



Government of Odisha

FINAL MEMORANDUM ON FLOOD & HEAVY RAIN

July & August, 2020



SPECIAL RELIEF COMMISSIONER

**Revenue & Disaster Management Department
Government of Odisha**

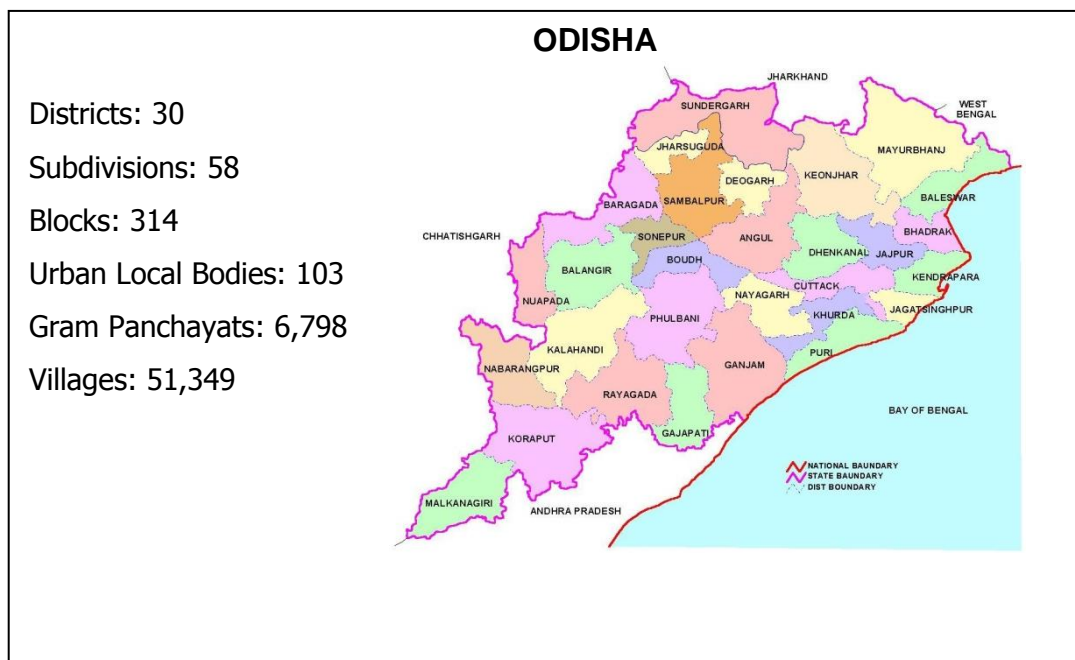


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Chapter-I

Overview



Odisha is located between $17^{\circ} 48' N$ and $22^{\circ} 35' N$ latitudes, and $81^{\circ} 47' E$ & $87^{\circ} 32' E$ longitudes. It extends over an area of 1,55,707 square km and is bounded by Bay of Bengal on the east (with coast line of about 480 km); Chhattisgarh on the west; Andhra Pradesh on the south and Jharkhand & West Bengal on the North.

The State on account of its unique geo-climatic position is vulnerable to natural disasters. Floods, droughts and cyclones have been a recurrent phenomenon in the State. Every year, the State experiences one or other major calamity without respite. The major disasters occurred in the State since 2000 are mentioned below.

Year	Calamity
2000	Drought
2001	Floods
2002	Drought
2003	Floods (Sept.)
	Floods (Oct.)
2004	Floods

