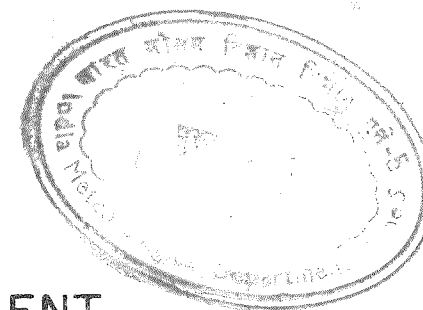
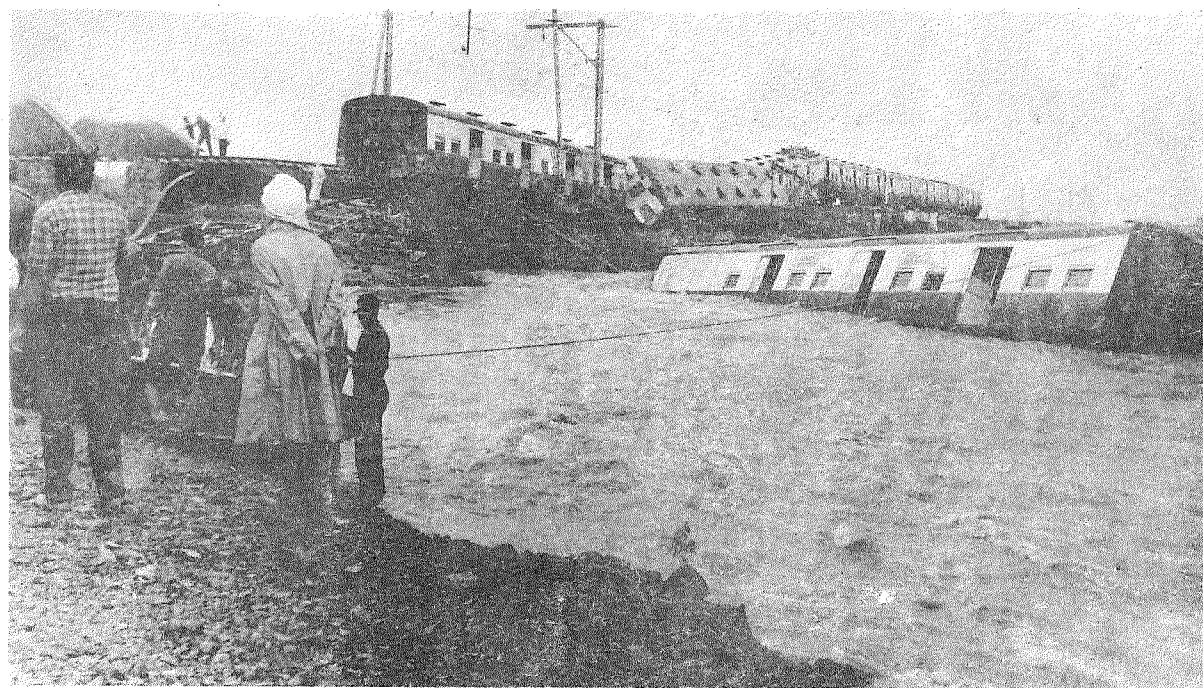


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INDIA METEOROLOGICAL DEPARTMENT DISASTROUS WEATHER EVENTS , 1989



ISSUED BY
ADDITIONAL DIRECTOR GENERAL OF METEOROLOGY
(RESEARCH)

Cover Photo : A bridge collapsed due to heavy rains on the
24th July 1989 near Wadgaon on Pune - Bombay
railway track resulting in two bogies of local
train drowned.

Courtesy : Daily "Tarun Bharat", Pune.

Printed at Rotaprint, India Met. Dept., Pune-5.

P R E F A C E

The year 1990 marks the beginning of the International Decade for Natural Disaster Reduction (IDNDR). The present publication entitled, "Disastrous Weather Events" is brought out annually by the India Meteorological Department, is of direct interest to the objectives of the programme. It gives information regarding disasters due to snowfall, coldwave, heatwave, drought, squall, gale, duststorm, lightning, thunderstorm, hailstorm, floods and heavy rains and cyclonic storms. These reports are helpful for risk assessment and may be useful for natural disaster mitigation in the country.

The publication has been prepared by the Investigation and Development division of the Office of Additional Director General of Meteorology (Research), Pune. I express my sincere thanks to all the officers and the supporting staff who have contributed to the compilation of the report.

Pune

1990

(Dr. H.N. Srivastava)
Additional Director General of
Meteorology (Research)



DISASTROUS WEATHER EVENTS OF 1989

The most striking disastrous weather events in 1989 were the following :

- i) Two severe cyclonic storms with cores of hurricane winds in the Bay of Bengal during 23rd to 27th May and 4th to 9th November took a toll of 110 human lives and 8147 cattleheads in Andhra Pradesh, Orissa and West Bengal.
- ii) Severe flood conditions prevailed over large areas of Andhra Pradesh, Assam, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Maharashtra, Orissa, Uttar Pradesh and West Bengal and took a toll of over 1400 human lives. Over Maharashtra alone, the death toll was about 900.
- iii) Severe cold wave condition prevailed over Bihar State during December. It took a toll of 87 human lives in Bihar.
- iv) Severe heat wave condition prevailed over Vidarbha during May and took a toll of 20 human lives.

The summary of these natural hazards is based on the various reports of the India Meteorological Department and press information. The figures for estimated losses are as per the press reports. The areas affected by the adverse weather phenomenon are depicted seasonwise on four maps.

I N D E X

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S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - 1 : SNOWFALL

CRITERIA

Moderate : 7.6 to 34.9 cm in 24 hrs.

Heavy : \geq 35.0 cm in 24 hrs.

