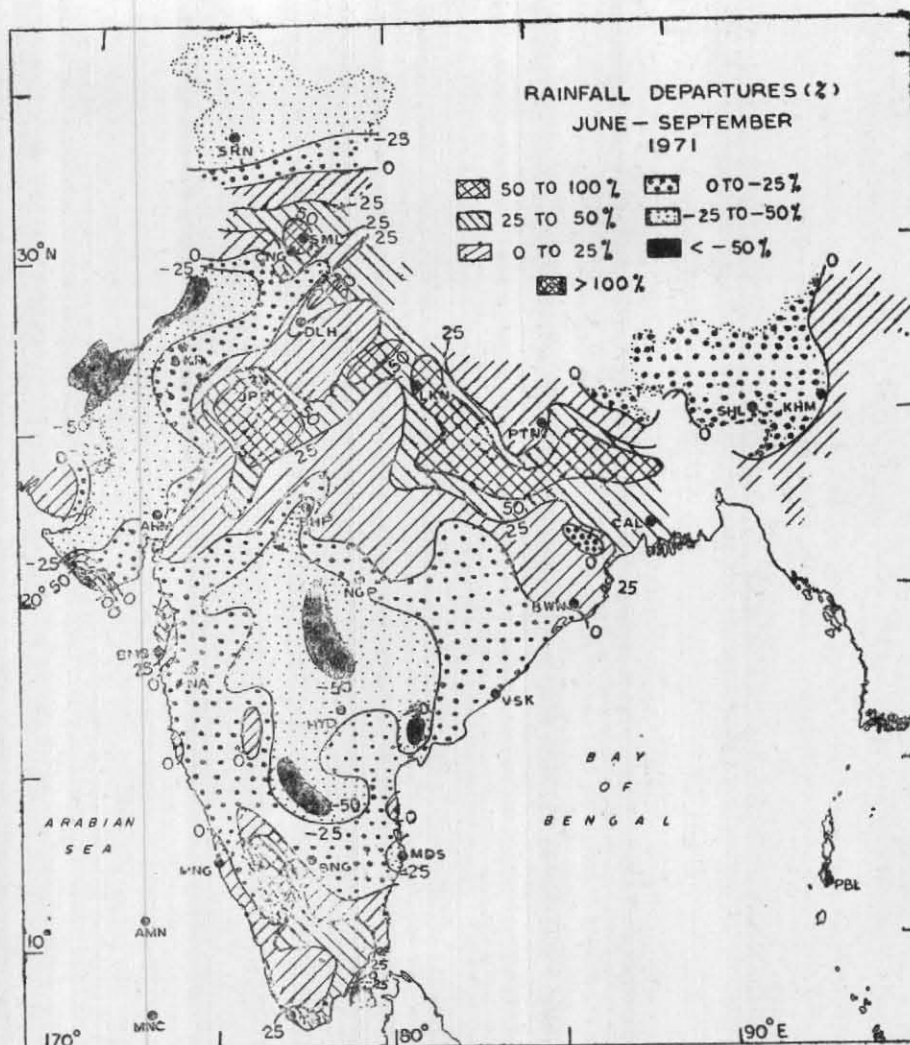


Fig. 2(b)

Percentage departure from normal of rainfall occurred during 1 June to 30 September 1971

The rainfall was in excess in most parts of north India, Konkan, and Kerala during this month. Heavy rain in Himachal Pradesh and the hills of west Uttar Pradesh caused floods in the *Alaknanda* and the *Mandakini*, resulting in a number of villages being washed away in Chamoli district. The Rishikesh-Joshimath road and the Nandprayag Ghat were badly damaged. Heavy rain in upper Assam, north Bihar and north Bengal caused floods in some parts of these areas during the second week of the month. Some parts of east Rajasthan and Kerala were also reported to have been affected by floods during the last week on account of heavy rain. The following stations had record rainfall for the month: Devgarh 47 cm on 19th; Tonk 24 cm on 29th; Jaipur 17 cm on 29th.

