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ANNUAL FLOOD REPORT - 1996

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ANNUAL FLOOD REPORT 1997 ~~1996~~

IRRIGATION AND WATERWAYS DIRECTORATE

GOVERNMENT OF WEST BENGAL.

CALCUTTA, ~~APRIL, 1997~~ ?

ANNUAL FLOOD REPORT OF WEST BENGAL

FOR THE YEAR ~~1996~~ 1997

C O N T E N T S

INTRODUCTION

1. The State of West Bengal consists of a combination of land varying from the high hills on the ~~north~~ north to the seas on the South. With the Tropic of Cancer running across it, the State is located between 21^0 31' 14" North latitudes and 85^0 45' 20" and 98^0 53' East longitudes. The geographical area of the State is about 87, 853 Sq. Km. Flood Season in State starts from 15th June and extends upto 15th October.

CLASSIFICATION OF AREAS

1. Geographical area	=	87,853 Sq. Km.
2. Area under forest	=	11,880 Sq. Km.
3. Total flood prone area	=	37,600 "
4. Area already protected	=	26,500 "

1.1 The State can be ~~demarcated~~ as demarcated into three district drainage basins, coming under the Ganga, Brahmaputra and Subarnarekha system respectively. The afore stated main basins in turn can be divided into Sub-basins having individual catchments of their own. The area wise distribution of the above main basins in the State is under :-

1)	Brahmaputra Basin	-	14,208 Km^2
2)	Ganga basin including Sundarban area.	-	71,485 Km^2
3)	Subarnarekha Basin	-	2,160 Km^2

1.2. River Systems.

1.2.1 Brahmaputra Basin Drainage the northen regions of the State, the rivers within the Brahmaputra system consists of a totalarea of 14,2000 Km^2 the main rivers being Sankosh, Raidak, Torsa, Kaljani, Jaldhaka, Teesta.

The different tributaries of these rivers are listed below :-

A.	Sankosh	-	Chiklajhore
B.	Torsa	-	Raidak-I, Raidak-II, Turturi.
C.	Torsa	-	Kaljani-Sil-Torsa, Char, Torsa, Dolong, Sapjai, Ghargharia, Goram, Dina, Pana, Jainti, Gabur Basra.
D.	Jaldhaka	-	Mujnai, Murti, Diana, Sutanga, Dolong, Dharala, Ghatia, Kumlar, Gilandi, Buduya.
E.	Teesta	-	Great Rangeet, Raman, Rangro, Lish, Ghish, Chel, Mal, Neora, Karali.

Brief description of the above rivers :-

A. Sankosh :- It is the eastern most river under Brahmaputra system in this State and serves as the natural boundary between West Bengal and Assam. After being joined by Raidak-II, it outfalls into Brahmaputra in Bangladesh by the name Gandadhar. The river has its origin in Bhutan.

B. Raidak :- Originate in Mt. Akungphu at an altitude of 4000 M of Bhutan. The river bifurcate into two channels at Bhutanghat, close to Indo Bhutan border. One of the branches, namely Raidak-I joints the united stream of Torsa and Kaljini, while the Raidak-II is joined by Sankosh and outfalls into Brahmaputra to Bangladesh by the name Gangadhar.

C. Torsa :- The river Torsa in Chumbi Valley of southern hill at an altitude of 7065M. It flows through Tibet, Bhutan, West Bengal and Bangladesh. Below Hasimara Bridge (on NH 34) it bifurcate into two channels, viz. Sil Torsa and Char Torsa. They reunite at Datlakhowa forest. The river passes by the Coochbehar town and is joined by Kaljani river and Raidak-I. The combined flow outfalls into Brahmaputra near Nageswari at Rangpur in Bangladesh.

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D. Jaldhaka :- The river has its origin Bitang lake in Sikkim at an altitude of 4400M. It flows through Sikkim, Bhutan, West Bengal and Bangladesh. After the river is joined and Sub-mountaineous regions, if finally flows into Dharals river and the combined stream, getting the name Dharala Ultimately outfalls into Brahmaputra in Bangladesh.

E. Teesta :- Teesta originated in the Glaciers of North Sikkim at an altitude of 6400 M and is formed by the Union of two streams viz. Lachen and Lachung at Chungthung is Sikkim. It enters West Bengal at Rangpo and upto Melli, it forms the boundary between West Bengal and Sikkim. Two of its tributaries, iva. Great Rangit and Ramman, also serve as the natural boundary between the two states. It outfallsinto Brahmaputra in Rangpur district of Bangladesh.

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1.2.2. GANGA BASIN:-

The Central, Southern and the South-Western parts of the State of West Bengal constitute the Ganga Basin. The Ganga, only a stretch of which is now flowing ~~through~~ through the narror Central weist line of the present shape of this State had been an active Delta builder.

The Ganga system comprise a total area of 71.485^2 within the State of West Bengal. The catchment areas ~~of~~ different rivers within this system in the State of West Bengal as under:-

Serial No.	Name of river Sub-Basin.	Catchment area in KM^2
A.	Mahananda	9460
B.	Punarbhaba	730
C.	Atrai	910
D.	Pagla Barsloi	730
E.	Dwarka-Brahmani	2500
F.	Bhagirathi-Hooghly	1170
G.	Jalangi	5344
H.	Mayurakshi	2720
I.	Ajoy	2490
J.	Keri-Gangur-Ghea	1302
K.	Churni	800
L.	Damodar	5250
M.	Dwarkeswar	4430
N.	24-Parganas (South & North) and Calcutta Prot Drainage Basin.	4330
O.	Kangsabati	8369
P.	Silabati	3952
Q.	Rupnarayan	2548
R.	Bidhban	820
S.	Rusulpur	1130
T.	Haldi	980
U.	Tidal Zone (Sundarbans areas)	11320

The Different tributaries of these rivers are listed below:-

1. Punarbhaba- Punarbhaba
2. Mahananda-Mechi, Balasan, Dauk, Nagar, Kulik, Gumar, Chiramati, Tangan.
3. Atrai - Atrai.
4. Pagla - Barsloi - Pagla, Barsloi, Bagmari.
5. Brahmani - Dwarka - Brahmani, Dwarka.
6. Bhagirathi-Hooghly - Bhagirathi, Hooghly.
7. Jalangi- - Halangi, Silamari, Bhairab, Suta
8. Mayurakshi - Mayurakshi, Babla, Noon Beel Shiddheswari, Kuiya, Bakreswar Kopai, Sal, Monikarnia, Laoki, Kana Mor, Gambhira.
9. Ajoy - Ajoy, Hinglow, Kungor .
10. Khari-Gangur-Ghea - Khari, Brahmani, Kabks, Bangour Ghea, Behula, Kana.
11. Churni - Churni.
12. Damodar - Damodar, Barakar, Sali.
13. Dwarakeswar - Gandheswari, Arkasha, Berai, ~~Dwarkeswari~~. Dwarakeswari.
14. Rupnarayan - Mundeswari, Dwarkeswar, Gandheswari Berai, Damodar, Tarjuli, Sankari, ~~Silabati~~, Silabati, Joynanda, Kubai, Parang, Kanki.
15. Haldi - Haldi, Kangsabati, Kumari, Bhairab, Banki, Tarafeni, Kaliaghai, Bagdrai, Chand, Kapaleswari.
16. Rasulpur - Rasulpur, Dichaban.
17. Tidal Rivers - Tolly's Nullah, Keorapukur, Ichamati, Raimangal, Kultigong Jamuna, Kalindi, Hari, Banga, Gosaba, Metia, Diali, Thakuran, Raidighi, Saptamukhi, Muri Ganga.