1.	1-8 Jan.	Himachal Pradesh	Heavy	(i) Chamba, Kinnaur, Lahul-Spiti and Shimla districts worst affected. In Pangti valley, the heaviest snowfall reported. (ii) Minimum temperature of -30°C reported in Lahul-Spiti district. All the lakes and rivers in Lahul-Spiti frozen. (iii) In Shimla 500 people reported stranded for three days at Chopal. (iv) Fortnightly helicopter service between Pangti-Pathankot suspended.
2.	16. Feb.	(a) Chamba, Kulu and Lahul-Spiti (b) Jammu and Kashmir	Heavy Heavy	(i) Vehicular traffic on Hindustan-Tibet road suspended. (ii) Shimla bound Vayudoot flight suspended. National highway closed for vehicular traffic due to heavy snowfall.
3.	19 Feb.	Darjiling	Heavy	(i) Normal life completely paralysed. (ii) Vehicular traffic disrupted.
4.	20 Feb.	Kinnaur, Lahul-Spiti and Shimla	Heavy	(i) Normal life completely paralysed. (ii) In Shimla city, water pipes burst at several places.
5.	14 Mar.	Chamba, Kinnaur and Lahul-Spiti	Heavy	Normal life paralysed.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
6.	27 Mar.	Jammu and Kashmir	Heavy		Jammu-Srinagar national highway blocked due to landslides, near Ramban.
7.	Dec. (4th week)	Shimla	Heavy	8 persons killed.	Shimla district remained cut off from rest of the country for 5 days.

TABLE - II : COLD WAVE

CRITERIA

Moderate : Night temperature 6 to 7°C below normal.

Severe : Night temperature below normal by 8°C or more.

1.	3 Jan.	(a) Chandigarh	Severe	One person killed.
		(b) Shimla	Severe	6 persons killed.
2.	8-15 Jan.	Rajasthan	Severe	10 persons died of which 4 from Udaipur and 2 from Bharatpur.
3.	9-11 Jan.	(a) Amritsar and Gurdaspur	Severe	2 persons died.
		(b) Shimla	Severe	7 persons died.
4.	13-16 Jan.	(a) Aurangabad, Gaya, Hazaribag, Madhubani, Muzaffarpur, Nawada, Samastipur, Saran and Vaishali	Severe	82 persons died out of which 24 in Saran district alone.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
		(b) Medinipur and South 24 Parganas	Severe	7 persons died of which 5 from Sagar-deep of South 24 Parganas.	
5.	16 Jan.	Ratnagiri	Severe	One person died and 5 other fell sick at Shimpoli.	
6.	16 & 17 Jan.	Chamba, Kinnaur and Lahul-Spiti	Severe		Most of the region experienced severe coldwave condition and minimum temperature fell down to -10°C to -20°C
7.	19-26 Jan.	(a) Chandigarh	Severe	4 persons died.	
		(b) Himachal Pradesh	Severe	One person died.	(i) Kinnaur and Lahul-Spiti districts worst affected. (ii) In the entire tribal belt minimum temperature remained below -15°C.
		(c) Punjab	Severe	3 persons died.	(i) Amritsar district worst affected. (ii) Night temperature in the range of 5° to 8°C below normal.
8.	29 & 30 Jan.	Chamba, Kinnaur and Lahul-Spiti	Severe		Minimum temperature in the range of -8° to -12°C reported.
9.	Feb. (2nd week)	Haryana	Severe	2 persons died.	
10.	11 Dec.	Vidarbha	Severe	One person died.	
11.	19 Dec.	Nagpur	Severe	One person died.	
12.	27-31 Dec.	Bihar	Severe	87 persons, of which 25 from Sitamarhi and 23 from Hazaribag district, died.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - III : HEAT WAVE

CRITERIA

Moderate : Day temperature 6 to 7°C above normal.

Severe : Day temperature above normal by 8°C or more.

1.	25 Apr.	Medinipur	Severe	One person died.	Normal life paralysed as the day temperature risen to 44°C.
2.	10-31 May	Rajasthan	Severe	9 persons died in different parts of the state.	
3.	15 May	Bolangir	Severe	One person died and another hospitalised due to sunstroke.	
4.	16 May	(a) Akola	Severe	2 persons died.	
		(b) Bangalore	Severe	One woman, a youth and a 8 year old girl died.	
		(c) Bhavnagar	Severe	3 persons died.	
		(d) Vidarbha	Severe	15 persons died due to sunstroke.	
5.	26 May	Uttar Pradesh	Severe	8 persons died.	
6.	30 May	Wardha	Severe	One person died at Devali.	
7.	5 Jun.	Jodhpur	Severe	One person died.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - IV : DROUGHT

KERALA

1.	Feb. to May	Idukki, Pathanamthitta, Wynad and some parts of Palakkad			<p>(i) 60 percent loss in crop reported in the month of April alone.</p> <p>(ii) Damage of cash crops, especially tea, cardamom, coffee and pepper reported. 3 million kgs saleable tea worth about Rs. one crore destroyed in Idukki district.</p> <p>(iii) The water level in reservoirs reduced to such an extent leading to acute shortage of power.</p> <p>(iv) Acute shortage of drinking water reported.</p>
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ORISSA

1.	Apr. to May	Entire state			<p>(i) Ganjam, Kalahandi, Phulbani, Puri, Sambalpur, Sundargarh districts and also 33 tribal villages in Koraput district worst affected.</p> <p>(ii) All ponds and reservoirs dried up. Tel river also completely dried up.</p> <p>(iii) About 15% of the existing tubewells in Ganjam, Kalahandi, Koraput and Phulbani districts dried up.</p>
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TAMIL NADU

1.	Mar.	Madras			<p>(i) Madras city worst affected. In some localities ration cards issued to collect water from local supply points.</p> <p>(ii) Water supply was made on alternate days due to limited storage in Poondi, Cholavaram and Red Hills reservoirs.</p> <p>(iii) Wells dried up and the taps reduced to a trickle.</p>
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S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - V : SQUALL

CRITERIA

Moderate : Surface wind speed (in gusts) upto 80 kmph.

Severe : Surface wind speed (in gusts) \geq 80 kmph.