The other notable amounts of very heavy rainfall (20 cm and above) during the month were :

Date	Station	Rain fall (cm)	Date	Station	Rain-fall (cm)
5	Mahabaleshwar	20	25	Bombay (Colaba)	28
14	Dharchula	27		Agumbe	23
15	Cooch Behar	22		Mahabaleshwar	21
20	Devgarh	28	24	Bombay (Colaba)	29
	Dabholim (Goa)	20		Bombay (Santa-cruz)	24
21	Bhavani Patna	23		Bhira	22
22	Bhubaneswar	28		Alibag	21
			25	Agumbe	21

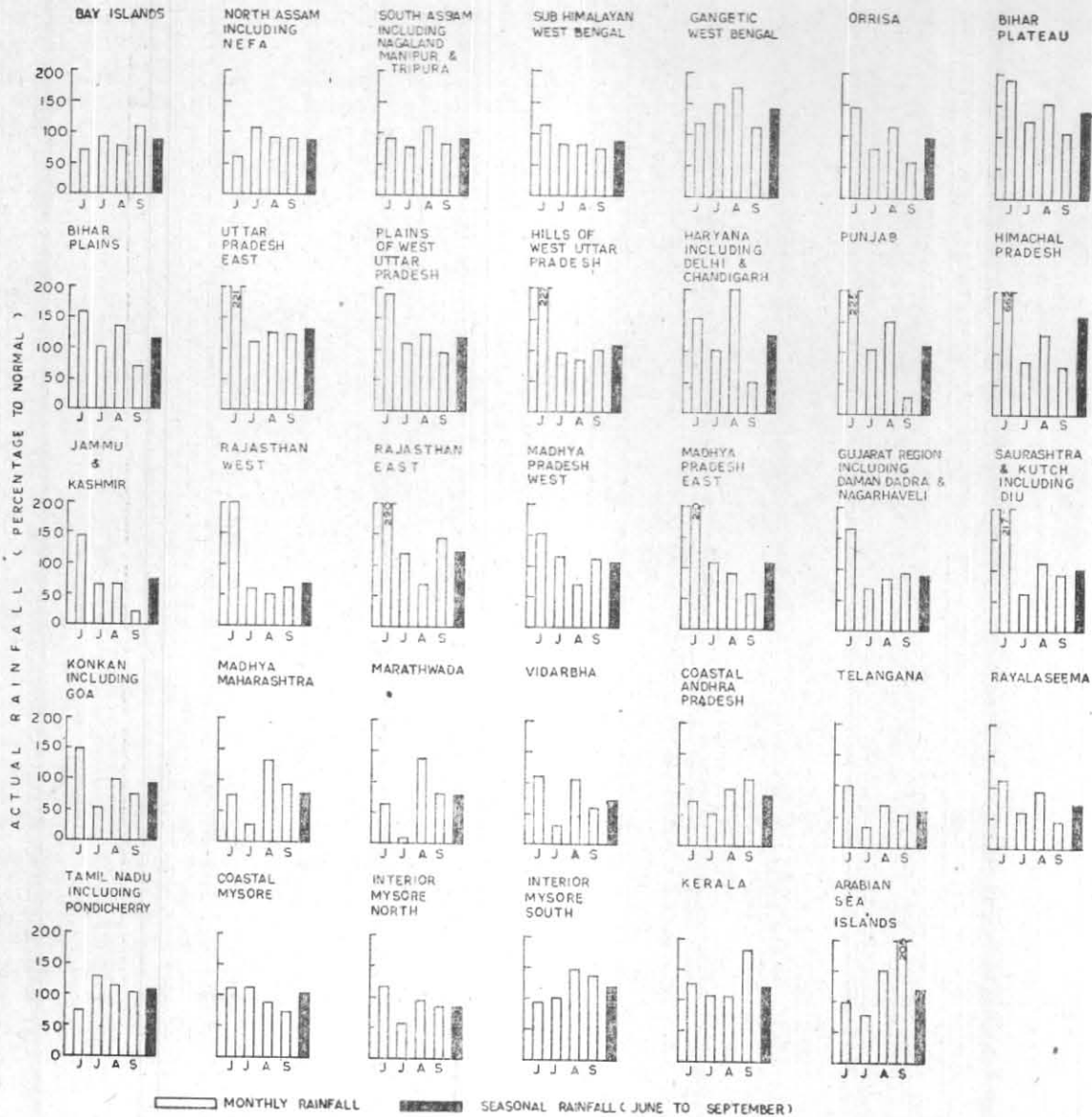


Fig. 3

Progress of monsoon month by month, June to September 1971

JULY

The southwest monsoon advanced into Jammu and Kashmir on 2 July and thereby covered the entire country by this date.

