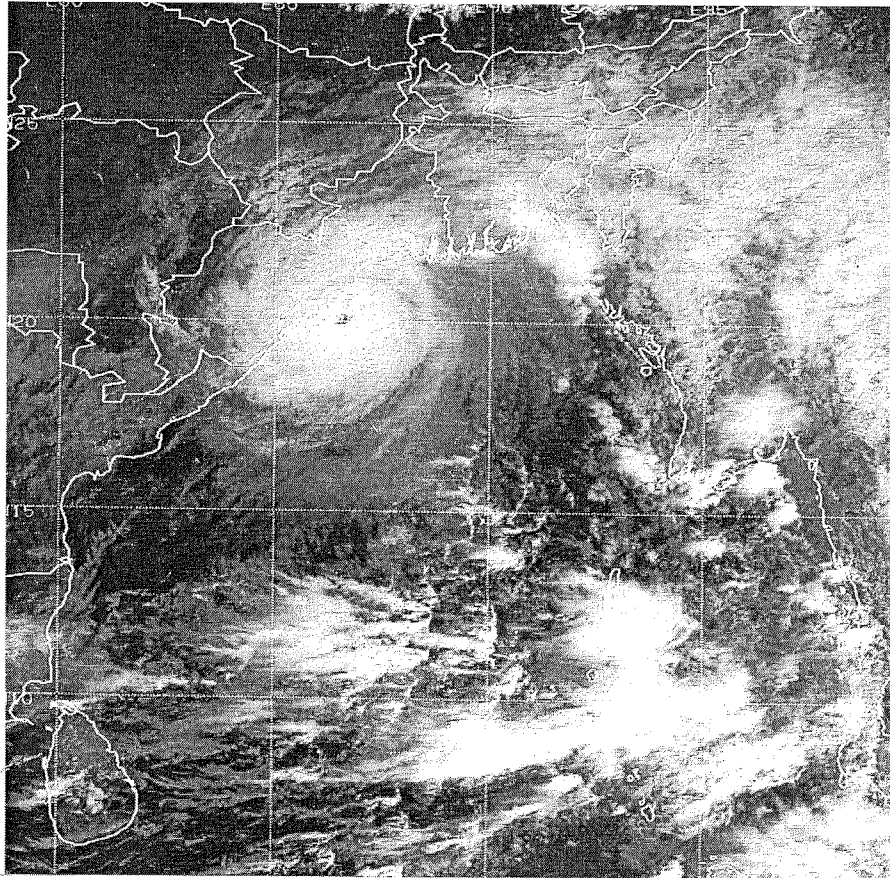


DISASTROUS WEATHER EVENTS

1999



ISSUED BY
NATIONAL CLIMATE CENTRE
OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL OF METEOROLOGY (RESEARCH)



भारत सरकार
GOVERNMENT OF INDIA

भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

DISASTROUS WEATHER EVENTS 1999

ISSUED BY
NATIONAL CLIMATE CENTRE

OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL OF METEOROLOGY (RESEARCH)

DISASTROUS WEATHER EVENTS
1999

Cover Photo

Satellite photograph of the Orissa Super
Cyclonic Storm (0930 IST) 29 October 1999

Designed & Printed at the
Meteorological Office Press
Office of the
Additional Director General of Meteorology (Research)
Pune

DISASTROUS WEATHER EVENTS OF 1999

The most striking disastrous weather events of 1999 were the following :

- (i) A super cyclonic storm formed in the Bay of Bengal during the last week of October; hit the Orissa coast on 29th causing unprecedented misery and devastation to Orissa State. It took a huge toll of 9885 human lives. Damages to several lakhs of houses and crops in lakhs of hectares of land were reported.
- (ii) Floods and heavy rains swept several parts of the country claiming more than 700 human lives apart from crop loss in several thousand hectares of land and damages to several thousand houses.
- (iii) Moderate to severe heat wave conditions prevailed in various parts of the country during March to May and claimed more than 100 human lives.

The summary of these natural hazards is based on press information and the various reports of the India Meteorological Department. The areas affected by the adverse weather conditions are depicted seasonwise on four maps.

INDEX

Table No.	Event	Page Nos.
I	Snowfall	1
II	Cold Wave	1-3
III	Heat Wave	3-4
IV	Drought	5
V	Squall	5
VI	Gale	6
VII	Duststorm	6
VIII	Lightning	7-10
IX	Thunderstorm	11-13
X	Hailstorm	13-14
XI	Floods and Heavy Rains	15-27
XII	Cyclonic Storm	28-29

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
-------	---------------	---------------	-----------	------------	------------------

TABLE - I : SNOWFALL

CRITERIA

Moderate : 7.6 to 34.9 cm in 24 hrs.

Heavy : ≥ 35.0 cm in 24 hrs.

1.	7 Jan.	Himachal Pradesh (Entire State)	Moderate		i) Vehicular traffic at Kotkhai, Jubbal, Chopal, Kufri and Kharapathar paralysed. ii) Normal life disrupted.
2.	28 Jan.	Shimla	Heavy		i) Normal life disrupted in Shimla and Tribal area. ii) Hindustan-Tibet road blocked beyond Dhalli in Shimla town.

TABLE - II : COLD WAVE

CRITERIA

(A) Where; Normal minimum temperature is 10°C or more.

Moderate cold wave : Night temperature 5° to 6°C below normal.

Severe cold wave : Night temperature 7°C or more below normal.

(B) Where; Normal minimum temperature is less than 10°C.

Cold wave : Night temperature 3°C to 4°C below normal.

Severe cold wave : Night temperature 5°C or more below normal.