A Brief note on the above Sub - basins.

1) Mahananda - The river Mahananda originate from Patlajhora near Kursaong town. It Bifurcates into two channels, viz. Fulahar Branch which flows through Bihar and Bansloi Branch which flows through West Bengal. At Atplaces, it froms the Indo-Bangladesh border. Mahananda carrying the flow of four tributaries, namely Nagar, Kalindri, Tangon and Punarbhaba, drains into Ganga from the nroth-Western side at Godogarighat just downstream, of the point where Ganga leaves the boundary of West Bengal.

2) Atrai :- Punarbhava-Some rivers like Sahu, Nim, Talma, Chani, Panga originate from the highlands in the district of Jalpaiguri. They gradually meet together afterwards, the combined stream assumes the same Karatowa. It then eaters Bangladesh where it assumes the name Atrai and bifurcates into to channels viz. Deepa and Atrai.

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The question channel i.e. Atrai reenters West Bengal in Kumarganj P.W. of West Dinajpur district. Covering some 40 Kms. length in the State it reenters into Bungladesh and ultimately outfalls into Brahmaputra.

The Dhepa on the other hand taking a south-Westernly course enters Gangarampur P.S. in West Bengal district, assuming the name Punarbhaba. Covering some 40 Km.s in length in West Dinajpur district, it touches the eastern boundary of Malda District and enters Bangladesh. Further down, it meets Mahananda in Bangladesh.

3) Nagar-Kulik Gamari Chimati Tangon Zlindri.

These rivers flow through Malda and West Dinajpur Districts. Somewhere they form the boundary either between West Bengal and Bihar or between West Bengal and Bangladesh. The ultimately outfall into Mahananda.

Nagar originating the Bangladesh flows along the boundary with West Bengal. Taking a southernly course, it receives a spill channel of Mahananda and is joined by Klik which was also its origin in Bangladesh. The Gamari and Chairrati are two other small rivers that blow thrugh West Dinajpur district before meeting the combined stream which ultimately outfalls into Mahananda.

Tangon is a tributory to Mahananda. It rises in Bangladesh. After flowing through the districts of West Dinajpur and Malda, it meets Mahananda on the boundary of Malda and Bangladesh.

River Kalindri has it origin in the North Bihar, Flowing across the plains of Purnea district, it enters Malda and outfalls into Mahananda.

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Pagla - Pansloi-Brahmani. These rivers rise in Rajmahal hills of Bihar. Flowing easterd across Bibhum district, they enter Murshidabad district as the tributaries of Bhagirathi.

5) Jalangi-Bhairab. Jalangi takes off from the right bank of river Padma in Murshidabad district, 165 Km. downstream of when it receive water from Padma. The river ends it journey by finally out falling into Hooghly area Nabadwip town. In it lower stage of journey, it is also known as Kharda.

Bhairab takes off from Gnaga in P.S. Ialbag of Murshidabad district. It is now almost a dead channel but furing rainy season for a few days, it receives watdr from Padma.

6) Ichamati-Churni. River Mathabhanga rises near to the mouth aof the Balangi on the Padma. It is not an important river in this State as it flows mainly in Bangladesh,. It flows only a few Kms. within Nadia district. At this stage, the river Bifuracates into two channels, the eastern branch, i.e. Churni runs a few Kms. in the district in a south - West direction to meet Bhagirathi. The other branch is known as Icharati which gets little supply from Mahananda and thrives on wash-outs and ridal flows.

7. Bhagirathi Hooghly. Bhagirathi or Hooghly is the rain river in the State. It is in fact the main artery of flow. Before the 12th century, the Ganga has its main course down Bhagirathi-Hooghly. Subsequently, the main flowx was pushed to the east through the present course of Padma. The flow of Bhagirathi increases down stream due to the run off and outflow from a number of eastern and western tributaries.

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After itd confluence with Jalangi, Bhagirathi is known as Hooghly and forms the boundary between 24- Parganas (North and Hooghly districts.)

8) Mayurakshi-Babla.

Mayurakshi originates from the Shigh lands of Santhal Parganas. It is the main river in Birbhum district. Carrying flows of different tributaries, its outfalls into Hijol Beel of Murshidabad district. Babla takes off from the Beel and drains into Bhagirathi.

9) Ajoy:- It rises in the hills near Deoghar in Bihar. The principal tributaries of this river areas Patro, Janiti, Darna, Kunoor and Hinglow.

10) Damodar:- It rises in the Palaman hills in Bihar. The river bifurcates into two channels at Baguahama, The main flow passes though Mundeswari channel and discharges into Rupnarayan. The other one, Amta channel carries discharges during high floods and outfalls into Hooghly.

11) Dwarakeswar-Silabati-Rupnarayan.

The lower tidal reach below the confluence of Dwarkeswar and Silabati is known as Rupnarayan. After receiving the rain flow Damodar through Mundeswari and branch of Kangsabati i,e; Old Cossye or Palaspai Khal, it ultimately outfalls into Hooghly. The river is tidal throughout itsentire course.

Dwarkaswar rises from the highlands of Purulia district. River Gangeswari rising from Bankura district meet Dwarkeswar near Bankura town Receiving waters of other streams like Arkasha, Berai, it enters Hooghly district and meets Silabati to form Rupnarayan.

Silabati originating in Purulia district, receiving water of Joypanda and after treversing through Midnapore district, it meets Dwarkeswar.

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12) Kangsabati - Kaliaghai-Haldi.

River Kangsabati rising in Purulia district is joined by Kumari in Bankura district. Further down, it is joined by the combined stream of Bhairab Banki and Farafeni rivers and thereafter flows an through the Midnapore district. After a tortous Padaspai Khal out falls into Rupnarayan.

River Kaliaghai trickles out from Jhargram P.S. in Midnapore district. Along its journey, it is fed by the flow of trabutaries Kapaleswari, Baghai and Chandia. The combined flow meets the another arm of Kangsabati i.e. New Cossye to form Haldi which falls into Hooghly.

12) Rasulpur:- It is river of Contai Sub-Division of Midnapore district formed by the three streams Bagda, Sarpai and Madhakhati and ultimately meets Hooghly.

14) Ridal rivers of Southern West Bengal.