1.	25 Mar.	Amravati and Nagpur	Severe		(i) Wheat grains and orange crop worst affected. (ii) Large number of roof-tops blown away. (iii) Power supply/telecommunication link completely disrupted.
2.	13 May	Cuttack	Severe	(i) 5 persons died and 10 other injured. (ii) 25 cattleheads perished.	(i) 217 villages affected. (ii) 91 houses completely and 1377 houses partially damaged. (iii) 121 Govt. Institutions badly damaged. (iv) Coconut, mango and betel plantation extensively damaged.
3.	17 May	(a) Bolangir	Severe		(i) Large number of roof tops blown away. (ii) 87 electric/telephone poles either uprooted or twisted.
		(b) Sambalpur	Severe	One woman died and 12 other injured when a tree fell on them.	(i) Several trees uprooted. (ii) Large number of electric poles uprooted/ twisted disrupting complete power supply.
4.	18 May	Madras	Severe	A 50 year old woman died and 23 other seriously injured when a compound wall of a cinema house collapsed.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
5.	30 May	Kendujhar	Severe	2 persons died and 7 others injured.	(i) Hundreds of houses including 7 buildings of different Govt. offices and one school building damaged. (ii) Several trees uprooted.
6.	3 Jun.	Cuttack	Severe	One person died in a wall collapse at Tikarpara Village.	

TABLE - VI : GALE

CRITERIA

Strong : Wind speed \geq 75 kmph.

1.	10 Mar.	Thiruvananthapuram	Strong		Extensive damage to property and agriculture reported.
2.	4 Apr.	Hassan	Strong	(i) Large number of roof tops blown off. (ii) Coconut, Jackfruit and Plantain trees damaged. (iii) Property worth lakhs of rupees destroyed.	
3.	18 and 19 Apr.	Cochi, Kollam, Kozhikode, and Thrissur	Strong		Extensive damage to agriculture product reported.
4.	20 Apr.	Dibrugarh	Strong		Power & Telecommunication systems completely disrupted.
5.	7 May	Palakkad	Strong		Extensive damage to crop and property reported.
6.	9 May	Cannur	Strong		Damage to property and agricultural product reported.
7.	14 May	Wynad	Strong		Agricultural crop and property damaged at Mananthody and Mankulam villages.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - VII : DUSTSTORM

CRITERIA

Moderate : Wind speed between 39 to 74 kmph and horizontal visibility upto 500 metres.

Heavy : Wind speed \geq 75 kmph and horizontal visibility upto 50 metres.

1.	23 Apr.	Jaipur	Severe		(i) Large number of advertising hoardings damaged. (ii) Vehicular traffic completely disrupted.
2.	6 Jun.	Bikaner and Ganganagar	Severe	5 persons died in Suratgarh tahsil of Ganganagar district.	(i) Roof tops of several houses collapsed. (ii) Electric/Telegraph poles damaged. (iii) Vehicular traffic completely disrupted.

TABLE - VIII : LIGHTNING

1.	29 Mar.	Cuttack	One person died and 2 others seriously injured at Kankaradia village.		
2.	27 Apr.	Medinipur	One student died and another injured in Bakolsa village.		
3.	29 Apr.	Haora	3 persons died and one injured.		
4.	11 May	Kodagu	3 members of a family died when the lightning struck at Hanakodu village.		

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
5.	18 May	Cuttack		2 girls died and 2 others injured at Kainthapala village, under Rajkonika block.	
6.	31 May	Kolhapur		One person electrocuted at Kavane village.	
7.	4 Jun.	Srinagar		4 persons died in the outskirts of the city.	
8.	7 Jun.	(a) Baramula		3 persons died at Bosianjbahale, a nearby place of the city.	
		(b) Thane		6 persons died and 11 others injured.	
9.	11 Jun.	Yavatmal		4 persons died at different places.	
10.	14 Jun.	Amravati		One woman electrocuted at Daryapur village.	
11.	15 Jun.	Chamba		3 persons died.	
12.	28 Jun.	Amravati		3 women electrocuted at Tembhurna village.	
13.	6 Jul.	(a) Calcutta		One person injured.	
		(b) Hassan		8 persons died and a cow perished.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
		(c) Puri		One man and a woman died and 2 others seriously injured at Aruanha village.	
14.	7 Jul.	Bhandara		A couple died due to electrocution at Adyal village.	
15.	8 Jul.	Bhandara		4 persons died due to electrocution while standing under a tree at Metewani village.	
16.	13 Jul.	Dharwad		(i) One person electrocuted at Kancharagatti village near Haveri. (ii) 2 buffaloes perished at Panigatti.	
17.	29 Jul.	Bankura		6 persons died and 2 others seriously injured.	
18.	7 Aug.	Cuttack		2 persons died and 2 others injured due to electrocution while working in the field at Hatakaranda village.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
19.	9 Aug.	Cuttack		(i) 7 persons died and 6 others injured. (ii) 2 bullocks perished.	
20.	22 Aug.	Yavatmal		3 persons died.	
21.	26 Aug.	Cuttack		11 persons injured.	
22.	30 Aug.	Baleshwar		One girl died at Bala village and 2 others injured at Jaleshwar.	
23.	12 Sep.	Bolangir		2 children electro- cuted.	
24.	28 Sep.	Sambalpur		3 children died and 6 other persons injured at Dhubenchhapal village.	
25.	24 Dec.	Jammu			Power supply of Jammu city completely paralysed as lightning damaged several transformers.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
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TABLE - IX : THUNDERSTORM

CRITERIA

Moderate : Loud peals of thunder with frequent lightning flashes, moderate to heavy rains and maximum wind speed 29 to 74 kmph.

Severe : Continuous thunder and lightning, heavy rains and maximum wind speed \geq 75 kmph.