Two depressions moved westnorthwestwards across Gangetic West Bengal, Bihar State, Uttar Pradesh and adjoining north Madhya Pradesh during the latter half of July. Two low pressure areas also moved westwards across Bihar and Uttar Pradesh in the first week. Under the influence of these systems the monsoon was active in Gangetic West Bengal, Bihar State, Madhya Pradesh and east Uttar Pradesh on many days during the month and in

Orissa, Punjab, Haryana and east Rajasthan on a few days. This led to excess of rainfall in Gangetic West Bengal, Bihar Plateau, east Madhya Pradesh and east Uttar Pradesh for the month. The monsoon was also active in coastal Mysore on many days and in Gujarat State, Konkan and Kerala on a few days in the second fortnight, mainly in association with a trough of low pressure that lay along and off the west coast. Floods were reported from many districts in West Bengal, Bihar State and east Uttar Pradesh and in some parts of Orissa, Assam, north Madhya Pradesh, Gujarat State and east Rajasthan during this month. The worst affected areas were

Bihar and West Bengal. Trichur and Kottayam districts in Kerala were also affected by floods.

The monsoon was weak in the interior parts of Maharashtra State, north Interior Mysore, Telangana and Jammu and Kashmir during most of the month and in Rajasthan, Gujarat State and west Madhya Pradesh in the first fortnight. As a result of scanty rainfall the interior parts of Maharashtra, some parts of Andhra Pradesh and north Interior Mysore were reported to be in the grip of drought and scarcity conditions.

Ten western disturbances moved eastwards across the Western Himalayas as feeble troughs or weak cyclonic circulations in the lower troposphere. They caused good rainfall in Himachal Pradesh and the hills of west Uttar Pradesh but only scattered or isolated rainfall in Jammu and Kashmir. Floods

were reported from Almora, Uttar Kashi and Pithoragarh districts in west Uttar Pradesh. The floods in the *Beas* and the *Sutlej* affected some areas of Amritsar, Jullundur and Kapurthala districts in Punjab.

The principal amounts of very heavy rainfall (20 m and above) during this month were :

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
1	Dalhousie	20	19	Umria	24
4	Pilibhit	22	20	Agumbe	34
12	North Lakhimpur	26		Satna	22

AUGUST

There was good monsoon activity in many parts of north India during this month under the influence of the following systems.

(i) A low pressure area which moved from Gangetic West Bengal to east Uttar Pradesh between the 3rd and the 5th.

(ii) A depression that moved from northwest Bay to east Uttar Pradesh between the 7th and the 10th.

(iii) A low over south Uttar Pradesh from the 12th to 15th which moved northwards to the hills of west Uttar Pradesh by the 17th.

(iv) A cyclonic circulation extending upto the middle troposphere that moved from Gangetic West Bengal to south Uttar Pradesh between the 19th and 23rd.

(v) A well marked low over central Madhya Pradesh on the 28th and 29th. It concentrated into a depression on the 30th and moved to north Madhya Pradesh on the 31st with its centre close to Satna.

(vi) The eastern part of the monsoon trough was close to the foot of the Eastern Himalayas for a few days in the second fortnight.

The monsoon was vigorous in Gangetic West Bengal on the 20th, 29th, 30th and 31st and active for about 10 days during the rest of the month. The monsoon was also vigorous in Vidarbha on the 30th and 31st and active for about a week to 10 days in Bihar State, Orissa, Uttar Pradesh and

Madhya Pradesh. It was active in Haryana on the 14th and 15th. The activity in Uttar Pradesh was confined mostly to the first fortnight, while in Madhya Pradesh, it was confined to the second fortnight.