Apart from the rivers described earlier within Ganga and Brahmaputra syste, there is a group of rivers in southern part of the state which fall in the tidal zone. These rivers mostly lie in the deltime zone to the east of Hooghly river popularly known as Sundarbans and form an intricate network with a number of criss-cross into connection Channels, thus dividing the land spill channels of ~~Ganga~~ Ganga, then upland supply running dry, during winter months. But gradually their offtakes from Ganga have deteriorated and in some cases being out-off from the prant river. New these rivers drain off whatsoever fresh discharge comes

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Country side, thus ultimately draining into Bay of Bengal though one or other of the principal estuaries in the area thick are, starting from Hooghly river sucessively the Barata of Muriganga or Channel Creek, Saptamukhi, Thakuran, ~~Malta~~ matla, ~~Gosh~~ Gosaba, ~~Mariabhanga~~ Muriganga, ~~Raimangal~~ Raimangal etc.

The Tolly's Nullah or the Adi Ganga, as it is sometime called is a small but important tidal creek draining into the Hooghly from the left in the victinity of the city of Calcutta.

1.2.3. SUBARNAREKHA BASIN.

The river Subarnerakha, though it has every small catchment within this State has get separate entity as it direct falls into the Bay of Bengal. It has its origin in the hills of ~~Chatenagpur~~ Chotonagpur range ~~rante~~ at an elevation of 609M. It earains a total areas of 18,951 Km^2) in ~~West Bengal~~ (13, 950Km^2) in Bihar, 2160 in West Bengal and 3201 Km^2 in Orissa) The main tributaries of the river areKanchi and Kharkai above Chandil in Bihar, Kakhai in Bihar and Orissa and Belong in West Bengal.

2. RAINFALL:- The main rainfall season in this State is the southwest monsoon season during which the entire land (excepting the extremenorth, the extreme northeast and extreme south) gets 75% of the annual rainfall. The Gangatic Plains of West Bengal 78% of its annutal rainfall during the fear months period, June to September. During the last seventy five years the dates of onset of monsoon over West Bengal was spread between last week of May to last week of June and and these of its withdrawal between last week of September to seconds week of October.

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2.1

RAINFALL PATTERE.

The main channel of Ganga divides West Bengal in two parts which are by and large homeggeneous from the meterological point of view . The northern half is designated as Sub-Himalayan West Bengal and the Southern half Gangetic West Bengal. Sub-Himalayan West Bengal is more susceptible heavy rains both in respect of amount we well as in frequence of occurance. Very heavy rain is more frequent in first two monsoon months (June and July) than in subsequent in Sub-Himalayan WestBengal. In Gangestic West Bengal the frequence is mixiмum in August followed by June, September and July in that order.

On the basis of rainfall distributiod , the State can be sub-divided into two breaк Zones.

1) The Himalayan and Sub-Himalayan Region.

ii) The Gangestic Plains.

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The Himalayan and Sub-Himalayan regions comprising districts of Darjeeling, Jalpaiguri, Cooch-Behar and Northern part of Islampur Sub-Division of West Dinajpur district of high incidence of Rainfall from 200 cm. to over 400 cm. to over 400 cm. about 80% of which is found to occur during the monsoon season for June to September. On the average Darjeeling, Cooch-Bhear and Jalpaiguri get 114.112 and 110 rainly days respectively in a year. The monsoon generally follow a northernly tract to ultimately break up against Eastern Himalaya - causing very heavey rainfall and conditions, it shifts northwards to the Himalayan foot hills. It has been found that a precipitation to the tune of 200 to 300 m.m. in 2 hours is not unusual while in more than forty occasions or rainfall of 250 mm and above have been registered during 1891-1965.

The Gangestic plain which constitute the major portion of the State can be further Sub-divided into the flowing seetors on the basis of average rainfalls-

SECTOR-I. Comprising the district of Bankura, Birbhum Murshidabad and Burdwan which receive an average rainfall between 1140 mm and 1400 mm.

SECTOR-II Consisting of the districts of Nadia, Hooghly, Western portion of West Dinajpur, Midnappre and North 24-Parganas having an average annual rainfall between 1400 mm. and 1650 mm.

SECTOR-III Comprising Howrah, Eastern portion of West Dinajpur, South 24-Parganas and Midnapur District which register and average annual rainfall between 1650 mm. and 1900 mm.

Such regional averations in the preciptitation pattern causes flood conditions from time to time.

The rainfall data as collected from Indian Metrological Departmen t for the districts is shown in Annexures.

5.

Rainfall in West Bengal during ~~1996~~ 1997 (in m.m.)

Serial No.	District	1.1.96- 28.2.96		1.3.96-31.5.96		1.6.96 - 30.9.96		% Departure	1.10.96 -15.10.96		% Departure.
		Actual	Normal	Actual	Normal	Actual	Normal		Actual	Normal	
1.	Cooch-Behar	26.3	25.6	700.6	610.1	2361.1	2747.5	-14	29.2	143.7	-80
2.	Jalpaiguri	40.3	22.6	666.6	447.6	2691.6	2656.7	1	79.2	109.8	-28
3.	Darjeeling	50.8	30.6	269.3	335.1	2504.0	2438.6	3	128.7	107.0	20
4.	N&S Dinajpur	8.1	18.7	42.0	197.7	1167.6	1065.1	9	47.5	91.4	-20
5.	Maldah	37.9	30.4	43.3	155.6	1448.3	1081.4	34	51.3	83.6	-39
6.	Murshidabad	23.0	27.9	315.6	182.4	956.1	1038.0	-8	65.4	79.6	-12
7.	Birbhum	34.8	26.5	166.7	122.1	1178.7	914.4	29	24.4	62.4	-61
8.	Burdwan	16.1	35.5	21.7	158.5	1091.7	1039.9	5	35.0	69.9	-50
9.	Bankura	55.4	37.5	43.0	138.3	1138.7	1003.3	13	19.0	61.4	-69
10.	Purulia	36.8	26.9	38.6	87.7	1319.5	1055.8	25	5.3	58.2	-91
11.	Midnapur	27.4	42.3	112.9	175.6	1122.5	1123.7	0	27.5	91.7	-70
12.	North-24Pgs.	21.8	27.7	107.4	152.9	1261.3	1180.9	7	80.4	89.9	-11
13.	South-24 Pgs.	37.9	38.0	113.6	195.7	1292.55	1277.4	1	35.7	97.5	-63
14.	Nadia	91.0	36.0	170.2	231.3	1215.9	1023.4	19	29.0	84.8	-66
15.	Hooghly	56.8	27.7	126.2	152.9	1202.3	1180.9	2	34.4	89.9	-62
16.	Howrah	18.6	50.9	67.1	232.7	905.6	1228.3	-36	51.6	78.9	-35

Map ?

~~Chief~~ Rainfall recorded at different Stations during flood season 1996(mm)

C H A R T -A.

Serial No.	Rain Gauge Station ?	8/7	9/7	10/7	11/7	12/7
1.	Jalpaiguri	19.8	71.2	37.4	47.2	93.8
2.	Cooch-Behar	N.A.	44.5	44.5	31.8	92.0
3.	Siliguri	71.6	2.8	16.2	47.0	280.4
4.	Alipurduar	0.6	121.4	67.8	11.4	210.0
5.	Hasimara	62.5	93.8	21.8	62.5	137.5
6.	Banarhat	43.0	36.8	20.3	8.0	135.5
7.	Malbatan	59.0	N.A.	74.0	57.6	176.4

C H A R T - B.