1.	25 Mar.	Nagpur	Severe		(i) Standing wheat, gram and orange crop badly damaged. (ii) Power and telecommunication systems completely disrupted.
2.	25 & 26 Mar.	Jalgaon	Severe	6 persons including 5 women died and 2 others injured at Bhodgaon village when a tree fell on them.	(i) Several roof tops of many houses blown off. (ii) Many trees, electric and telephone poles uprooted.
3.	27 Mar.	(a) Puri	Severe	2 persons died and 3 others seriously injured at Bhapur.	(i) Hundreds of thatched houses blown off. (ii) Many trees uprooted. (iii) Electric and telephone lines snapped at several places disrupting power and communication systems.
		(b) Vidarbha	Severe		Extensive damage to standing crop reported.
4.	3 Apr.	Hassan	Severe		(i) Several tile-roofs blown away. (ii) Hundreds of Banana, Coconut and Jack-fruit trees razed to ground.
5.	4 Apr.	Coorg	Severe	8 persons died and 22 others injured.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
6.	27 Apr.	Haora	Severe	A woman and a boy died when a tree fell on them at Sibpur thana.	
7.	29 Apr.	(a) Hugli	Severe	7 passengers reported missing when a boat carrying them capsized.	
		(b) Nadia	Severe	(i) 4 passengers died on the spot and 5 others injured at Birahi Bazar of Haringhata when a banyan tree fell on a car in which they were travelling. (ii) 7 persons seriously injured in a house collapse at Gobindpur.	
8.	2 May	(a) Bangalore	Severe	(i) One year old child died and 2 other children injured when the asbestos roof top of a house fell on them. (ii) One watchman injured.	
				(i) 2 cars and a scooter damaged.	
				(ii) 2 hoardings of a theatre blown off.	
				(iii) Several trees uprooted.	
				(iv) Electric/telecommunication services completely disrupted.	

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
		(b) Kendujhar	Severe	One person killed at Champua.	
9.	8 May	Cannur	Severe	4 fishermen died.	(i) About 500 houses either fully or partially damaged. (ii) Extensive damage to property and agricultural products reported.
10.	9 May	Pathanamthitta	Severe		Extensive damage to property and agriculture reported.
11.	11 May	Bangalore	Severe		(i) Roof-top of an agricultural co-operative society building at Shunkoppa blown off resulting loss of property worth Rs. 50,000/-. (ii) Large number of trees uprooted disrupting vehicular traffic.
12.	15 May	(a) Calcutta	Severe	One person died.	Electric/telecommunication system completely disrupted.
		(b) Haora	Severe	4 persons died and 12 others injured in various incidents of house collapse.	Electric/telecommunication system completely disrupted.
13.	16 May	Palakkad	Moderate		Crops and property in Paddoor and Thenilapuram villages affected.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
14.	17 May	Bangalore	Severe	(i) A woman killed when a roof top fell on her. (ii) 15 persons injured when tent of a touring cinema collapsed at Audugudue.	(i) Hundreds of trees uprooted. (ii) Low lying area of the city inundated by rain water.
15.	10 Jun.	Lucknow and Sultanpur	Severe	9 persons died.	
16.	12 Jun.	Yavatmal	Severe	One woman died due to roof collapse.	
17.	27 Jun.	Yavatmal	Severe	2 women together with 2 children reported died in a house collapse at Bori Aran village.	
18.	22 & 23 Jul.	Puri	Severe	One student killed and 50 others including teachers injured, when a school building at Orei village, collapsed.	(i) 8 villages affected. (ii) 115 private houses and five public institutions either fully or partially damaged. (iii) Large number of trees uprooted.
19.	29 Jul.	(a) Calcutta	Severe		Compound wall of National Library damaged when a big tree fell on it.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
		(b) Jalpaiguri	Severe	(i)	Embankments of Chel and Teesta rivers damaged.
				(ii)	Embankment of Pagli in Pagli Bhutta cracked.
20.	27 Aug.	Jorhat	Severe	(i)	Several houses damaged.
				(ii)	100 trees uprooted snapping telephone/ electric lines.
				(iii)	Heavy damage of 11 KV and 33 KV feeder of Assam State Electricity Board reported.

TABLE - X : HAILSTORM

CRITERIA

Slight : Sparse, usually small in size and often mixed with rain.

Moderate : Fall abundant enough to whiten ground.

Heavy : Includes atleast a proportion of large stones.

1.	9-11 Mar.	Aurangabad, Beed, Jalna, Latur, Nanded, Osmanabad and Parbhani.	Heavy	(i) 5 persons died and several others injured in Nanded and Parbhani districts. (ii) Large number of birds perished.	(i) One inch thick hail reported in Aurangabad city. (ii) Standing rabi and mango crops extensively damaged. (iii) Property worth Rs. 15.94 crores damaged. (iv) Many trees uprooted disrupting vehicular traffic.
2.	10 & 11 Mar.	(a) Anantpur	Heavy		(i) 15 villages affected. (ii) Property and crop worth about Rs 37 lakhs damaged.
		(b) Mahbubnagar	Heavy		(i) 8 villages affected. (ii) Property and crop worth about Rs 67 lakhs damaged.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
3.	11 Mar.	Fatehpur	Heavy		(i) Hailstones weighing 100-200 gms reported. (ii) Standing crop in 1000 acres of land badly damaged. (iii) Several trees uprooted disrupting vehicular traffic. (iv) Telecommunication link snapped.
4.	14 Mar.	Sonipat	Heavy		(i) 38 villages affected. (ii) Standing wheat and tur crop in 6 villages completely damaged.
5.	25-28 Mar.	Ahmadnagar, Akola, Amravati, Buldhana, Dhule, Jalgaon, Nashik, Pune and Yavatmal	Heavy	(i) 22 persons died and several others injured. (ii) Large number of cattleheads perished.	(i) Hailstones of lemon size reported. (ii) Wheat, grains and orange crop badly damaged. (iii) Orange crop worth Rs. 1 crore lost.
6.	29 Mar.	Ganjam	Heavy	(i) One woman died and 4 others injured at Banda village. (ii) Large number of cattleheads perished.	Several houses damaged.
7.	1 Apr.	Kottayam and Thrissur	Moderate		Extensive damage to property and agriculture reported.
8.	9 Apr.	Hisar	Moderate		Gram, mustard and wheat crop badly damaged.
9.	18 Apr.	Sibsagar	Heavy	One woman and a boy died.	300 dwelling houses damaged.
10.	24 Apr.	Gauhati	Moderate		Power and telecommunication services completely disrupted.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
11.	25 Apr.	Jalpaiguri	Heavy		(i) Several people rendered homeless in Alipurduar due to damage of roof tops. (ii) Power supply completely disrupted.
12.	26 Apr.	(a) Shimoga	Heavy		(i) Large number of houses damaged. (ii) Coconut and banana plantations badly damaged. (iii) Loss estimated to be worth of rupees several lakhs.
		(b) Sibsaagar	Heavy	2 persons died.	Large number of electric/telephone poles uprooted.
13.	28 Apr.	Baleshwar, Cuttack and Mayurbhanj	Heavy	(i) 10 persons died and about 100 injured in Baleshwar district. (ii) Hundreds of cattleheads perished.	(i) Hailstones weighing 200 gm to 3 kg reported. (ii) One lakh population in Baleshwar district affected. (iii) Paddy crop in 25,000 hectares of land damaged. (iv) Tile roofs of Kanpur ME school in Cuttack district damaged. (v) In Baleshwar district, mango orchards and betel plantations damaged. (vi) Large number of telephone/electric poles uprooted disrupting telecommunication and power supply completely.
14.	2 May	Nashik	Heavy	2 persons died.	
15.	5 Jun.	Shimla	Moderate		Apple crop damaged.
16.	6 Jun.	Kota	Heavy	2 persons died.	
17.	17 Jun.	Shimla	Heavy		(i) Normal life completely paralysed. (ii) Apple crop badly damaged.
18.	28 Jun.	Shimla	Heavy		(i) Apple crop damaged. (ii) Vehicular traffic on Shimla-Solan highway completely disrupted.