Seven western disturbances moved eastward across the Western Himalayas as feeble upper air troughs or cyclonic circulations during this month. The western end of the monsoon trough lay close to the foot of the Western Himalays from the 1st to 9th and again from the 17th to the 20th. In association with these systems, there was good monsoon activity in the eastern Himalayas and the adjoining plains during the period from the 1st to the 10th and from the 17th to the 24th. The monsoon was vigorous in Punjab and Haryana on the 2nd and 3rd.

According to press reports, heavy rain in the Western Himalayas caused breaches and landslides on the roads linking Simla with Kalka and Badrinath with Kedarnath. Floods were also reported from the northern districts of Punjab and some parts of Haryana and Jammu region. Heavy damage to fruit and rabi crops was reported from Mahasu district of Himachal Pradesh. The flood situation continued to be serious in West Bengal, in Bihar and in some parts of Uttar Pradesh during this month, resulting in heavy damage to crops and other property. A few hundreds of people lost their lives in these areas. Malda town in West Bengal was completely cut off by flood

waters for a number of days, while the Barauni industrial complex, Patna, Monghyr and Khagaria towns were also seriously affected by floods. Floods were also reported from Cuttack and Balasore districts in Orissa. The monsoon was generally weak over most parts of the Peninsula from the 1st to the 12th. In association with a trough of low that lay off the west coast from the 12th to 15th, the monsoon was vigorous in Kerala on the 13th, active to vigorous in coastal Mysore and active in Konkan on the 14th and 15th. But the interior parts of the Peninsula continued to have deficient rainfall upto about the 20th. The monsoon was active to vigorous in many parts of the Peninsula during the last 10 days in association with a trough that persisted off the west coast and a few low pressure systems that moved across the Peninsula.

Good rainfall in interior Maharashtra, Interior Mysore and Andhra Pradesh in the latter half of the month relieved the drought conditions that were prevailing there during July and the first half of August. Heavy rain in Mangalore on the 13th and

14th inundated many parts of the town and caused many houses to collapse. Heavy rain in Kerala caused floods in some parts of Cannanore and Calicut districts. Low lying areas were flooded and road communications were disrupted in Marathwada due to heavy rain in the last week.

The amounts of very heavy rainfall (20 cm and above) during the month were :

Date	Station	Rain-fall (cm)	Date	Station	Rain-fall (cm)
1	Faizabad	21	29	Broach	26
7	Bilaspur	23	30	Uluberia	26
8	Chandbali	22		Gondia	23
11	Agumbe	21		Mahabaleshwar	23
14	Bangalore	20	31	Veraval	21

SEPTEMBER

There was good monsoon activity in north and central India during the first 10 days of the month in association with the following systems :

(i) A depression which lay over north Madhya Pradesh, with its centre close to Satna on 31st August, moved northwards to west Uttar Pradesh and weakened by 3 September.

(ii) A quasi-stationary low over northeast Rajasthan and adjoining Haryana from the 4th to the 6th.

(iii) A low pressure area that moved from north Orissa to central Bihar between the 3rd and 7th, and thence to central Uttar Pradesh by the 8th. Subsequently, it moved northwards and broke up over the Himalayas.

The monsoon was active in Uttar Pradesh and Madhya Pradesh on most days, and in Orissa, Gangetic West Bengal, Bihar State, Haryana and east Rajasthan on a few days during the period from 1st to 10th.

As a result of heavy rain in the various parts of north India during the first 10 days, the flood situation in Uttar Pradesh, Bihar and West Bengal worsened and continued to be grave. The districts of Lucknow, Jaunpur, Sultanpur and Azamgarh in Uttar Pradesh were particularly hit during this period. Large areas of Lucknow and Jaunpur cities

were submerged by flood waters. A large number of houses collapsed in Uttar Pradesh causing some loss of life. Floods were also reported from some parts of Madhya Pradesh and east Rajasthan.