1.	1 Jan.	Medinipur	Severe cold wave (A)	3 persons died.	
2.	1-2 Jan.	Srinagar	Severe cold wave (B)		i) Air services disrupted and road traffic on Patni Top, Jawahar Tunnel and Jammu-Srinagar highway affected due to dense fog. ii) Dal lake frozen.
3.	2 Jan.	Nadia	Severe cold wave (B)	3 persons died.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
4.	4 Jan.	Ratnagiri	Moderate cold wave (A)	2 children died.	
5.	7-9 Jan.	(a) Alwar, Bharatpur, Bikaner, Chittorgarh, Churu, Dholpur, Ganganagar, Jaipur and Tonk (b) Fatehpur and Lucknow	Severe cold wave (B) Cold wave (B)	3 persons died; one in Bharatpur and 2 in Jaipur i) One person died. ii) A few cattle perished in Lucknow Cantonment area.	
6.	10-13 Jan.	Ajmer, Bharatpur, Bhilwara, Bikaner, Chittorgarh, Churu, Dholpur, Ganganagar, Jaipur, Kota, Sirohi and Udaipur	Severe cold wave (B)	i) 6 persons died. ii) 2 elephants died in Jaipur city	
7.	12 Jan.	Patna	Severe cold wave (A)	13 persons died in Athmalgola, Bash-belchi, Karawta villages of Bash Subdivision	
8.	13 Jan.	Medinipur	Moderate cold wave (A)	One person died	
9.	17 Jan.	Jaipur	Severe cold wave (B)	One person died in Jaipur City	
10.	18 Jan.	Nadia	Cold wave (B)	One person died in Ranaghat	
11.	10-19 Jan.	Uttar Pradesh (Many parts)	Severe cold wave (B)	133 persons died	
12.	19-21 Jan.	Begusarai, Darbhanga, Madhubani, Nalanda and Nawada	Severe cold wave (B)	24 persons died	
13.	28-29 Jan.	Muzaffarpur	Cold wave (B)	2 persons died each in Rejma-Shiohan and Raega-Sitamarhi	
14.	29 Jan.	Jaipur and Tonk	Severe cold wave (B)	2 persons died	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
15.	25 Feb.	Dharamsala	Cold wave (B)	2 persons died.	
16.	23 Nov.	Srinagar	Severe cold wave (B)	Along Amarnath Yatra route some mazdoors working for security force died.	
17.	8 Dec.	Barmer	Moderate cold wave (A)	One person died.	
18.	15 Dec.	Ajmer	Cold wave (B)	One person died in Nasirabad	
19.	24 Dec.	Jaipur	Cold wave (B)	2 persons died in Jaipur city.	
20.	27-30 Dec.	Banswara, Ganganagar and Jaipur	Moderate cold wave (Both A and B as appropriate)	6 persons died.	

TABLE - III : HEAT WAVE

CRITERIA

- (A) Where; Normal maximum temperature is 40°C or less.
Moderate heat wave : Day temperature 5° to 6°C above normal.
Severe heat wave : Day temperature 7°C or more above normal.
- (B) Where; Normal maximum temperature is more than 40°C.
Heat wave : Day temperature 3°C to 4°C above normal.
Severe heat wave : Day temperature 5°C or more above normal.

1.	1-11 Mar.	Orissa (Entire State)	Moderate heat wave (A)	7 persons died.	
2.	12-30 Apr.	Adilabad, Cuddapah, Khammam, Krishna, Mahabubnagar, Nalgonda, Nizamabad, Srikakulam and West Godavari	Moderate heat wave (A)	13 persons died.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
3.	20-24 Apr.	Bankura, Medinipur and Purulia	Moderate heat wave (A)	6 persons died.	
4.	21 Apr.	Alwar	Severe heat wave (A)	2 persons died.	
5.	26-30 Apr.	(a) Gaya, Jahanabad, Nalanda, Nawada, Patna and Vaishali (b) Alwar, Jaipur and Tonk (c) Gwalior (d) Vidarbha region (e) Delhi	Severe heat wave (A) Severe heat wave (A) Severe heat wave (A) Severe heat wave (Both A and B as appropriate) Severe heat wave (A)	62 persons died. 3 persons died each in Alwar, Jaipur city and Malpura in Tonk district. 2 persons died. 2 persons died and 5 hospitalized in Nagpur city. More than 12 persons died in New Delhi.	
6.	1-3 May	Rajasthan (Entire State)	Severe heat wave (Both A and B as appropriate)	12 persons died.	
7.	3 May	Amritsar	Severe heat wave (A)	2 persons died.	
8.	5 May	Raipur	Severe heat wave (B)	One person died in Raipur city.	
9.	7 May	Nagpur	Severe heat wave (B)	One person died in Nagpur city.	
10.	27 May	Jaipur	Severe heat wave (B)	One person died in Jaipur city.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
-------	---------------	---------------	-----------	------------	------------------

TABLE – IV : DROUGHT

N I L

TABLE – V : SQUALL

A sudden increase of wind speed by at least 29 kmph (16 kts), the speed rising to 40 kmph (22 kts) or more and lasting for at least one minute

CRITERIA

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

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

1.	7 Apr.	Kamrup	Severe		In Guwahati, a passenger ferry boat sank in Brahmaputra near Sukreswar Ghat. Several boats also badly damaged.
2.	14 May	Dhubri	Severe	A boat capsized killing 2 persons in Brahmaputra.	
3.	15 May	Tinsukia	Severe	One person injured in Digboi.	Several trees and electric poles uprooted disrupting power supply.
4.	10 Jun.	Bhopal	Moderate		In Bhopal city and neighbourhood, roof tops blown off and trees uprooted.
5.	27 Aug.	Bardhaman	Moderate		Modern Rice Mill and many kutcha houses damaged.

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
-------	---------------	---------------	-----------	------------	------------------

TABLE – VI : GALE

CRITERIA

Strong : Wind speed \geq 75 kmph

1.	4 & 8 Apr.	Thiruvananthapuram	Strong		i) 175 houses damaged. ii) Electricity and telephone lines disrupted.
2.	22 Apr.	Idukki	Strong	3 persons injured.	i) 114 houses damaged. ii) Widespread damage to crops reported.
3.	26 Apr.	Bangalore	Strong	2 persons injured in Rajajinagar, Bangalore city.	
4.	9 May	Entire Upper Assam	Strong		Hundreds of trees uprooted disrupting power supply and normal life for 2 days.
5.	12 May	Sangrur	Strong	5 persons died and 7 injured.	
6.	12 Jun.	Mangalore	Strong		Roofs of the houses damaged and tiles blown away.

TABLE – VII : DUSTSTORM

CRITERIA

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

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

1.	17 May	Kaithal	Moderate	3 persons died and 2 injured	
2.	19 May	Azamgarh	Moderate	One woman died and another injured.	i) Dozens of roof tops blown off. ii) Electricity poles uprooted and wires snapped off.