S.N.	Date/period	Area affected	Intensity	Casualties	Extent of damage
19.	15 Jul.	Jammu and Kashmir	Heavy		Standing crop and orchard extensively damaged.
20.	20 Dec.	Ganganagar	Heavy		Vehicular traffic completely disrupted at Sadulshar tehsil.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
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TABLE - XI : FLOODS AND HEAVY RAINS

ANDHRA PRADESH

1.	Jul.	Anantpur, Cuddapah. East Godavari. Karimnagar. Khammam, Nalgonda. Nizamabad. Prakasam, Warangal and West Godavari	Severe (Godavari and Krishna)	(i) 226 people died. (ii) Hundreds of cattleheads perished. (iii) (iv) (v)	One lakh houses collapsed. Crop in 2 lakh hectares of wetland and 1.80 lakh hectares of dryland affected. The loss estimated to be worth Rs. 297 crores. 17 minor irrigation tanks breached. IAF helicopter deployed for relief and rescue operation.
*	Whole year	Entire State		(i) 264 human lives lost. (ii) 43213 cattleheads perished.	(i) Damage to public utilities estimated to Rs 525.660 crores. (ii) Total damage to Rs 915.350 crores.

ARUNACHAL PRADESH

1.	Jun. (3rd week)	East Kameng. Tawang and West Kameng	Severe (Bichum)	16 persons died. (i) (ii) (iii) (iv)	Thousands of people rendered homeless. Number of major bridges washed away disrupting vehicular traffic on Assam-Bomdila and Tawang-Bomdila-Seppa roads. In East Kameng district. Bana bridge washed away. Border Road Task Force labour camp washed away.
*	Whole year	Entire State		(i) 24 human lives lost. (ii) 800 cattleheads perished.	Total damage was estimated to to Rs 1.520 crores.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
<u>ASSAM</u>					
1.	Jun. (2nd & 3rd week)	Barpeta. Darrang. Dibrugarh. Kamrup and Sonitpur	Severe (Brahmaputra and its tributaries)	(i)	Due to breaches of the embarkment of river Puthimari in Kamalpur circle of Kamrup district. 5000 hectares of land inundated rendering 24,000 people homeless.
				(ii)	Standing 'Ahu' paddy. 'Sali' paddy seedling and jute crop extensively damaged.
				(iii)	In Sonitpur district. 20 houses washed away affecting 400 families.
2.	Jul. to Aug. (3rd week)	Cachar. Dhubri. Dibrugarh Goalpara. Jorhat, Kamrup. Karbi-Anglong. Karimganj. Lakhimpur. Nagaon. Sibsagar and Sonitpur	Severe (Brahmaputra and its tributaries)	28 persons died. (i)	3,230 villages covering the land area of 6,38,240 hectares affected.
				(ii)	Crops in the area of 3,68,741 hectares damaged.
				(iii)	23,97,076 people affected.
				(iv)	30,457 huts damaged.
				(v)	Railway and road link between upper and lower Assam completely disrupted.
3.	Oct. (2nd week)	South Assam	Severe	(i)	Vast area of south Assam inundated by flood water rendering large number of families homeless.
				(ii)	Standing crop in Cachar district badly damaged.
*	Whole year	Entire State		(i) 34 human lives lost.	(i) Damage to public utilities estimated to Rs 223.223 crores.
				(ii) 3086 cattleheads perished.	(ii) Total damage to Rs 308.619 crores
<u>BIHAR</u>					
1.	Oct. (1st week)	Katihar and Purnia	Severe (Kosi)	(i)	600 families affected.
				(ii)	50 families rendered homeless at Maderichak and Lokhsmipur villages in Manibari block of Katihar district.
				(iii)	Vast area of standing crop submerged.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
				(iv)	Katihar-Jogbani metre gauge section of North Eastern Frontier Railway suspended.
				(v)	Train communication on Katihar-Saharsa section suspended due to inundation of about 300 feet track.
*	Whole year	Entire State		(i) 26 human lives lost.	(i) Damage to public utilities estimated to Rs 0.840 crores. (ii) Total damage to Rs 9.500 crores.
		<u>GUJARAT</u>			
1.	8 Jul.	Surat	Heavy rains	2 shepherds drowned in Tapi river.	
2.	Aug. (3rd week)	Godhra. Kheda. Sabarkantha and Vadodara	Severe (Sherdi)	(i) 4 persons including a 16 year old girl washed away in Hathamati river near Himmatnagar in Sabarkantha district. (ii) One person washed away in Savli taluka of Vadodara district. (iii) 2 persons swept away in flooded canal of Sinor taluka in Vadodara district. (iv) 450 cattle heads perished in Godhra district.	(i) In Godhra town. 500 houses and huts damaged and another 500 huts washed away. (ii) In Kheda district. 6 villages and 16 other hamlets cut off from rest of the state affecting 2,500 people. (iii) 30 metre wide road bridge between Vadodara and Godhra washed away. (iv) A bridge between Wankaner and Kadathala in Savli taluka of Vadodara district washed away. The damage estimated to be Rs. 3 lakhs. (v) In Sabarkantha district. 29 houses washed away. Damage estimated to be around Rs. 20,000.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
*	Whole year	Entire State		(i) 90 human lives lost. (ii) 2557 cattleheads perished.	(i) Damage to public utilities estimated to ₹ 1.300 crores. (ii) Total damage to ₹ 2.870 crores.
<u>HARYANA</u>					
1.	27 Aug.	Ambala	Heavy rains	One woman died and a boy injured in a house collapse.	'Grand Trunk' road damaged at several places.
*	Whole year	Entire State		(i) 1 human life lost. (ii) 1 cattlehead perished.	(i) Damage to public utilities estimated to ₹ 0.040 crores. (ii) Total damage to ₹ 0.916 crores.
<u>HIMACHAL PRADESH</u>					
1.	12-14 Jul.	Kangra and Hamirpur	Heavy rains		(i) Vehicular traffic disrupted due to landslide. (ii) Water supply and telecommunication services badly affected in Hamirpur district.
2.	22 Jul.	Hamirpur	Heavy rains		Vehicular traffic suspended due to landslide.
3.	25 Jul. to 2 Aug.	Entire state	Severe	(i) 50 persons died in a landslide about 52 Kms from Shimla on Hindustan Tibet road. (ii) 3 persons died in a Kutcha house collapsed in Shimla district.	(i) Kinnaur district cut off by road from Shimla due to major landslide. (ii) Low lying areas on the side of river bank inundated by flood water. (iii) Communication system and power supply badly affected (iv) Vayudoot flight on Delhi-Kullu route suspended. (v) 100 metre stretch of Hindusthan-Tibet road buried under the debries of boulders of rocks.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
*	Whole year	Entire State		(i) 33 human lives lost in floods. (ii) 98 cattleheads perished.	(i) Damage to public utilities estimated to Rs 62.860 crores. (ii) Total damage to Rs 164.420 crores.
		<u>JAMMU & KASHMIR</u>			
1.	25 Apr.	South Kashmir	Heavy rains	4 members of a family died and another seriously injured in a house collapse.	
2.	7 Jun.	Baramula	Heavy rains	30 people injured due to landslide near Seri. 65 kilometers from Baramula.	
3.	15 Jul.	Jammu	Heavy rains		A number of houses collapsed.
4.	29 & 30 Jul.	Jammu and Kashmir	Heavy rains	3 persons died and 3 others injured.	(i) Normal life completely disrupted. (ii) Several houses collapsed.
5.	27 Aug.	Punch	Heavy rains	12 persons died.	Jammu-Srinagar national highway closed for traffic.
*	Whole year	Entire state	-	-	-
		<u>KARNATAKA</u>			
1.	5 Jun.	Bidar	Flash flood	7 members of a family swept away in Rajola nala in Gunahalli.	