Five western disturbances affected the extreme northwestern parts of India during this month. Heavy rain in the hills of west Uttar Pradesh caused floods in Nainital, Pilibhit and Rampur districts in northwest Uttar Pradesh.

The southwest monsoon withdrew from west Rajasthan on the 13th, and from the rest of northwest India, Uttar Pradesh, west Madhya Pradesh and Gujarat State by the 29th. Its withdrawal from west Rajasthan was about a week later than the normal date of withdrawal from this area. Its withdrawal from Gujarat State and the rest of northwest India was near about the normal date, while the withdrawal from west Uttar Pradesh and west Madhya Pradesh was about a week ahead, and from east Uttar Pradesh about a fortnight ahead of the normal date. The monsoon did not withdraw further from north India during the rest of the month. It was, however, generally weak in east Madhya Pradesh and northeast India from the 12th till about the end of the month.

A low pressure area, which moved from the Andaman Sea to Madhya Pradesh and adjoining

Maharashtra across Orissa during the period from the 18th to 23rd, caused widespread rain in the Bay Islands, Orissa, Gangetic West Bengal and Bihar Plateau and scattered thundershowers in Madhya Pradesh on a few days during this period. A depression which formed in the central Bay on the 27th, moved northwards, intensified into a severe cyclone over the north Bay and struck the West Bengal coast on the 29th evening. It caused many houses to collapse in the coastal districts of West Bengal. The death toll was reported to be about 60. Calcutta experienced gales reaching 100 to 120 kmph on the 29th evening and reported a record negative pressure departure of 26 mb.

The monsoon was generally weak over north Peninsular India during the first three weeks and over the south Peninsula in the first week. In association with a north-south oriented trough extending to 1.5 km, and a complex system of low

pressure areas that lay over the Peninsula during the second fortnight there was an excess of rainfall in the south Peninsula in the second fortnight and in the north Peninsula in the last week.

The southwest monsoon withdrew from east Madhya Pradesh and Maharashtra State on 9 October and from northeast India and north Andhra Pradesh by 12 October and was confined to the south Peninsula thereafter.

The amounts of very heavy rainfall (20 cm and above) over the country during September were :