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
TABLE – VIII : LIGHTNING					
1.	18 Feb.	Thiruvananthapuram		One woman and 2 children died in Kattakada.	
2.	4 Apr.	Idukki		5 persons injured.	
3.	1 May	Bankura		i) 3 persons died. ii) Several cattle perished.	A few houses damaged.
4.	4 May	Chitradurga and Hassan		i) 7 persons died. ii) One cattle perished.	
5.	5 May	Dindugul and Salem		6 persons died.	
6.	6 May	Chitradurga		2 persons died each in Davangere and Mellikatte.	
7.	7 May	Kozhikode		One woman died.	
8.	9 May	(a) South 24 Parganas (b) Nagaon (c) Bangalore		2 persons died in Namkhana. One woman badly injured.	
9.	10 May	(a) Hassan (b) Puri and Sundargarh		One person died in Adihalli. 3 persons died.	Explosion of TV tubes and telephone services also affected.
10.	11 May	Kozhikode		8 persons injured.	
11.	13 May	Chitradurga		One person died in Konasagara.	
12.	14 May	Tumkur		2 persons died in Bhadravathi.	
13.	16 May	(a) Pune (b) Beed		A woman and her son died in Pimpri and 2 persons injured in Bhosari. 4 persons died.	
14.	19 May	Angul		3 persons died.	
15.	21 May	Bijapur and Gulbarga		4 persons including one woman died in Bagewadi, Indi and Shahpur.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
16.	25 May	Nagpur		One child died in Bhiwapur.	
17.	26 May	Nalanda		6 persons including a child died in Sahilganj.	
18.	4 Jun.	Bardhaman		One person died and 6 injured in Kalna.	
19.	11 Jun.	Malda		7 persons died.	
20.	14 Jun.	Purulia		2 persons died.	
21.	16 Jun.	(a) Howrah (b) Nashik		One person died. 2 persons died in Gangakhed.	
22.	17 Jun.	Beed		6 persons died.	
23.	19 Jun.	Ratnagiri		5 persons died.	
24.	22 Jun.	Bokaro		3 girls died and 5 persons injured in Temli -Madhubagan.	
25.	30 Jun.	Katihar and Sitamarhi		i) 2 persons died and one injured. ii) A few cattle perished.	
26.	4 Jul.	Giridih		One boy died and 8 children seriously injured in PathalDIM.	
27.	6 Jul.	Medinipur		2 persons died and 2 injured in Haldia.	
28.	7 Jul.	(a) Howrah		2 youths died and 7 injured in Santospur.	
29.	17 Jul.	(b) Bankura (a) East Singhbhum (b) Pathanamthitta		One student died in Ranibandh. 5 workers including 2 women died at Jamshedpur. One person died and another injured.	
30.	23 Jul.	Idukki			One house damaged.
31.	31 Jul.	Puri		One person died in Tarangira.	
32.	3 Aug.	Gaya and Shekhpura		4 persons including 3 women died and another 3 women injured.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
33.	5 Aug.	Cuttack		One person died in Ukundra.	
34.	22 Aug.	Araria		One person died and 4 injured in Raniganj.	
35.	4 Sep.	Puri		One girl died in Balidiha.	
36.	7 Sep.	Cuttack and Puri		2 persons died and 35 injured in Banra and Bidyadharpur.	
37.	22 Sep.	Katihar		4 persons died in Kadwa.	
38.	23 Sep.	(a) Bidar		i) 2 persons died.	
		(b) Bhandara		ii) Death of a few cattle reported.	
				2 women died and 3 injured in Tumsar.	
39.	24 Sep.	Kolar		2 persons injured.	
40.	25 Sep.	Giridih		One woman died and a man injured in Kudpania village.	
41.	30 Sep.	Azamgarh, Fatehpur, Ghazipur, Kanpur and Sultanpur		i) 19 persons died & 12 hospitalized.	
				ii) A few cattle perished.	
42.	1 Oct.	(a) Chandauli		5 persons died and a few shepherds injured.	Some houses damaged.
		(b) Saharsa		2 persons died and 4 injured in village Toorki-Simri Bakhtiyarpur.	
43.	3 Oct.	Tumkur		3 persons died.	
44.	4 Oct.	(a) Kozhikode		5 school children and one lady teacher died and 60 children injured in Kuttiadi.	
		(b) Bokaro		One student died and 2 women injured in Chandrapura.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
45.	11 Oct.	(a) Nagpur (b) Jamui		2 persons died in Bhiwapur and Gumthigram. In Dokli village, i) 3 persons died. ii) A few cow perished.	
46.	12 Oct.	Palakkad		One man and a child died in Mankara.	
47.	13 Oct.	Thiruvananthapuram		One person died in Nedumangad.	
48.	18 Oct.	Dakshina Kannada		One agricultural labour died and 5 others injured at Karkala in Udipi.	3500 telephone lines went out of order as a tower at Manipal Exchange was struck.
49.	20 Oct.	Kannur		One child died and 2 persons injured.	
50.	22 Oct.	(a) Waynad (b) Chitradurga		One student died and one person injured. i) One woman died in Kaniyuru. ii) A few persons injured in Kambhshi and Nelayadi..	
51.	26 Oct.	Idukki			47 houses fully and 53 houses partially damaged.
52.	29 Oct	Kasaragode		One person died and another injured in Kanjangad.	

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
-------	---------------	---------------	-----------	------------	------------------

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.	12 Feb.	Jabalpur	Moderate		Crops damaged.
2.	17 Mar.	Kottayam	Severe	12 persons died and 9 injured.	
3.	18 Mar.	Ernakulam, Idukki and Kozhikode	Moderate	2 persons died.	i) Damage to property and agriculture reported. ii) Electricity lines disrupted.
4.	3 Apr.	Nalbari	Severe		i) Trees and poles uprooted. ii) Temples, school, office of Electricity Board, of the area, damaged. iii) 200 families became homeless.
5.	4 & 8 Apr.	Idukki, Pathanamthitta and Thiruvananthapuram	Severe		i) 73 houses fully and 102 houses partially damaged. ii) Electricity, Telephone and Railway network disrupted. iii) Crops and rubber plantations damaged.
6.	5 Apr.	Nalbari	Severe	4 persons died and many injured.	i) Electricity poles and trees uprooted. ii) Roof tops of schools, colleges and public institutions, in the area, blown off.
7.	9 Apr.	Nadia	Moderate	3 persons injured.	
8.	17 & 18 Apr.	Birbhum	Moderate		Damage to agriculture properties reported.