Serial No.	Raingr Gauge Station ?	6/8	7/8	8/8	9/8
1.	Maithon	18.8	54.6	44.2	--
2.	Panchet	44.8	38.8	19.0	--
3.	Tilaiya	12.2	49.0	32.2	--
4.	Tenughat	12.2	29.5	67.8	--
5.	Durgapur	17.4	29.2	74.6	--
6.	Massanjore	1.2	19.2	222.2	54.4
7.	Tilpara	5.4	15.4	143.8	162.4
8.	Harinkhola	71.0	60.2	47.4	88.8

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3. REPORT ON FLOOD AND EROSION IN WEST BENGAL DURING THE YEAR ~~1996~~.

The districts of Darjeeling, Jalpaiguri and Coochbehar in North Bengal experienced a continuous spell of rain from 11. 07. 96 to 18. 07. 96. Consequently all major rivers of North Bengal crossed danger level and at many places the river level was above extreme danger level. The high flood passing through these rivers caused extensive damages at various vulnerable and critical stretches, embankments, spurs, structures and other protective works. The major breaches occured on different embankments are indicated below :-

1) The armoured Manabari embankment on river Chel near Oodlabari Grampanchyat breached for a length of about 80 mtrs ;

2) The Chengmari embankment on river Diana breached on 4 places total length being nearly 3.5 KM ;

3) The left embankment on river Teesta at Coochlibari breached for a length of 600 mtrs.

In Uttar Dinajpur during the above spell of flood the Westweir embankment on river Doloncha and adjoining Sufnikhola embankment breached at 3 places causing flooding of adjoining area.

In Dakshin Dinajpur the rivers Tangon, Punarbhava and Atrai remained above danger level for more than 8 days. Balurghat Town was threatened due to slips, cuts and erosion on the Town protective embankment. Some areas of Balurghat Block and 23 Gram Panchayats in Gangarampur Block including a part of Gangarampur Municipality Municipality was affected due to flood.

I n Malda district river Mahananda(Fulahar Branch) crossed extreme danger level on 16. 7. 96 and the river flowed above danger level for a considerable period resulting extensitve damages to irrigation embankment and protective works. The river Ganga also rules above danger level for a considerable period. Erosion was active on Bhutnidiara Circuit Embankment and the northern part of the island was threatened with erosion. It may be pointed out that at this portion the Bhutnidiara Circuit embankment was eroded last year and the proposed new retired embankment could not be constructed due to non-availability of land. Active erosion also took place on the left bank of river Ganga from Radhutola to Manikchakghat. This year the erosion zone has extended towards upstream side.

In the month of July'96 severe erosion was observed at Mouza Alaipur(Shibnagar Point) and Nashibpur in P.S. Lalgola, the total affected length being nearly 2 KM and the maximum width from bank line at certain point was nearly 200 mtrs. The Akherigunj Market place and some adjoining

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areas with built up katcha and pucca houses were severely threatened and the residence have to be shifted to safer places. Further, the Akherigunj Bazar was disconnected due to disruption in the pucca road.

West Bengal is a tail end State of the Ganga basin, the largest river basin in India. Due to this position of the State of West Bengal it has to bear the effect of mamoth flood discharge during every monsoon. Even when there is no appreciable rain in the district of Malda and Murshidabad through which the river Ganga/Padma is passing before entering into Bangladesh there is high intensity flood due to monsoon rains in the States of Himachal Pradesh, Uttar Pradesh and Bihar as it has happened in this year.

The maximum water level attains during the flood period was 26. 10 metre on 3. 9. 96 at Manikchak against extreme danger level of 25.30 metre while the maximum level was 24.65 meter on 3. 9. 96 at Farakka against the extreme danger level of 23.77 metre. From records it is observed that such similar levels were recorded to be 26.01 metre at Manikchak in 1979 and 24.85 metre at Farakka in 1987.

Due to rise in Ganga, water level in Fulahar branch of Mahananda also increased and caused slips at different places. Due to local rainfall, water level in Barsoi branch also increased and is still above danger leve.

Name of river	Gauge Station	D.L.	E.D.L.	Maximum level attained with date.
Ganga	Patna (Gandhighat) Bihar	48.60	50.27	49.73 on 29.8.96
Ganga	Manikchak(Malda)	24.69	25.30	26.10 on 3.9.96
	Farakka(Malda)	22.25	23.77	24.65 on 3.9.96
	Nurpur(Murshidabad)	21.03	21.64	23.02 on 3.9.96
	Garia(-do-)	20.57	21.18	22.51 on 4.9.96
	Chakghat(do-)	20.88	21.49	21.93 on 4.9.96

On account of such high intensity of flood in the river Ganga was areas were flooded in the district of Malda affecting several lakhs of people, causing damages to large number of houses and standing crops, roads and flood embankments. It has caused damages to the bank protective work both in the districts of Malda and Murshidabad and it is apprehended that during the falling stage of the flood there will be wide scale land erosion on the left bank of the river Ganga on the upstream of Farakka Barrage in the District of Malda and on the downstream of Farakka Barrage in the right bank of the river Ganga/Padma in the district of Murshidabad. To combat the situation the State has to undertake massive restoration works in the districts of Malda and Murshidabad.

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In the cirst week of August the State experienced the second spell of flood due to heavy rainfall in the catchments of DVC and Sidheswari river of Mayurakshi System. The rainfall recorded in different gauge stations are given in Annexure-II.During the spell Maithon and Panchet had to release heavy discharge down the reservoirs. Consequently heavy discharge passed down Durgapur Barrage for a prolong period, the maximum discharge being 1,22,000 cusecs.

Similarly, due to heavy flood discharge in the Siddheswari uncontrolled catchment the out flow from Tilpara Barrage was more than 1,00,000 cusecs. The other rivers in the Mayurakshi system namely Dwarka, Bharambhani, Bakreswar and Kapai also carried heavy discharge resulting in flood in the lower valley in Kandi,Khargram, Bharatpur and Barwan P.S. The protective embankments on rivers Dwarka and Kuye breached at several places.

Consequent to the above flood the river Bhagirathi was flowing above extreme danger level at Swarupgunj and Katwa for a prolong period causing inundation to an area of 79 Sq. KM in Nabdwip, Nakashipara and Krishnagunj Police Stations. Due to breaches in Malhirdanga(Ex-Zamindari embankment) at 3 places, a vast area in P.S.Santipur was a inundated. Besides, some length of area of Tarapur embankment and Jagatkhali embankment were threatened.The river Silabati and Rupnarayan also crossed extreme danger level and remained above EDL for a prolong period.As a result, the Unprotective low lying areas in Ghatal were inundated. However, there was no major breach in protective embankment in Midnapur district.

Due to heavy discharge passing down the river Damodar, the lower flood plain areas in the Howrah and Hooghly districts suffered causing damages in the embankments and inundation of low lying spill area particularly the Khanakul and Pursura Blocks in Hooghly and Udaynaranpur block in Howrah Districts .