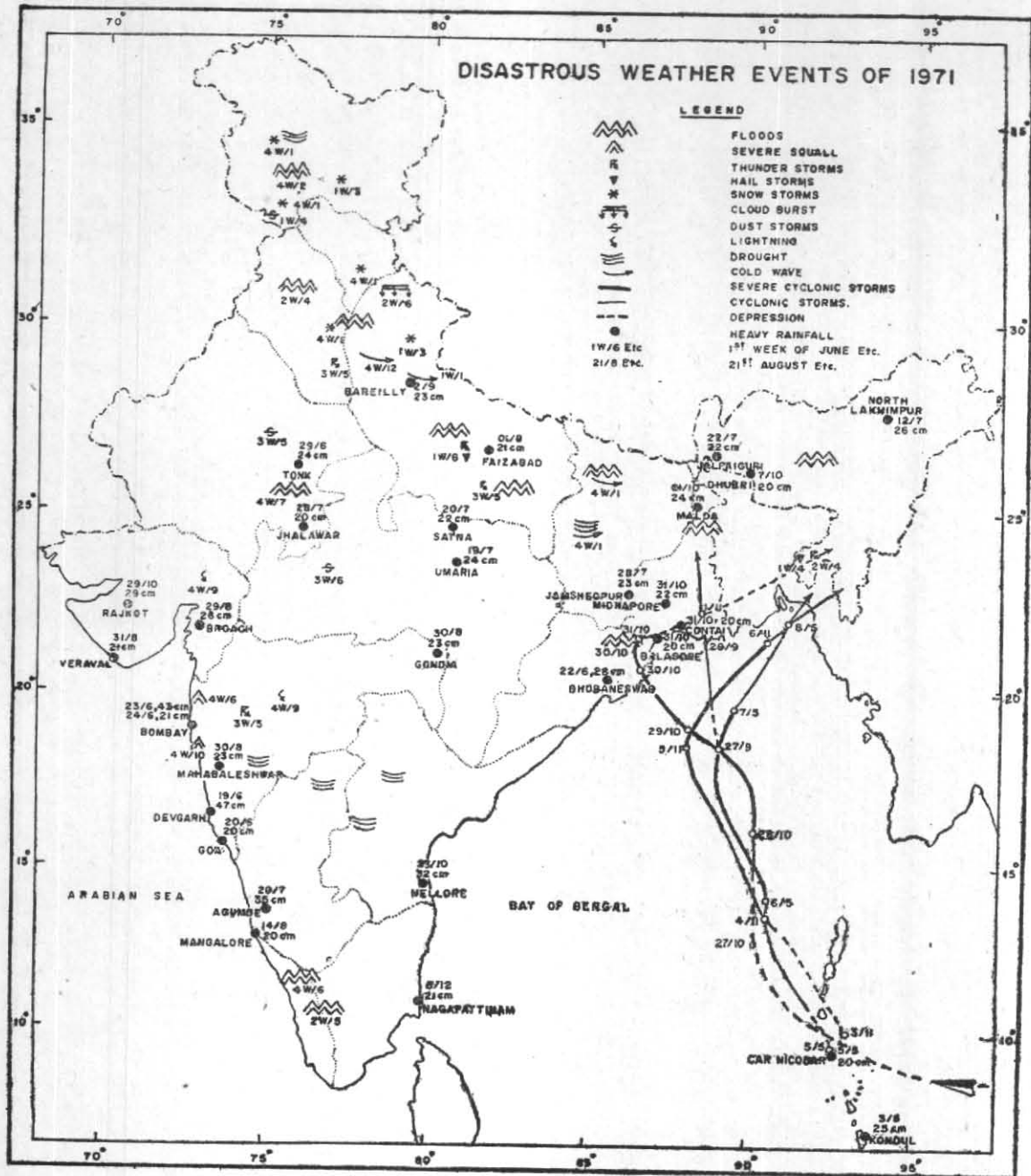
Date	Station	Rainfall (cm)
2	Bareilly	23
8	Vidisha	28
10	Pilibhit	26

ERRATA

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Foot Note on p. 608

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Details of disastrous weather events of 1971

Disastrous Weather Events of 1971

Every year some part of the country or the other experiences spells of unusually adverse weather conditions which bring disaster and misery to large sections of the community by disrupting the normal life and economy. Some of the phenomena that come under this category are : cyclonic storms striking the coastal areas, floods, droughts, duststorms, heavy rain or snowfall, sudden cloud bursts, heat waves, cold waves, severe hail storms, thundersqualls, lightning etc.

The map presents in pictorial form, the areas and time of occurrence of such disastrous weather events during the year 1971.

The details of the disastrous weather events during 1971 are given below.

Cyclonic Storms

During this year, four cyclonic storms developed in the Bay of Bengal within a period of about 6 weeks, i.e., from the end of September to the first week of November. Of these, the most destructive one struck the Orissa coast on the early morning of 30 October and caused very severe damage to life and property. Its genesis was as a depression in the south central Bay of Bengal on 27 October. It intensified into a severe cyclonic storm on 29th, and at the time of crossing the Orissa coast it was reported that it had a maximum wind speed of about 150 km/hour, accompanied by a tidal wave 5-m high. While crossing the coast near Paradip it wrought unprecedented havoc in the coastal districts of Orissa and parts of Bengal. About 10,000 people were reported to have lost their lives, and more than one million rendered homeless. The damage to crops and other properties was estimated to be a few crores of rupees.

Another severe cyclone which struck the West Bengal coast on 29 September caused thousands of houses to collapse and took a toll of about 60 human lives. Calcutta experienced gales of 100 to 120 km/hour. In the third week of June, Bhubaneswar in Orissa, was affected by cyclone and torrential rains bringing normal life to a standstill.

Floods/Heavy Rain

In the last week of February, Jammu and Kashmir experienced heavy rains, snowfall and landslides causing disruption to traffic and communications.