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
9.	22 Apr.	(a) Idukki (b) Chitradurga	Severe Severe	3 persons injured.	i) A few houses damaged. ii) Widespread damage to crops and property reported. In Basavapatna and Chickjajuru, i) Approx. 23,000 Areca nut trees, 1500 Coconut trees, 5000 Banana trees and many Mango trees razed to the ground.. ii) Hundreds of electricity poles fell disrupting power supply.
10.	25 & 26 Apr.	Bangalore	Severe	2 persons injured due to tree fall.	(a) Power supply cut off as cables snapped off. (b) Low lying areas flooded. (c) One scooter damaged due to tree fall.
11.	1 May	(a) Bardhaman and Bankura (b) Nagaon	Severe Moderate	5 persons died. 2 persons died and 4 injured in Lunding.	i) Several buildings damaged. ii) Power and telecommunication systems disrupted.
12.	9 May	Sithamarhi	Severe	3 persons died.	
13.	15 & 16 May	Pune	Moderate		Many trees uprooted and electric supply disrupted.
14.	18 & 20 May	Nagpur	Moderate		Many trees uprooted and 2 houses collapsed in Nagpur city.
15.	24 May	Bardhaman and Medinipur	Severe	2 persons died and 8 seriously injured.	
16.	1 Jun.	Coochbehar	Severe		i) Electricity poles and many trees uprooted. ii) Many houses damaged.
17.	5 Jun.	Koraput	Moderate		i) Several trees uprooted. ii) 70 mud houses damaged.
18.	14 Jun.	Medinipur and Purulia	Severe	7 fishermen died in Digha, another 2 persons died in Purulia.	Several trees uprooted.
19.	23 Jun.	South 24 Parganas	Moderate		In Dayapur village, Gosaba block flooded and many huts damaged.

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
20.	2 Jul.	Birbhum	Moderate	One person died and 3 injured in Abdarpur village.	One house damaged.
21.	9 Jul.	Birbhum and Murshidabad	Severe	3 persons died and 31 persons including 21 students injured.	
22.	12 Jul.	Howrah	Moderate	One person died in Benapur.	
23.	27 Jul.	Jalpaiguri	Moderate	One woman died and 20 injured in Alipurduar.	
24.	3 Aug.	Coochbehar	Moderate	One person died.	
25.	9 Aug.	South 24 Parganas	Severe		550 boats damaged.
26.	22 Aug.	Uttar Dinajpur	Moderate	2 women died.	
27.	17 Oct.	Medinipur	Severe (Tornado)		Six villages affected.
28.	29 Oct.	Medinipur and South 24 Parganas	Severe (Tornado)	80 persons injured.	i) 10,000 people affected. ii) 5000 houses damaged.

TABLE - X : HAILSTORM

CRITERIA

- Slight : Sparse, usually small size and often mixed with rain.
Moderate : Fall abundant enough to whiten ground.
Heavy : Includes at least a proportion of large stones.

1.	3 Jan.	Aurangabad, Solapur and Yavatmal	Moderate		Tur, wheat, jowar, maize and grapes damaged.
2.	4 Feb.	Koiar	Moderate		Crops damaged in Doddaballapur.
3.	5 Feb.	Nagpur	Moderate		Standing crops damaged in Bhiwapur, Khaparkheda and Narkhed.

S.No.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
4.	8 Feb.	(a) Bhopal (b) Adilabad and Nizamabad	Moderate Heavy	i) One person died in Mudhol mandal. ii) Hundreds of sheep perished.	Crops damaged. i) Very heavy hails reported. ii) Standing crops (maize, millet, wheat, sugarcane and sunflower) worth several lakhs of rupees damaged. iii) Near Borgam, 132 kV line on Ditchapalli-Nizamabad grid fail causing 16 hours' power cut.
5.	9 & 10 Feb.	Vidarbha region	Moderate		Widespread damage to crop reported.
6.	11 Feb.	Chhindwara	Moderate	One man and a woman died.	Crops damaged in Saunser and Pandurna.
7.	16 Feb.	Udaipur	Moderate	One person died.	Damage to crops reported.
8.	28 Feb.	Bijapur	Moderate	Many people injured.	Extensive damage to grapes in Bijapur, Junmala, Savanahalli and Honaganahalli reported.
9.	22 Apr.	Chitradurga and Uttar Kannada	Heavy	More than 40 persons injured.	Very heavy hails reported from Hoalkere, Siddapura and Udugere.
10.	12 May	Jind, Kaithal and Sirsa	Heavy		Sunflower crop damaged.
11.	22 Sep.	Baran, Jhalawar, Kota and Sawai Madhopur	Heavy	One child died in Sawai Madhopur.	Damage to standing crop reported.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
------	---------------	---------------	-------------------	------------	------------------

TABLE – XI : FLOODS AND HEAVY RAINS

ANDHRA PRADESH

1.	18-20 Oct.	Srikakulam	Heavy rains	3 persons died, 2 in Kaviti and one in Kanchili.	<ul style="list-style-type: none"> i) Thousands of hectares of coconut and cashewnut plantations destroyed in Ichapuram, Kaviti, Sompeta, Mandasa and Kanchili Mandals. ii) Several electric poles and telecom lines damaged. iii) 8 irrigation bunds damaged in Ichapuram and Sompeta. iv) Hundreds of thatched houses damaged.
----	------------	------------	-------------	--	--

ARUNACHAL PRADESH

1.	9 May	Most parts of the State	Heavy rains	One person died.	17 houses/huts damaged.
2.	10-12 Jul.	Lohit	Moderate flood (Lohit)		Tezu town cut off from rest of the State for 3 days due to landslides.