Following heavy precipitation in the catchment of the Damodar Basin during the period from 7. 8. 96 to 12. 8. 96 release of Tenughat Dam and combined discharge from Maithan & Panchayet Dam, the water level of Durgapur Barrage increased sharply from 7. 8. 96 to 9. 8. 96 .The discharge at downstream of Durgapur Barrage incurred rapidly from 86,250 cusecs on 7. 8. 96 tp 1,23,795 cusecs on 9. 8. 96.The high discharge continued for several hours and then gradually reduced to 84,825 cusecs on 10. 8. 96.As a result the plains in river area i.e. on the country side of the embankments were exposed to flooding due to water logging within the Circuit Basin along the rivers which were ruling high water level. High quantum of D.V.C.discharge was released through Amta channel,Rupnarayan, Hurhura Khal, Kana Damodar etc.The area under P.S.Shyampur,Udaynarayanpur, Bagnan, Amta,Uluberia and Bouria etc. in Howrah district and P.S.Khanakul

in Hooghly District suffered serious damages water logging and inundation. The various embankments like Amta channel, Rajapur Khal Kanadamodar, Rupnarayanleft and Hooghly right and sluices in different places in the district of Howrah suffered from severe damages. As a result of this down-pour and passing of high D.V.C. discharge slips and damages to the earthen embankment including damages to the existing protective works in the river/Canal side slopes of embankments took placeand emergency protective works were taken at those places to safeguard the flood embankments.

Due to heavy rainfall in the District of Banking during the above mentioned period the water level of the River Darakeswar rose to a great extent and crossed D.L. at Shaikpur on 8. 8. 96 at 10 hours resulting damages to the flood embankment. The water level of Mundeswari rose and crossed E. D. L. at Harinkhola on 10. 8. 96 at 6.00 hours. Causing considerable damages to the embankment at places. Due to spill over of water in the river Damodar, Mundeswari, Darakeswar some areas of Khanakul-I & II, Pursura and Arambagh Block also inundated. The total area of inundation is about 114. Sq. km. Due to spill over of River Hooghly some area at Balagarh Block also inundated comprising the 10. Sq. km.

There is no report received from Midnapore District causing heavy flood in the yeay 1996.

North Bengal Rivers

D.L.-Danger Level
E.D.L.-Extreme Danger Level
(P) -Protected
(U) -Unprotected

Sl. No.	River.	Gauge at	Level attained	Date.	Time	Remarks.
1.	Teesta	Coronation Bridge.	149.50M	12.7.96	9.00 Hrs.	Above D.L. (U)
	Protected D.L. = 150.00M E.D.L. = 153.60M		150.10M	13.7.96	6.00 Hrs.	Above D.L. (P)
	Un-Protected D.L. 149.40M E.D.L. 151.80M		150.10M	17.7.96	19.45 Hrs.	-do-
2.	Teesta	Damohani	85.65M	27.6.96	7.30 Hrs.	Above D.L. (U)
	Protected D.L. =85.95M		85.74	4.7.96	10.00 Hrs.	-do-
	E.D.L =86.30M		85.77M	5.7.96	9.00 Hrs.	-do-
	Un-protected D.L. =85.65M		85.80M	6.7.96	9.00 Hrs.	-do-
	E.D.L.85.80M		86. 25M	13.7.96	10.00 Hrs.	above D.L. (P)
3.	Jaldhaka	NH-31 Crossing	80.17M	4.7.96	10.00 Hrs.	above D.L. (P)
	Protected D.L-D.L. =					
	EDL = 80.10 80.90		80.22	4.7.96	12.00 Hrs.	-do-
	Un-protected D.L. 80.00		80.42M	13.7.96	10.00 Hrs.	-do-
	E.D.L.80.50		80.28	17.7.96	12.00 Hrs.	-do-
4.	Torsa	Hasimara	116.50	3.7.96	6.30 Hrs.	above D.L. (P)
	Protected D.L. =116.30M E.D.L. = 117.50M		117.50	13.7.96	9.00 Hrs.	Crossed EDL(P)
	Un-protected D.L. = 116.30M E.D.L.=116.90M					
5.	Diana	Chengmari	200.55	3. 7. 96	5.00 Hrs.	above D.L.
	D.L. = 200.50M					
	E.D.L = 201.40M		200.50	12.7.96	9.00 Hours	Crossed D.L.
6.	Mansai	Mathabhanga	48.70	17.7.96	10.00 Hours	Crossed E.D.L(U)
	Protected D.L = 48.40M E.D.L.=48.90M					above DL(P)
	Unprotected. D.L- =48.20M E.D.L =48.70					
7.	Sankosh	L.R.P.crossing	48.35	13.7.96	9.00 Hours	above DL(U)
	Protected D.L. 48.50 E.D.L.49.40					
	Unprotected D.L.48.20 E.D.L. = 49.10					

contd...p/2

Serial No.	River.	Gauge at	Level attained	Date.	Time	Remarks
8.	Tangon	Bansihari	25.72M	16.7.96	6.00Hrs.	Above D.L
	D.L.=25.60M E.D.L.=26.12M		25.85M	17.7.96	"	-do-
			25.94M	18.7.96	"	-do-
			25.92	19.7.96	"	-do-
			25.80	5.9.96	"	-do-
9.	Punarbhaba	Gangarampur	26.55	16.7.96	"	above EDL
	D.L. = 25.82M E.D.L. = 26.42M		26.50	17.7.96	"	-do-
			26.04	18.7.96	"	above D.L.
			26.15	19.7.96	"	-do-
			2625	22.7.96	"	-do-
			26.05	3. 9.96	"	-do-
10.	Atrai	Balurghat	23.23	16.7.96	6.00 Hrs.	above DL
	D.L. = 23.15M E.D.L. = 23.76M		23.48	17.7.96	"	-do-
			23.62	18.7.96	"	-do-
			23.59	19.7.96	"	-do-
			23.55	22.7.96	"	-do-
			23.26	3.9.96	"	-do-
11.	Mahananda	Englishbazar	21.01	28.8.96	6.00 Hrs.	above DL
	D.L.= 21.00M E.D.L = 21.75M		21.07	29.8.96	" Hrs.	-do-
			21.16	30.8.96	"	-do-
			21.69	2.9.96	"	-do-
			21.93	3.9.96	"	above EDL
			22.36	5.9.96	"	-do-
			22.42	6.9.96	"	-do-
			22.49	9.9.96	"	-do-
			22.49	10.9.96	"	-do-
			22.46	11.9.96	"	-do-
			22.42	12.9.96	"	-do-
			22.34	13.9.96	"	-do-
			21.88	16.9.96	"	-do-
			21.62	17.9.95	"	above DL
			21.34	18.9.96	"	-do-
			21.09	19.9.96	"	-do-
12.	Fulahar	Teljana	91.70Ft	21.8.96	"	above DL
	D.L.= 90.00ft E .D.L.=93.00ft		91.50ft	22.8.96	"	-do-
			91.30ft	23.8.96	"	-do-
			90.30ft	28.8.96	"	-do-
			90.40ft	29.8.96	"	-do-
			90.60ft	30.8.96	"	-do-
			94.40ft	2.9.96	"	above EDL
			94.30 ft	3.9.96	"	-do-
			92.40 ft	5.9.96	"	above D.L.
			92.40ft	6.9.96	"	-do-
			92.40ft	9.9.96	"	-do-
			92.30ft	10.9.96	"	-do-
			91.40ft	11.9.96	"	-do-
			91.00ft	12.9.96	"	-do-
			90.40ft	13.9.96	"	-do-
13.	Ganga	Manikchakghat	24.75M	21.8.96	6.00hrs.	above D.L.
	D.L.= 24.69M E.D.L.= 25.30M		24.81M	22.8.96	"	-do-
			24.96M	23.8.96	"	-do-
			25.36M	26.8.96	"	above EDL
			25.43M	27.8.96	"	-do-
			25.51M	28.8.96	"	-do-
			25.61M	29.8.96	"	-do-
			25.70M	30.8.96	"	-do-
			25.98M	2.9.96	"	-do-
			26.01M	3.9.96	"	-do-
			25.80M	5.9.96	"	-do-
			25.68M	6.9.96	"	-do-