Heavy rains with high winds in the second week of May in Kerala's Trichur district, caused considerable damage to property like plantain and coconut groves, and disrupted traffic and communications.

In June, heavy rains accompanied by floods affected several parts of Uttar Pradesh, Assam, Bihar, West Bengal and Kerala causing loss of life and damage to crops worth crores of rupees and breakdown of normal traffic and communication. Due to the change of course by some rivers (like the *Kali* river) thousands of people were rendered homeless. Exceptionally heavy rainfall was recorded at Bombay on 23 June (43.4 cm).

In the first week of July, flooded *Gandak* washed away 600 feet of railway embankment at Mattatia adjoining Chitanniband and about a dozen villages.

In the month of July, floods affected many parts of Assam, Orissa, West Bengal and Bihar, the most prominent being the Bihar floods. Loss of life was reported. Several villages were washed away rendering thousands of people homeless. Crops and fertile land worth several crores of rupees were reportedly destroyed.

In the first and second week of August, flooded rivers in Uttar Pradesh, Bihar and Assam caused further havoc with damage to life and property. Moderate floods also affected Madhya Pradesh, Punjab, Haryana and West Bengal States.

In the last fortnight of August, floods again affected several parts of Bihar, Uttar Pradesh, West Bengal and Himachal Pradesh causing loss of life, property and crops. Parts of Maharashtra were also moderately affected by floods preceded by heavy rains.

In the first two weeks of September, floods in *Ganga*, *Kosi* and *Gomti* rivers affected parts of Uttar, Pradesh West Bengal and Bihar.

In the last week of September, floods of moderate intensity affected parts of Bihar and Maharashtra.

Assam and surrounding areas were affected by floods in the 2nd week of October causing disruption of traffic and communication and loss of life. Several thousands of people were rendered homeless.

On the whole, during this year, Uttar Pradesh, Bihar, Orissa and West Bengal were very seriously affected by floods. According to official reports, 1025 human lives were lost and property worth Rs. 596-crores was damaged in floods, making this year the most flood-stricken year since 1954. The total population in the country affected by floods was estimated as 57 million and the total area affected as 12.5 million hectares, including a cropped area of 5.87 million hectares.

Thunderstorms, Hailstorms and Squalls

In the first and second week of April, heavy thunderstorms and hailstorms affected Tripura disrupting the power supply in and around Agartala.

In the third week of May, parts of Maharashtra and the cities of New Delhi and Allahabad were lashed by thunderstorms followed by heavy rain causing damage to roads, standing crops, mango gardens and even involving loss of life.

In the first week of June, parts of Uttar Pradesh were affected by thunderstorms followed by hailstorms causing damage to fruits and standing crops reported worth crores of rupees.

In the last week of June, squally winds affected Bombay suburbs and Calcutta City.

In the fourth week of October thunderstorms and squalls uprooted a number of trees and blew off roofs of huts and caused power failure in some parts of Bombay City and suburbs.

Duststorms

During the first week of April, Jammu and surrounding areas were affected by duststorm followed by squalls and heavy rain, causing breakdown of traffic and communications.

In the third week of May, several parts of north and central India were affected by duststorms

which caused considerable inconvenience to the public.

Snowstorms

In the last two weeks of January, heavy snowfall affected parts of Himachal Pradesh, Jammu and Kashmir and Kumaon hills, disrupting normal traffic.

During the first week of March, several border districts in Kashmir and parts of Uttar Pradesh were also affected by snowstorms.

Droughts

The delay in the winter rains during the year adversely affected crops in parts of the country. The untimely rains in May over Uttar Pradesh and Bihar also damaged *rabi* crops like wheat.

Drought conditions prevailed in all the 21 districts of Andhra Pradesh, a portion of Maharashtra (Marathwada region and western Maharashtra) and parts of Mysore and Assam owing to the failure of the monsoon in these regions.

Cloud burst

Cloud bursts in the second week of June affected 20 villages in the 18 kilometre mountain belt between Nandaprayag and Ghat in the Chamoli district, involving loss of life and property and causing damage to farm land.