ASSAM

1.	2-4 May	Jorhat and Nalbari	Moderate flood (Pagladiya)		<ul style="list-style-type: none"> i) Vast crop-land inundated, damaging paddy, boro and ahu crops. ii) Embankment of river Pagladiya breached at Hablakha. iii) Road communication disrupted.
2.	30 & 31 May	Dhemaji, Dhubri, Lakhimpur and Sonitpur	Moderate flood (Brahmaputra and its tributaries)		<ul style="list-style-type: none"> i) Vast areas inundated. Road communication between North Lakhimpur - Jonai and Dhemaji-Jonai and National Highway No. 52 disrupted. ii) Portion of dam at Bhimpara (North Lakhimpur) washed away. iii) Standing crop damaged.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
3.	Jun. (4 th week) and Jul. (entire)	Entire State	Severe flood (Brahmaputra and its tributaries)	14 persons died in different incidences and 39 injured due to landslides.	<ul style="list-style-type: none"> i) Landslide reported from the hill "Kalapahar" and the areas of Navgraha and Khareguli. ii) 1410 villages affected. iii) 3.38 lakh population affected. iv) 1.45 lakh hectares of land affected. v) Severe erosions caused by flood posed threat to Kaziranga National Park and other dykes in Dhubri and Kamrup districts. vi) National Highway No. 52 and other roads submerged. vii) Railway link beyond Gogamukh cut off. viii) 126 houses/huts damaged.
4.	22 Aug. to 2 Sep.	Dhemaji, Dhubri, Golaghat, Jorhat and Sibsagar	Severe flood (Brahmaputra and Dayang)	2 persons died.	<ul style="list-style-type: none"> i) 601 villages affected. ii) 3.5 lakh population affected. iii) 25,000 hectares of crop-land flooded. iv) Road/railway links disrupted. v) More than 2000 families became homeless in Dhubri and Golaghat districts due to erosion by Brahmaputra and its tributary, Dayang.
5.	12 & 13 Sep.	Jorhat and Kamrup	Heavy rains	One person died and another injured due to landside in Guwahati.	<ul style="list-style-type: none"> i) Vast areas inundated. ii) Standing crop damaged.
6.	17-19 Oct.	Kamrup	Heavy rains		Guwahati city inundated disrupting road communication.
*	Whole year	0.223 m. ha.		<ul style="list-style-type: none"> i) 17 persons died. ii) 992 cattle lost. 	<ul style="list-style-type: none"> i) 0.891 million people affected. ii) Crop in 0.059 m.ha. affected. iii) 133 houses damaged.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
BIHAR					
1.	Jul. (entire) and Aug. (1 st week)	Most parts of the State	Severe flood (Ganga, Gandak, Bagmati and their tributaries)	i) 216 persons died. ii) 12 cattle died.	i) Left embankment of Bagmati near Karkauli in Darbhanga district and that of Gandak near Babutola village breached inundating low lying areas in Darbhanga and West Champaran districts in all 3.44 lakh hectares of land inundated. ii) Standing paddy seedlings destroyed. iii) Extensive damage to property and agriculture reported. iv) Over 10 lakh cattleheads affected. v) 23,538 houses/huts damaged.
2.	22-29 Sep.	Banka, Bhagalpur, Dumka, Godda, Katihar, Khagaria, Madhepura, Munger and Purnea	Heavy rains	i) 69 persons died. ii) 2016 cattle died.	i) Thousands of people became homeless. ii) Extensive damage to property and agriculture reported. iii) 2,25,365 houses/huts damaged.
*	Whole year	0.845 m. ha.		i) 285 persons died. ii) 2028 cattle perished.	i) 6.566 million people affected. ii) Crop in 0.304 m.ha. affected. iii) 2,48,903 houses damaged.
GOA					
1.	9-13 Jun.	Goa (Entire State)	Heavy rains	2 persons died.	i) Landslides reported from many parts. ii) Air traffic, Konkan railway services and road services badly affected.
GUJARAT					
1.	19-23 Jun.	Valsad	Heavy rains	4 persons died.	5 houses damaged.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
2	16-22 Jul.	Ahmedabad, Bharuch Surat, Vadodara and Valsad	Heavy rains	One person swept away at Haria village near Valsad.	i) A few houses and huts fully and 257 houses partially damaged. ii) Bridges submerged cutting off road link to several villages. iii) Ahmedabad and Vadodara flooded to such extent that trapped commuters had to use fire brigade boats.
3. *	Aug. Whole year	Entire state	Heavy rains	46 persons died i) 73 persons died. ii) 36 cattle lost.	689 houses damaged.
HIMACHAL PRADESH					
1.	9 Jul.	Shimla	Heavy rains		i) Due to landslide in Jakhu, 6 houses and 15 metre long portion of a forest road damaged. ii) Dozens of trees uprooted.
2.	10 & 11 Aug.	Kullu and Mandi	Heavy rains (Cloud burst)	i) 10 persons died in inundation and landslides. ii) 40 cattleheads perished.	i) Landslides reported. ii) 8 houses washed away and many damaged. iii) Apple orchards and paddy fields damaged.
3.	19 & 20 Aug.	Chamba and Mandi	Heavy rains (Cloud burst)	Several cattleheads perished.	i) 3 bridges washed away. ii) Widespread damage to property reported.
4.	25 Aug.	Kangra	Heavy rains		i) Kangra and Dharamsala inundated. ii) Widespread damage to property reported.
5.	13 Sep.	Kullu	Heavy rains (Cloud burst)		i) 9 bridges, 5 water mills and a few irrigation canals damaged. ii) Crop in hundreds of hectares of land destroyed.
6.	17 Sep.	Chamba	Heavy rains (Cloud burst)	i) One person drowned in a flooded Nullah at Lulwan. ii) 6 horses killed.	i) Several buildings collapsed and a few bridges and wood worth lakhs of rupees destroyed ii) Crop in hundreds of hectares of land damaged.
*	Whole year	0.242 m.ha.		i) 30 persons died. ii) 129 cattle perished.	i) 5.170 million people affected. ii) Crop in 0.242 million hectare affected. iii) 2224 houses damaged.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
JAMMU & KASHMIR					
1.	30 Jul.	Anantnag	Heavy rains		2000 Amarnath Pilgrims held up near Chandanwadi , Yatra suspended temporarily.
KARNATAKA					
1.	25-26 Apr.	Bangalore	Heavy rains	2 scooterists injured.	i) Several trees uprooted, one scooter crushed under a tree. ii) Power cables cut off, many areas of the city plunged into darkness.
2.	2 & 3 May	Bangalore	Heavy rains	One person died and 15 other injured when Thanjavur Express met with an accident due to fall of a tree.	i) In Thittamaranahalli – Channapatna, hundreds of Coconut, Palm, Mango and Banana trees uprooted. ii) About 150 trees uprooted in Bangalore University. iii) Bangalore-Mysore road traffic disrupted due to uprooted trees and electricity poles.
3.	4 May	Chitradurga and Hassan	Heavy rains		Many houses damaged in Harapanahalli, Arsikere and Kodur .
4.	5 May	Bangalore and Bijapur	Heavy rains	A State transport bus driver electrocuted due to live wire.	i) About 50 trees uprooted in Bangalore city. ii) Mango orchards damaged. iii) 21 vehicles trapped under uprooted trees. iv) Telephone and electricity lines snapped off.
5.	7 May	Bangalore Rural	Heavy rains	5 persons including 2 children died when bus was swept away.	
6.	10 May	Bangalore	Heavy rains	3 persons injured as tree fell upon them.	i) 2 cars crushed under an uprooted tree. ii) Telephone lines affected due to uprooted trees.
7.	12 May	Hassan	Heavy rains	One old man died and his wife seriously injured.	In Adihalli, 50 coconut trees and several banana plantations uprooted.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
8.	14 May	(a) Bangalore	Heavy rains		i) Several trees fell. ii) A car damaged due to fall of a tree.
		(b) Tumkur	Heavy rains	i) One old woman and a child died under a house collapse. ii) One person injured and two goats perished in Malavalli taluka.	
9.	11 Jun.	Uttara Kannada	Heavy rains	In Kumta and Murudeshwar, i) 5 persons including one woman died. ii) 14 cattle heads perished.	i) Lakes and ponds over flown. ii) 27 villages submerged in Honavar taluka.
10.	12 Jun.	Dakshina Kannada	Heavy rains		i) Landslides reported. ii) Tiled roofs of several houses and cowsheds blown off. iii) Konkan railway track between Honavar and Murudeshwar completely covered by mud due to landslide. iv) Mangalore – Karkala road breached at many places and covered with mud due to landslide from nearby hills.
11.	12 - 24 Jul.	Entire State	Severe flood (Tungabhadra, Krishana, Cauvery, Ghataprabha and Malaprabha)	i) 122 persons died. ii) 959 cattles died.	i) Major roads submerged forcing traffic deviations. ii) Landslides reported on National Highway, 15 km. from Yellapura. iii) 16,828 houses/huts damaged and many houses collapsed rendering many people homeless. iv) Extensive damage to property and agriculture reported.
12.	1 & 2 Aug.	Gulbarga and Shimoga	Flash flood	i) 2 persons died. ii) A few cows, hundreds of poultry birds and 350 sheep washed away.	i) In Belkota, Dammur and Ambalga villages, 82 families forced to leave their houses. ii) Green gram, Black gram, Jowar, Sesame and Banana on thousands of hectares destroyed. iii) 14 th hair-pin bend in Agumbe ghat collapsed completely causing deep cracks of almost 80 ft and disrupting traffic.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
13.	2 & 3 Oct.	Bijapur, Chitradurga and Tumkur	Heavy rains	11 persons died in drowning/house collapse.	30 houses and one school building collapsed.
14.	13 Oct.	Dharwad	Flash flood	i) 2 persons washed away. ii) A few sheep also washed away.	i) 22 villages inundated. ii) 16 houses collapsed. iii) Damage to crops reported.
15.	15 Oct.	Bangalore	Heavy rains	One woman died in a house collapse.	
16.	18 Oct.	Dakshina Kannada	Heavy rains		In Udipi, 3500 lines in Manipal telephone exchange went out of order.
17.	22 Oct.	Chitradurga	Heavy rains	One woman washed away in Hiriyur.	
18.	24 Oct.	Mysore	Heavy rains	In Mysore city, one person died and another injured in house collapse.	
19.	26 Oct.	Kolar	Heavy rains	4 members of a family and one woman died and 5 other injured in house collapse at Masthi.	
20.	27 Oct.	Mandya	Heavy rains		i) Mysore – Arasikere sector railway line damaged. ii) Standing crop in a few hectares damaged as the crop area inundated in Krishnarajpet.
KERALA					
1.	5 Feb.	Kollam	Heavy rains	4 persons injured.	Widespread damage to crops, trees, electricity and telephone lines reported.
2.	25 & 28 May	Idukki and Kottayam	Heavy rains	One person died.	Landslides reported from Idukki.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
3.	7-12 Jun.	Entire State	Heavy rains	18 persons died and more than 80 injured.	i) Rail/Road service dislocated. ii) Many houses damaged. iii) Widespread damage to property and agriculture reported.
4.	16-20 Jun.	Ernakulam, Idukki, Kallur, Kasaragode, Kozhikode, Malappuram, Palakkad and Pathanamthitta	Heavy rains	14 persons died out of which 5 died in a house collapse.	i) Kuttiyadi canal-wall collapsed. ii) Many houses damaged. iii) Widespread damage to crops and property reported.
5.	17-31 Jul.	Idukki, Kannur, Kasaragode, Kollam, Palakkad, Pathanamthitta Thiruvananthapuram and Thrissur	Heavy rains	19 persons died and 6 injured in different incidences of house collapse.	i) Landslides from various places reported. ii) Many trees/electric poles uprooted. iii) Widespread loss of property and agriculture reported.
6.	2 Aug.	Kasaragode. Kozhikode and Malappuram	Heavy rains	3 persons died.	
7.	9 Oct.	Kannur	Heavy rains	2 persons died in a landslide near Nadapuram.	i) Landslides reported. ii) A few houses destroyed.
8.	18 Oct. to 22 Nov.	Entire state	Heavy rains	21 persons died.	i) 1218 houses/huts damaged. ii) Widespread damage to property and agriculture reported.
MADHYA PRADESH					
1.	24 Jun.	Balaghat and Jabalpur	Heavy rains		Road links to Balaghat and Jabalpur disrupted in several areas.
2.	18 Jul.	Dewas	Heavy rains	6 persons died in house collapse at Khal village.	