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
2.	6 & 7 Jul.	Uttar Kannad	Heavy rains	2 persons died at Machali village near Uttar Kannad-Goa border. (i) (ii) (iii)	Large number of trees uprooted disrupting power supply. Low lying areas flooded. Vehicular traffic and telecommunication services disrupted.
3.	12 Jul.	Dharwad	Heavy rains	One person died in house collapse at Shirol village in Nargund taluka. (i) (ii) (iii) (iv)	30 houses washed away in Beladadi and Sajjapur villages in Gadag taluka. 2 hay stocks washed away in Mundargi. A tank in Kadaramandalagi village in Ranabimmur taluka breached. Vehicular traffic between Mundargi and Gadag completely disrupted.
4.	133 Jul.	Kolar	Heavy rains		More than 10 houses collapsed and 76 houses damaged in Bamboo Bazar area in Srinivasapura.
5.	16 Jul.	(a) Bangalore	Heavy rains	45 years old man died due to roof collapse at Balepet.	
		(b) Bidar	Heavy rains	(i) 3 boys washed away. (ii) Several cattle-heads perished.	(i) Large quantity of food grains and fodder stock washed away. (ii) Roofs of 25 houses blown away. (iii) Flood water entered into number of houses.
6.	20-26 Jul.	(a) Hassan	Severe (Hemavathi)		(i) Large number of paddy fields submerged. (ii) Several houses damaged. (iii) Extensive damage to coffee crop reported. (iv) Large number of trees/electric/telephone poles uprooted disrupting electric and telecommunication services.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
		(b) Dakshin Kannad and Shimoga	Heavy rains	5 passengers (i) travelling in a (ii) bus from Jog (iii) falls to Mangalore injured when a tree fell on the bus.	Several houses collapsed. Large number of trees uprooted. 15 kilometers of the coastline suffered erosion in Udupi tehsil.
		(c) Kodagu	Heavy rains		(i) 255 families rendered homeless. (ii) Plantation and paddy crops submerged. (iii) Several trees and about 1000 electric poles uprooted. Damage estimated to be worth Rs. 50 lakhs.
7.	16 Sep.	Bangalore	Heavy rains		(i) Low lying areas of the city inundated with flood water. (ii) Number of houses collapsed. (iii) A bridge washed away.
8.	24 Sep.	Bellary and Dharwad	Heavy rains	One person died (i) in Gadag in Dharwad district. (ii)	More than 50 huts collapsed in Janata colony near Habalafolla gate in Gadag. About 20 mud houses collapsed in Belagal cross area in Bellary.
9.	29 & 30 Sep.	Bijapur. Gulbarga and Raichur	Heavy rains	7 persons died. (i) (ii) (iii)	Hundreds of houses collapsed. One railway bridge on Karnataka- Maharashtra border washed away disrupting train services. Vast area of agricultural land specially tobacco crop submerged.
*	Whole year	Entire State		(i) 55 human lives lost. (ii) 477 cattleheads perished.	(i) Damage to public utilities estimated to Rs 44.440 crores. (ii) Total damage to Rs 65.810 crores.
		<u>KERALA</u>			
1.	Jun. (2nd week)	Alapuzha and Thrissur	Heavy rains		(i) 400 houses damaged in Arattupuzha and Thrikkunnapuzha villages in Alapuzha while 35 houses damaged in Thrissur.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
					(ii) Large number of people in Alapuzha shifted to safer places. (iii) Sea-erosion in Thrissur reported.
2.	9 Jun.	Kasaragod	Heavy rains		Damage to property and agriculture reported.
3.	11 Jun.	Kasaragod	Heavy rains		(i) Large number of houses collapsed. (ii) Banana plantation and coconut plums destroyed. (iii) Road along hilly ranges washed away in several places.
4.	11 & 12 Jul.	Idukki and Kottayam	Heavy rains	One person died.	Extensive damage to property and agriculture reported.
5.	16 Jul.	Idukki	Heavy rains		Extensive damage to agriculture reported.
6.	18 Jul.	Pathanamthitta	Heavy rains		Damage to property reported.
7.	21 Jul.	Thiruvananthapuram	Heavy rains		15 houses damaged at Ponmudi.
8.	21 & 22 Jul.	Alapuzha, Ernakulam, Idukki, Kozhikode, Malappuram and Palakkad	Heavy rains	17 persons of which 11 from Idukki alone died.	(i) About 100 houses damaged. (ii) Extensive damage to property and agriculture reported.
*	Whole year	Entire State		(i) 73 human lives lost. (ii) 9639 cattleheads perished.	(i) Damage to public utilities estimated to ₹ 332.080 crores. (ii) Total damage to ₹ 774.590 crores.