contd...p/3

Serial No.	River.	Gauge at	Level attained	Date	Time	Remarks
13.(contd.)	Ganga	Manikchakghat	25.61M	9.9.96	6.00hrs.	Above EDL
D.L. = 24.69M			2567M	10.9.96	"	-do-
E.D.L.= 25.30M			25.65M	11.9.96	"	-do-
			25.55M	12.9.96	"	-do-
			25.42M	13.9.96	"	-do-
			24.95M	16.9.96	"	Above DL
			24.65M	17.9.96	"	-do-

Central Bengal Rivers

1.	Ganga	Farakka	22.29M	5.8.96	6.00hrs above D.L.
D.L. = 22.25M			22.49M	6.8.96	" -do-
E.D.L. = 23.75M			22.59M	7.8.96	" -do-
			22.71M	8.7.96	" -do-
			22.87M	9.8.96	" -do-
			22.73M	13.8.96	" -do-
			22.78M	14.8.96	" -do-
			22.98M	16.8.96	" -do-
			23.37M	19.8.96	" -do-
			23.52M	20.8.96	" -do-
			23.62M	21.8.96	" -do-
			23.61M	22.8.96	" -do-
			23.70M	23.8.96	" -do-
			23.89M	26.8.96	" above EDL
			24.01M	27.8.96	" -do-
			24.10	28.8.96	" -do-
			24.19	29.8.96	" -do-
			24.26M	30.8.96	" -do-
			24.56M	2.9.96	" -do-
			24.65M	3.9.96	" -do-
			24.54M	5.9.96	" -do-
			24.41M	6.9.96	" -do-
			24.29M	9.9.96	" -do-
			24.32M	10.9.96	" -do-
			24.30M	11.9.96	" -do-
			24.23M	12.9.96	" -do-
			24.13M	13.9.96	" -do-
			23.73	16.9.96	" above D.L.
			23.55M	17.9.96	" -do-
			23.28M	18.9.96	" -do-
			23.00M	19.9.96	" -do-
			22.71M	20.9.96	" -do-
	Ganga	Gbriya	21.32M	21.8.96	6.00hrs above EDL
D.L. = 20.57M			21.50M	22.8.96	6.00hrs -do-
E.D.L. = 21.18M			21.82	26.8.96	" -do-
			22.43M	5.9.96	" -do-
	Ganga	Nurpur	21.90	21.8.96	" above EDL
D.L.= 21.03M			22.10	22.8.96	" -do-
E.D.L.= 21.64M			22.28	25.8.96	" -do-
			22.36	26.8.96	" -do-
			22.83	1.9.96	" -do-
			22.94	5.9.96	" -do-
	Ganga	Chakghat	20.93M	22.8.96	" above D.L.
D.L. = 20.88M			21.24M	26.8.96	" -do-
E.D.L. = 21.49M			21.85M	5. 9.96	" above EDL

contd....p/4

Serial No.	River.	Gauge at	Level attained	Date	Time	Remarks
5.	Jalangi	Swarupganj	8.44	8.8.96	6.00hrs.	Crossed D.L.
	D.L.= 8.44M E.D.L = 9.05M		9.05M	10.8.96	6.00hrs	"E.D.L.
			9.35	13.8.96	"	Above EDL
			9.17	16.8.96	"	-do-
			9.05	17.8.96	"	Crossed EDL
			9.22M	21.8.96	"	above EDL
			9.21	28.8.96	"	-do-
6.	Churni	Hanskhali	8.17	8.8.96	6.00 hours	above EDL
	D.L.= 7.53M E.D.L = 8.14M					
7.	Bhairab	Akheriganj	19.10	1.9.96	6.00hrs.	above EDL
	D.L.= 18.44M E.D.L = 19.05M		19.33	5.9.96	"	-do-

South Bengal Rivers.

Serial No.	River.	Gauge at	Level attained	Date.	Time.	Remarks.
1.	Damodar	Champadanga	12.89	27.6.96	6.00hrs.	Crossed D.L.
	D.L.= 12.89M E.L.L = 13.50M					
2.	Damodar	Amta	5.64	8.8.96	6.00hrs.	Crossed D.L.
	D.L.= 5.64M		6.24	8.8.96	"	Crossed EDL
	E.D.L.= 6.24M		6.49	10.8.96	"	Maximum Level
			5.64M	22.8.96	"	(above E.D.L.) Crossed D.L.
			6.26	24.8.96	"	above E.D.L.
3.	Haraheswar	Saikpur	11.76	8.8.96	3.00hrs.	crossed D.L.
	D.L. = 11.73M E.L.L = 12.34M		12.06	8.8.96	10.00hrs	above D.L.
4.	Mandeswari	Harinkhola	12.85	9.8.96	1.00	Crossed D.L.
	D. L = 12.80		13.41	9.8.96	4.00hours	Crossed E.D.L.
	E.D.L. = 13.41M		13.45	10.8.96	5.00hours	above E.D.L.
5.	Rupnarayan	Baxi	4.11	29.7.96	6.00hours	Crossed D.L.
	D.L. = 4.11M		4.11	10.8.96	11.20hours	"
	E. D. L.= ~~5.58~~ 5.54M		4.55	15.8.96	9.00	above D.L.

contd...p/5

Serial No.	River.	Gauge at	Level attained	Date.	Time.	Remarks.
6.	Rupnarayan D.L. = 6.85M E.D.L = 7.46M	Bandar	8.16	9.8.96	6.00hrs.	above EDL
7.	Rupnarayan D.L. = 5.33M E.D.L. = 5.94 M	Ranichak	6.93	9.8.96	6.00hrs	above EDL
8.	Old Cossye D.L. = 8.94m E.D.L. = 9.60M	Kalmizole	10.06	9.8.96	6.00hrs	above EDL
9.	New Cossai D.L.= 9.29M E.D.L= 9.90 M	Panskura	9.45	9.8.96	6.00hrs	above D.L.

Important Reservoir & Discharge Data during Flood Season 1 9 9 6 .