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
3.	29-31 Jul.	Gwalior, Indore, Jabalpur and Sagar	Heavy rains		i) Low-lying areas submerged under 8 ft. of water. ii) 60 houses collapsed. iii) Road links in several areas disrupted.
4.	5-11 Aug.	Hoshangabad, Sagar and Vidisha	Heavy rains	3 children died.	i) Many houses and huts collapsed. ii) Damage to crops reported.
5.	15-20 Sep.	Hoshangabad, Narsinghpur, Raisen, Sehore and Vidisha	Severe flood (Narmada)	i) 27 persons died. ii) 654 cattle died.	i) Hundreds of villages flooded and Army called for rescue operations. ii) 29,168 houses/huts damaged.
MAHARASHTRA					
1.	12-18 Jun.	Sindhudurg	Heavy rains	19 cattle heads perished.	i) Kudal, Malvan and Vengurla worst affected. ii) 290 houses collapsed and 1583 persons became homeless. iii) Extensive damage to property and agriculture reported.
2.	14 Jun.	Parbhani	Heavy rains	4 persons died.	Thousand of commuters stranded at various suburbs due to water logging and local trains running behind schedule.
3.	17 Jun.	(a) Mumbai (b) Jalgaon	Heavy rains Heavy rains	2 persons died. 5 persons drowned in a stream at Mohgarh.	
4.	21 Jun.	(a) Nandurbar (b) Nashik	Heavy rains Heavy rains	3 persons, including one woman died in house collapse at Boral One person died at Sinnar.	
5.	23 & 24 Jun.	Entire State	Heavy rains	21 persons died and several injured.	Road/rail traffic disrupted i) Railway services, road links disrupted. ii) Substantial damage to property and agriculture reported.
6.	Jul. (3 rd week)	Mumbai, Nashik, Pune, Raigad, Ratnagiri and Thane	Heavy rains	i) 22 persons died and 6 injured due to landslide in Mumbai. ii) 4 persons washed away in the river at Nashik.	i) Multiple landslides due to torrential rains caused the worst traffic-jam in 20 years on Pune-Mumbai road and landslides also reported on Mumbai-Goa highway and Ratnagiri. ii) Konkan railway services disrupted as the portion of rail track between Pen and Jite damaged. iii) Extensive damage to property and agriculture reported.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
7.	3 & 4 Aug.	Vidarbha region	Heavy rains		Many houses damaged, trees uprooted and damage to crops also reported.
8.	9 Aug.	Nagpur	Flash flood (Jamb)	55 passengers in M.P. State Transport bus swept away in the flooded river at Sonsar along Vidarbha-M.P. border.	
9.	19-22 Sep.	Bhandara and Nagpur	Heavy rains	3 persons died in different incidences.	Damage to crops and property reported.
MANIPUR					
1.	2-4 Sep.	Tamenglong and Thoubal	Heavy rains	12 persons died and 5 injured in landslide.	i) A few houses damaged in Khonglaron. ii) Large areas of Thoubal inundated, standing crops damaged.
MIZORAM					
1.	1 Jul.	Aizawl	Flash flood (Chhimituipui)		East Mizoram cut off from rest of the State.
NAGALAND					
1.	2-4 Sep.	Kohima	Heavy rains		i) 80 houses damaged due to landslides at Khuzama. ii) Road link between Imphal-Kohima disrupted as a portion of National highway No. 39 washed away.
ORISSA					
1.	Jul. (4 th week) and Aug. (1 st week)	Balasore, Bhadrak, Cuttak, Kendrapara, Koraput, Mayurbhanja and Sambalpur	Moderate flood	14 human lives lost.	i) 289 villages waterlogged and many roads submerged affecting nearly 2 lakh population. ii) Many houses damaged. iii) Extensive loss to properties and damages to crops in approx. 10,000 hectares reported.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
RAJASTHAN					
1.	22 & 23 May	Barmer, Bikaner and Jaisalmer	Heavy rains	i) One woman died in house collapse at Khajuwala. ii) Nearly 5100 animals perished.	Many houses damaged.
2.	22-25 Jul.	Baran, Bikaner, Bundi, Churu, Dholpur, Ganganagar, Jhalawar and Kota	Moderate flood (Chambal)	35 villagers swept away while attempting to put up a bridge near Parcila village in Dholpur district.	Many houses collapsed.
3.	30 & 31 Jul.	Entire State	Heavy rains	7 persons died in different incidences.	i) Hundreds of houses damaged/collapsed. ii) Wall of Fort Jaisalmer collapsed.
4.	5-7 Aug.	Ajmer, Alwar, Baran, Bharatpur, Bhilwara, Churu, Dausa, Dholpur, Jhalawar and Kota	Heavy rains	One woman and a child swept away.	
*	Whole year	0.020 m.ha.		i) 46 persons died. ii) 3650 cattle perished.	i) Crop in 0.020 m.ha. affected. ii) 7152 houses damaged.
TAMIL NADU					
1.	5 May	Dindugul	Heavy rains	3 persons died.	
2.	21-23 Nov.	Karur, Nagapattinam, Perambalur, Pudukottai, Thanjavur and Trichirappalli	Moderate flood (Tamraparni and Kudamuruti)	17 persons died.	i) 19 villages marooned, 19 lakh hectares of crop land submerged. ii) 225 tanks breached. iii) 45,000 people became homeless. iv) Rail/road traffic disrupted.
*	Whole year	0.001 m.ha.		i) 103 persons died. ii) 628 cattle perished.	i) Crop in 0.001 m.ha. affected. ii) 36,501 houses damaged.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
UTTAR PRADESH					
1.	15 Jun.	Siddharth Nagar	Heavy rains		More than 48 villages affected.
2.	27-30 Jul.	Pithoragarh	Heavy rains	One woman pilgrim of Mansarovar yatra died due to landslide near Tavaghat.	Landslides near Lakhanpur and Mangati on the Mansarovar pilgrimage route reported. Pilgrims stranded at Bambudi and Barchat.
3.	17 & 18 Aug.	Gorakhpur and Jaunpur	Moderate flood (Ghaghra, Gomati and Sai)	i) 86 human lives lost. ii) 9 cattle died.	i) Dozens of villages marooned. ii) Thousands of people residing in low lying area took shelter to safer places. iii) Road and rail links disrupted at several places. iv) Substantial loss of property and agriculture reported. v) 1,023 houses/huts damaged.
4.	1-3 Oct.	Kanpur	Heavy rains	9 persons died and 2 injured due to house collapse.	
*	Whole year	0.054 m.ha.		i) 96 persons died. ii) 9 cattle lost.	i) 0.184 million people affected. ii) Crop in 0.041 m.ha. affected. iii) 1139 houses damaged.
WEST BENGAL					
1.	22 Jun.	Uttar and Dakshin Dinajpur	Heavy rains	10 persons died in landslide at Mungpoo.	i) Landslides reported. ii) 10 houses damaged.
2.	25 Jun.	Darjeeling	Heavy rains		Communication disrupted due to landslides at Kalimpong.
3.	28 Jun.	Darjeeling	Heavy rains	13 persons died due to landslides.	i) Landslides reported at Kalimpong and Kurseong. ii) 200 houses damaged.
4.	29 Jun.	South 24 Parganas	Heavy rains		Many blocks of Sundarbans inundated.
5.	3 Jul.	Calcutta, Coochbehar, Darjeeling and Jalpaiguri	Heavy rains		i) 3000 people became homeless. ii) One corporation school building damaged in Calcutta.
6.	20 Jul.	Hooghly and North 24 Parganas	Flash flood (Ichchamati)	One person died at Barasabati.	Many areas waterlogged making people homeless.