MADHYA PRADESH

1.	13 Aug.	Rajnandgaon	Severe (Karra)	8 persons including 3 women drowned.
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S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
*	Whole year	Entire state	-	-	-
		<u>MAHARASHTRA</u>			
1.	7 Jun.	Nagpur	Heavy rains	One person injured in a house collapse at Rambag.	
2.	29 Jun.	Amaravati	Heavy rains	One person drowned in swollen Amha tank.	
3.	30 Jun.	Yavatmal	Heavy rains	2 persons drowned in a flooded nala near Saikhada.	
4.	23-25 Jul.	Aurangabad, Beed, Bombay, Jalna, Kolhapur, Nanded, Osmanabad, Parbhani, Pune, Raigarh, Ratnagiri and Sangli.	Severe (Amba, Ambani, Bindusara and Patalganga and their tributaries)	(i) 917 people died. (ii) 14,000 cattle-heads perished.	1.1 lakh houses either fully or partially damaged. 2 lakh families rendered homeless. 50 villages in Beed, Nanded and Raigarh marooned. Damage to building road and power stations estimated to be worth Rs. 91 crores. In Raigarh district, entire hutment colony on the bank of Patalganga river completely wiped out. 72 cms. of rain in 24 hours period reported. In Bombay, local train services as well as long distance trains cancelled. Bombay recorded highest rainfall since 1984. In Beed district, Beed town razed to ground. In Pune district, Bhaje village completely wiped out due to landslide. Pune-Bombay train services suspended.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
*	Whole year	Entire State		(i) 917 human lives lost. (ii) 14629 cattleheads perished.	(i) Damage to public utilities estimated to ₹ 85.680 crores. (ii) Total damage to ₹ 135.960 crores.
<u>MANIPUR</u>					
1.	Aug. (1st week)	Entire state	Severe	(i) (ii)	7 lakh people affected. 50,000 people rendered homeless.
*	Whole year	Entire State		(i) 4 human lives lost. (ii) 51 cattleheads perished.	- -
<u>MIZORAM</u>					
*	Whole year	Entire State		10 human lives lost	-
<u>ORISSA</u>					
1.	12-20 Jun.	(a) Baleshwar	Severe	(i) (ii) (iii) (iv)	158 villages with about 2.5 lakhs population affected. 20,796 hectares of agricultural land submerged. 42 houses totally/partially damaged. Road/embarkment breached at 11 places.
		(b) Cuttack	Severe	(i) (ii)	163 villages with 1.89 lakhs population affected. 9,421 hectares of cultivated land submerged.
		(c) Puri	Severe	(i) (ii)	94 villages with population of 7,270 affected. 29,554 hectares of cultivated land submerged.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
					(iii) 1,301 houses totally/partially damaged. 109 school buildings damaged.
					(iv) Roads/embankment breached at 88 places. 31 culverts damaged.
2.	2-6 Aug.	Baleshwar, Cuttack, Kendujhar and Mayurbhanj	Severe (Vaitarani, Subarna- rekha, Budhabalang, Jalaka, Salandi and their tri- butaries)	2 persons washed away in Budhabalang river at Bati- ghati village of Baleshwar.	(i) More than 4 lakh people affected in Baleshwar and Cuttack district. (ii) Standing crops in large track of low lying riverine areas damaged. (iii) Many roads either washed away or submerged disrupting vehicular traffic. (iv) About 1 lakh of people in Cuttack dis- trict shifted to safer places.
3.	11 & 12 Sep.	Cuttack	Heavy rains		(i) Normal life paralysed. (ii) Low lying areas flooded.
*	Whole year	Entire State		2 human life lost.	-
<u>PUNJAB</u>					
1.	22 Jul.	Amritsar	Heavy rains	10 persons died and 15 others injured.	People living in low lying areas. shifted to safer places
2.	27 Jul.-2 Aug.	Patiala	Heavy rains	(i) 3 persons drowned in river Sutlej. (ii) 2 persons died and 5 others injured in house collapse.	Normal life disrupted at many places.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
3.	29 & 30 Jul.	Amritsar and Gurdaspur	Severe (Ravi)	(i)	Atleast 70 villages flooded and another 46 villages cut off from district headquarter.
				(ii)	90 meter wide breach developed in Dhussi Bandh, on the left bank of river Ravi.
*	Whole year	Entire state			
		<u>RAJASTHAN</u>			
1.	2 Jul.	Ganganagar	Heavy rains	(i)	About 100 houses collapsed.
				(ii)	Low lying areas water logged.
2.	21 & 22 Jul.	Bikaner and Ganganagar	Heavy rains	(i)	Low lying areas flooded.
				(ii)	Several Cutcha houses collapsed.
				(iii)	Vehicular traffic completely disrupted.
3.	22 Aug.	Ganganagar	Heavy rains		3 houses collapsed at Padampur.
*	Whole year	Entire State			
		<u>TAMILNADU</u>			
1.	19 Jun.	Madras	Heavy rains		Main trunk of 300 year old Banyan tree collapsed.
2.	22 Jul.	Coimbatore and Nilgiri	Heavy rains	10 persons, 6 of which from Coimbatore, died	Train services between Vijaywada-Kazipet section disrupted due to flooding of railway track.
*	Whole year	Entire State		(i)	21 human lives lost.
				(ii)	15 cattleheads perished.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
<u>UTTAR PRADESH</u>					
1.	Jul.-Aug.	23 districts	Severe (Ganga and its tri- butaries)	160 persons died.	(i) 7801 villages with population 44.93 lakhs affected. (ii) 94.53 lakh hectares of land including 5.94 lakh hectares of agricultural land affected.
*	Whole year	Entire State		(i) 168 human lives lost. (ii) 516 cattleheads perished.	- -
<u>WEST BENGAL</u>					
1.	25 Jul.	Haora	Severe (Rupnarayan)		Large number of villages inundated due to breaches of embankment.
2.	27 Jul.	Darjiling	Heavy rains	4 persons died and 50 others injured in a landslide at Kalimpong.	
3.	28 Jul.- 3 Aug.	Bardhaman	Severe (Ajay and Tamal)		(i) 40 villages inundated by flood water. (ii) 400 families rendered homeless. (iii) 8,800 hectares of agricultural land submerged. (iv) 5 dams breached.
4.	29 Jul.	(a) Calcutta	Heavy rains		One big tree uprooted damaging compound wall of National Library.