(Discharge in cumecs)

Serial No.	Reservoir/ Barrage	Conservation Level(m)	Levels on (m) 5/8	6/8	7/8	8/8	9/8	Release/Discharge on(Cumec) 5/8	6/8	7/8	8/8	9/8
1.	Maithon	146.304	144.31	144.54	145.14	146.87	147.51	189.27	222.49	257.42	185.10	191.87
2.	Panchet	124.968	126.84	126.39	126.16	128.25	128.81	509.00	506.0	504.0	531.0	808.0
3.	Massanjore	121.310	114.132	114.361	114.452	115.763	117.927	3.71	3.96	63.64	4.73	377.33
4.	Kangsabati	132.588	132.19	132.124	132. 71	132.69	132.42	143.24	144.06	583.36	709.27	570.14
5.	Tilpara	--	62.789	62.606	62.667	62.332	61.752	137.63	96.28	62.30	1872.72	934.28
6.	Durgapur	--	63.856	63.856	63.703	64.008	64.008	1600.51	1972.25	2314.59	2514.73	3056.98

CONTINUED

Serial No.	Reservoir/ Barrage	Conservation Level(m)	Levels on (m) 10/8	11/8	12/8	Release/Discharge on(Cumec) 10/8	11/8	12/8
1.	Maithon	--	147.50	N.A.	146.95	202.90	N.A.	101.81
2.	Panchet	--	127.87	127.03	126.19	614.0	505.0	463.0
3.	Massanjore	--	116.064	118.262	118.354	3.88	3.71	4.84
4.	Kangsabati	--	132.16	132.04	131.98	290.93	144.46	---
5.	Tilpara	--	61.600	61.722	61.630	51.85	164.26	52.90
6.	Durgapur	--	64.008	64.008	64.008	3037.73	2603.94	2175.81

Districtwise report on cost of restoration of Irrigation Department Embankments and Canals for Flood during 1 9 9 6./

Serial No.	Name of District	Cost of Permanent restoration of damages (Rs. Lakhs)	Immediate requirement of fund for urgent restoration (Rs. Lakhs)
1.	Darjeeling, Jalpaiguri, Cooch-Behar Combined	1250.00	300.00
2.	Uttar Dinajpur	30.00	15.00
3.	Dakshin Dinajpur	50.00	15.00
4.	Maldah	370.00	90.00
5.	Murshidabad	350.00	80.00
6.	N a d i a	75.00	10.00
7.	Midnapur	50.00	10.00
8.	H o w r a h	25.00	10.00
9.	H o o g h l y	25.00	10.00
10.	B u r d w a n	25.00	10.00
	TOTAL :	2200.00	550.00

INDEX MAP OF
WEST BENGAL

SCALE: 1: 2,000,000

FLOODED AREA DURING 199 -

HYDROLOGICAL STATIONS -

LEGENDS

INT. BOUNDARY

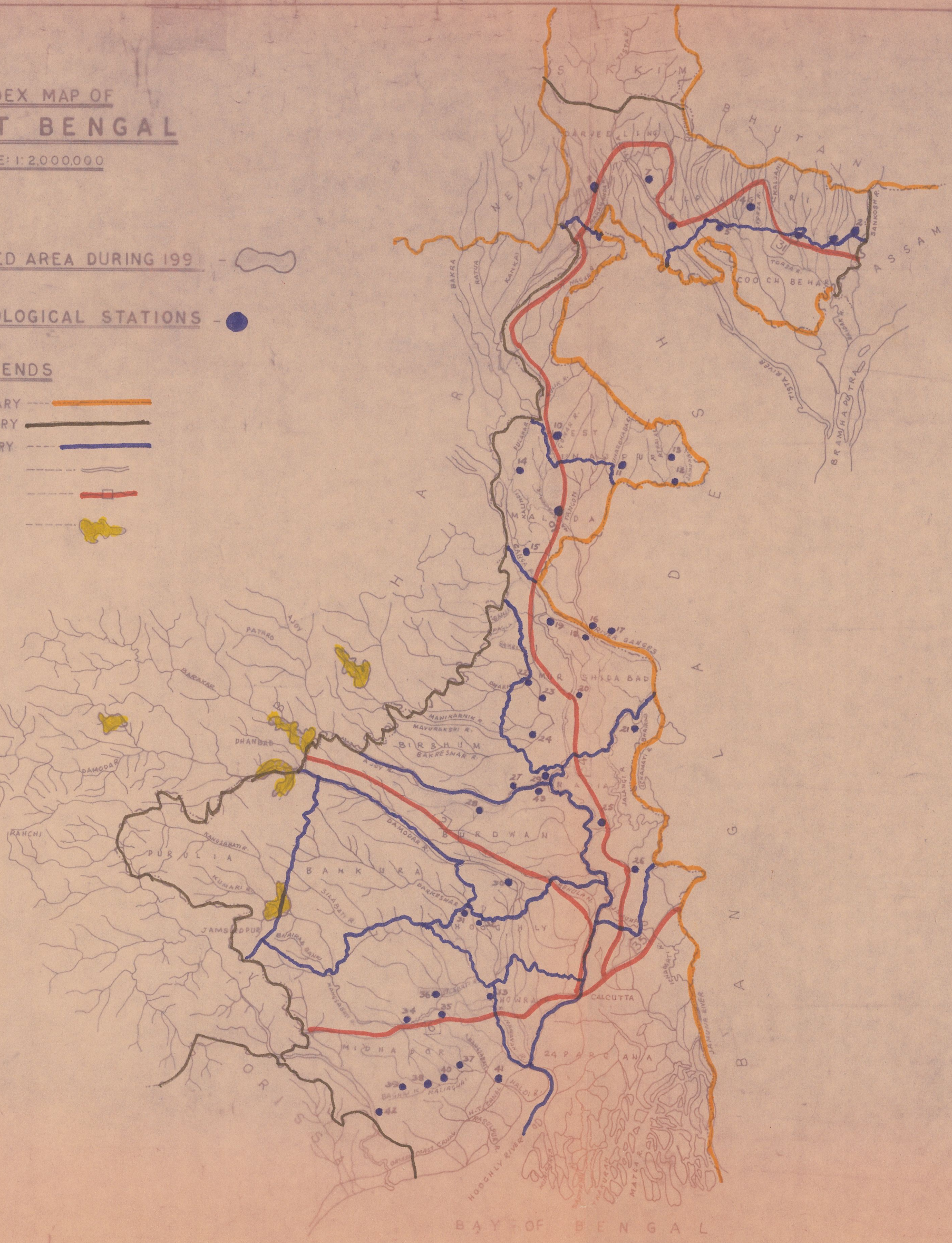
ST. BOUNDARY

DT. BOUNDARY

RIVER

N.H.

RESERVOIR



D.S.L. 120.42 M.
DATUM 120.00 M.

DATE 19.6.96 26.6.96 3.7.96 10.7.96 17.7.96 24.7.96 31.7.96 7.8.96 14.8.96 21.8.96 28.8.96 5.9.96 11.9.96 18.9.96 25.9.96 3.10.96 9.10.96

KANGSABATI RESERVOIR DIST - BANKURA

F.R.L. 121.21 M.

D.S.L. 106.90 M.
DATUM 106.00 M.