S.N.	Date / Period	Area affected	Intensity (River)	Casualties	Extent of damage
7.	Aug. (2 nd week)	Malda and Medinipur	Severe flood	33 persons died.	3000 huts damaged and 13,000 houses washed away.
8.	15 Aug.	Darjeeling	Heavy rains		Kalimpong detached from rest of the State due to landslides.
9.	16 Aug.	Malda	Heavy rains		40 villages waterlogged.
10.	19 Aug.	Howrah	Heavy rains		Vast areas of land inundated.
11.	24 Aug.	Nadia	Heavy rains		Nabadwip town waterlogged.
12.	26 Aug.	Darjeeling	Heavy rains	2 persons died in a landslide.	Landslides reported.
13.	Sep. (1 st week)	Bardhaman, Malda, Murshidabad, Nadia, Uttar Dinajpur and Dakshin Dinajpur	Moderate flood (Ganga, Mahananda and Mayurakshi)	4 persons died.	i) 2.15 lakh people affected and thousands became homeless. ii) Extensive damage to property and agriculture reported.
14.	14 Sep.	Howrah	Heavy rains		300 families became homeless in Amta village.
15.	22-26 Sep.	15 districts including Bardhaman, Birbhum, Calcutta, Howrah, Malda and Nadia	Severe flood (Kangsabati, Kapileshwari, Roopnarayan and Subarnarekha)	79 persons including 2 children died.	i) Vast areas waterlogged. ii) Rail, road and air services disrupted. iii) Total 30 lakh population affected. iv) Paddy crop in several thousand hectares damaged.
16.	Oct. (2 nd week)	Bardhaman, Malda, Uttar Dinajpur and Dakshin Dinajpur	Moderate flood		i) 92,000 kutcha houses damaged ii) Standing paddy crop damaged.
*	Whole year	2.593 m.ha.		i) 142 persons died. ii) 3272 cattle lost.	i) 12.848 million people affected. ii) Crop in 1.095 m.ha. damaged. iii) 5,56,660 houses damaged.