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
		(b) Jalpaiguri	Heavy rains		Embankment of river Teesta and Chel damaged.
5.	31 Jul.- 7 Aug.	Medinipur	Severe (Kangsabati)	5 persons died. (i)	173 villages in Ghatal subdivision submerged. (ii) 3 lakh people rendered homeless. (iii) Road communication from Ghatal to other town completely disrupted.
6.	1 Aug.	Murshidabad	Heavy rains		Embankment of Kuya river breached.
7.	6 Aug.	(a) Barddhaman	Severe	(i)	25,000 people rendered homeless. (ii) Hundreds of village of Kandi subdivision submerged under flood water.
		(b) Hugli	Severe	(i) (ii)	3 lakh people rendered homeless. 4 blocks in Arambagh subdivision badly affected.
*	Whole year	Entire State		(i) 6 human lives lost in floods.	- -
<u>UNION TERRITORY</u>					
<u>CHANDIGARH</u>					
1.	26 Dec.	Chandigarh	Heavy rains	One person died and 5 others injured in a house collapse.	

S.N.	Date/period	Area affected	Intensity (river)	Casualties	Extent of damage
*	Whole year	Entire State		-	-
		<u>DADRA, NAGAR & HAVELI</u>			
*	Whole year	Entire State		~	~

* Compiled tentative report by Central Water Commission (Based on the reports received from the State Govts upto 1.2.90)
concerned with the damages caused by floods only.

S.N.	Date/period	Area of formation/ dissipation	Intensity	Casualties	Extent of damage
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TABLE - XII : CYCLONIC STORMS

BAY CYCLONES

1.	23-27 May	<p><u>Formation</u> : At Lat.17.3°N, Long. 90.5°E in Central Bay</p> <p><u>Landfall</u> : 40 kms. northeast of Baleshwar</p> <p><u>Dissipation</u> : Over Gangetic West Bengal</p>	<p>Severe (with a core of harricane winds)</p>	<p>(i) 38 persons in West Bengal and 17 in Orissa died. (ii) 1030 cattleheads perished in West Bengal.</p>	<p>(i) In West Bengal, 3.2 million people affected. (ii) 55,160 houses either partially or completely damaged in Midnapore district. (iii) In Orissa, Baleshwar and Cuttack districts worst affected. (iv) In 5834 villages, 30.25 lakhs people affected. (v) 7236 houses completely and 92,191 partially damaged. (vi) Crops in 15,902 hectares of land damaged. (vii) Total loss estimated to be worth Rs. 1 crore and 42 lakhs.</p>
2.	21-25 Jul.	<p><u>Formation</u> : Lat. 18°N, Long. 88°E over central and adjoining north- west Bay</p> <p><u>Landfall</u> : South of Kalingapatnam</p> <p><u>Dissipation</u>: Over south Pakistan and neighbourhood.</p>	<p>Cyclonic storm</p>	<p>3 girls under Rajnagar block of Cuttack dis- trict washed away.</p>	<p>(i) Cuttack and Puri districts worst affected. (ii) In Cuttack district, 193 villages with population 1.15 lakhs affected. Standing crops in 12,254 hectares damaged. 159 roads damaged. (iii) In Puri district, 48 villages with population 14,586 affected. Crops in 4357 hectares damaged. 14 roads damaged.</p>

S.N.	Date/period	Area of formation/ dissipation	Intensity	Casualties	Extent of damage
3.	4-9 Nov.	<p><u>Formation</u> : Lat. 11.0°N, Long. 99.5°E</p> <p><u>Landfall</u> : Just north of Kawali in south Andhra coast.</p> <p><u>Dissipation</u>: At the point of landfall itself.</p>	Severe (with a core of hurricane winds)	<p>(i) 55 people died.</p> <p>(ii) 7117 cattleheads perished.</p>	<p>(i) 5 lakh people in 545 villages in Nellore and Prakasam districts affected.</p> <p>(ii) One lakh families rendered homeless.</p> <p>(iii) 1,49,112 huts/houses damaged.</p> <p>(iv) Crops in 62,380 hectares of land damaged.</p> <p>(v) Rail services between Vijaywada-Madras and Ulavapadu-Venkateswarapaliam, compl- etely disrupted.</p>