DATE 19.6.96 26.6.96 3.7.96 10.7.96 17.7.96 24.7.96 31.7.96 7.8.96 14.8.96 21.8.96 28.8.96 5.9.96 11.9.96 18.9.96 25.9.96 3.10.96 9.10.96 15.10.96

MASSENJORE RESERVOIR DIST.- BIRBHUM

24.00 M

E.D.L. 23.75 M.

D.L. 22.25 M.

DATUM 22.00 M

DATE 5.8.96 6.8.96 7.8.96 8.8.96 9.8.96 13.8.96 14.8.96 16.8.96 19.8.96 20.8.96 21.8.96 22.8.96 23.8.96 26.8.96 27.8.96 28.8.96 29.8.96 30.8.96 2.9.96 3.9.96 5.9.96 6.9.96

RIVER - GANGA - GAUGE STATION - FARAKKA
DIST - MURSHIDABAD

E.D.L. 25.30 M.

D.L. 24.69 M.

DATUM 24.40 M.

DATE 21.8.96 22.8.96 23.8.96 26.8.96 27.8.96 28.8.96 29.8.96 30.8.96 2.9.96 3.9.96 5.9.96 6.9.96 9.9.96 10.9.96 11.9.96 12.9.96 13.9.96 16.9.96 17.9.96

RIVER - GANGA - GAUGE STATION - MANIKCHAKGHAT
DIST - MALDAH

E.D.L. 21.75 M.

D.L. 21.00 M.

DATUM 20.60 M.

DATE 28.8.96 29.8.96 30.8.96 2.9.96 3.9.96 5.9.96 6.9.96 9.9.96 10.9.96 11.9.96 12.9.96 13.9.96 16.9.96 17.9.96 18.9.96 19.9.96

RIVER - MAHANANDA - GAUGE STATION - ENGLISHBAZAR
DIST. - MALDAH

86.20 M.

86.00 M.

E.D.L. 85.80 M.

D.L. 85.65 M.

DATUM 85.50 M.

DATE 2.8.96 4.9.96 5.9.96 6.9.96 13.9.96

RIVER - TEESTA - GAUGE STATION - DOMOHANI
DIST. JALPAIGURI

E.D.L. 6.24 M.

D.L. 5.64 M.

DATUM 5.40 M.

DATE 6.8.96 8.8.96 19.8.96 22.8.96 24.8.96

RIVER - DAMODAR - GAUGE STATION - AMTA
DIST. - HOWRAH

E.D.L. 9.05 M.

D.L. 8.44 M.

DATUM 7.80 M.

DATE 8.8.96 10.8.96 12.8.96 16.8.96 17.8.96 21.8.96 23.8.96

RIVER - JALANGI - GAUGE STATION - SWARUPGANJ
DIST - NADIA

E.D.L. 28.35 M.

D.L. 27.13 M.

DATUM 27.00 M.

DATE 21.8.96 22.8.96 23.8.96 28.8.96 29.8.96 30.8.96 2.9.96 3.9.96 5.9.96 6.9.96 9.9.96 10.9.96 11.9.96 12.9.96 13.9.96

RIVER - PULAHAR - GAUGE STATION - TELIANA
DIST - MALDAH

E.D.L. 26.42 M.

D.L. 25.82 M.

DATUM 25.70 M.

DATE 16.7.96 17.7.96 18.7.96 19.7.96 22.7.96 3.8.96

26.05

RIVER - PUNARBHABA - GAUGE STATION - GANGARAMPUR
DIST - [illegible]

RESERVOIR LEVELS AND RIVER STAGES
DURING FLOOD SEASON 1996.

Scale 1 cm = 1 day

EXECUTIVE ENGINEER, CHIEF ENGINEER'S DRAWING OFFICE, I & W DIRECTORATE, WRITERS BUILDINGS, CALCUTTA - 700001.

DRAWING NO: C.E. - [illegible]

DATE

ANNEXURE- IX

GAUGE READINGS OF DIFFERENT RIVERS IN THE DISTRICT OF JALPAIGURI, COOCH BEHAR AND DARJEELING UNDER NORTH BENGAL FLOOD CONTROL COMMISSION FROM 19.7.93 to 22.7.93.

(ALL READINGS IN METRE)

Name of rivers	Name of the Gauge Station	Unprotected Yellos.	Unprotected Red.	Protected Yellow.	Protected Red	WATER LEVEL AT 6.00 HRs. 19.7.93	20.7.93	21.7.93	22.7.93
1. TEESTA.	a) Teesta Bazar.	211.00	213.00			206.35	206.40	206.10	207.15
	b) Coronation Bridge.	149.40	151.80 85.30	150.00 85.60	153.60 86.30	147.35 85.58	146.70 85.56	146.55 85.32	147.45 85.46
	C) Domohani.	85.30							
JALDHAKA.	a) L.R.P. Rd.	160.70	161.30	161.00	161.00	157.57	157.47	157.42	157.37
	b) N.H.31 Crossing.	80.00	80.50	80.10	80.10	79.94	79.80	79.53	79.50
	c) Mathabhanga	48.20	48.70	48.40	48.40	47.53	48.77	48.65	48.10.
TORSA.	a) Hashimara.	116.30	116.90	116.30	117.50	116.45	116.05	116.44	115.30
	b) Cooch Behar.					40.88	41.98	42.18	41.44
KALJANI	P.W.D. Bridge. Alipurduar			45.10 (D.L.)	45.70 (B.D.L.)	45.45	46.19(upto 14.00 Hrs)	-	-
RAIDAK-I	L.R.P.	46.70	47.60	47.00	47.90	-	-	49.04	45.61
RAIDAK-II	L.R.P.	48.10	49.00	48.40	49.30	46.12	-	48.90	46.92
DIANA	Chengmari.	-	-	200.50	201.40	200.65	199.15	199.40	199.10
SANKOSH.	L.R.P.	48.20	49.10	48.50	49.40	46.19	-	48.92	46.53
MAHANANDA.	SILIGURI RD. BRIDGE.	116.00 (D.L.)	116.90 (E.D.L.)	-	-	114.80	114.70	114.83	114.40

INDEX MAP OF

WEST BENGAL

SCALE: 1:2000000

Flooded Area During 1996

LEGENDS

INT. BOUNDARY

ST BOUNDARY

DT BOUNDARY

RIVER

N.H.

SERVOIR

SIKKIM

BHUTAN

NEPAL

DARJEELING

KALIMPONG

COOCH BEHAR

ASSAM

MANABARI

CHENGBARI

COOCHLIBARI

BRAHMAPUTRA

WEST DINAJPUR

BALURGHAT

GANGARAMPUR

MALDA

FARAKKA

AKHARIGANJ

MURSHIDABAD

KANDI

NADIA

MAYAPUR & NABADWIP

BURDWAN

KHANAKUL I & II

CALCUTYA

HOOGHLY

BIRBHUM

BANKURA

PURULIA

MIDNAPOR

24 PARGANA

SAGAR

BAY OF BENGAL

ORISSA

BIHAR

JAMSHEDPUR

RANCHI

MAYURAKSHI DAM

TILAIYA DAM

MAITHON DAM

PANCHET DAM

SABATH DAM

HOOGHLY RIVER

RIVER GANGES