* Casualties and damages due to Floods and Heavy rains as reported by the Central Water Commission and Ministry of Agriculture

S.N.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
------	---------------	---------------	-----------	------------	------------------

TABLE – XII : CYCLONIC STORM

**ARABIAN SEA
CYCLONE**

1.	16-22 May	Formation Near 14.5°N; 70.5°E About 350 km WSW of Panjim at 0300 UTC of 17 th .	Very Severe Cyclonic Storm	i) 453 persons (most of them fishermen) from Jamnagar, Kutch and Mehsana districts lost their lives. ii) 50,448 cattle lost.	i) Jamnagar, Kutch and Mehsana districts of Gujarat, affected. ii) More than 4,500 houses damaged.
		Landfall No landfall in Indian Territory			
		Dissipation Over NW Rajasthan and neighbourhood on 23 rd .			

BAY CYCLONES

1.	15-19 Oct.	Formation Near 16.0°N; 88.5°E About 530 km SE of Puri at 0300 UTC of 16 th .	Very Severe Cyclonic Storm (Maximum Reported Intensity : T4.5)	In West Bengal, i) 197 persons died. ii) More than 8300 cattle lost.	i) Coastal Orissa and Gangetic West Bengal affected by widespread rainfall with heavy to very heavy falls on 17 to 19 and 18 & 19 respectively. ii) Water-logging reported in Calcutta. iii) Storm surge of 2 to 2.5 metre reported at Chilka Lake at landfall. iv) Crops in thousands of hectares of land destroyed.
		Landfall Close to Gopalpur (Orissa coast) between 1900 and 2000 UTC of 17 th .			

S.N.	Date / Period	Area affected	Intensity	Casualties	Extent of damage
		Dissipation As a less marked Low Pressure Area (LPA) over Bihar Plateau and adjoining Gangetic West Bengal on 20 th .			
2.	25-31 Oct.	Formation Near 13.5°N; 95.5°E About 350 km NE of Port Blair at 0300 UTC of 26 th . Landfall Near Paradip (Orissa coast) on 29 th (between 0400 & 0530 UTC). Dissipation Over Bay areas near coastal Andhra Pradesh and neighbourhood on 1 st November.	Super Cyclonic Storm (Maximum Intensity Reported : T 7.0 with estimated lowest central pressure: 912hPa wind instrument went out of order)	(a) In Orissa State i) 9885 persons died, of which, 8119 from Jagatsinghpur district alone. ii) 2142 persons injured. (b) In West Bengal 2 children died and 50 persons injured in South 24 Parganas.	i) As the system was of unprecedented intensity, it caused very heavy damage and devastation along the coastal districts of Orissa and adjoining districts in West Bengal. ii) Cuttack, Dhenkanal, Jagatsinghpur, Jajpur, Kendrapara, Keonjhar, Khurda, Mayurbhanja and Puri districts of Orissa and Medinipur. Murshidabad and South 24 Parganas districts of West Bengal affected. Jagatsinghpur district in Orissa worst affected. iii) In Orissa, (a) According to Touring Officer's Report, storm surge of 9 m above astronomical tide was reported at Paradip from 0630 hrs. IST to 1600 hrs. IST on 29 th . Storm surge penetrated into the land and there was a tidal inundation upto 35 km from coast. (b) Crops in over one lakh hectares damaged. (c) Over 12.48 lakh houses damaged. iv) In West Bengal, (a) 10,000 people affected. (b) Many houses damaged.