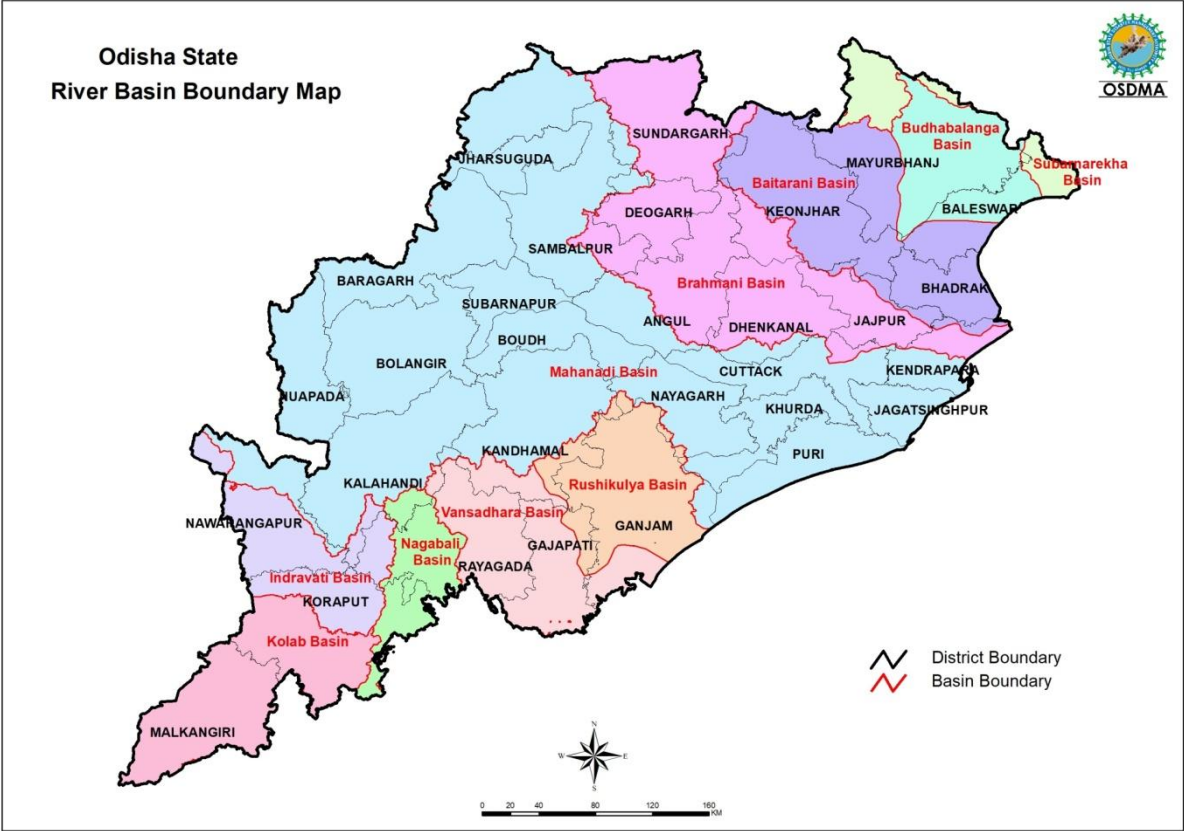
2005	Floods & Heavy rain
2006	Floods
2007	Floods (July)
	Floods (Aug/ Sept.)
2008	Floods (June/ Sept.)
2009	Hailstorm/ Tornado,
	Flash Floods
	Drought
2010	Flash floods, Heavy rain
	Drought
	Unseasonal cyclonic rain
2011	Floods
2013	Cyclone PHAILIN & Floods thereafter
2014	Flood & Cyclone HUDHUD
2015	Drought
2018	Cyclone TITLI
	Drought
2019	Cyclone "FANI"
	Cyclone "BULBUL"
2020	Cyclone "AMPHAN" in May
	Floods

The recurring phenomenon of natural disasters in quick succession and its destructive implications on land, labour, livelihood, assets and infrastructure have severely impacted all sectors of socio-economic life. Four major cyclones within a period of two years' time, such as, Titli in October 2018, Fani in May 2019, Bulbul in November 2019 and AMPHAN in May 2020 along with flood and drought are glaring examples of recurring disasters affecting the people and economy of the State.

River System of Odisha

The river system of Odisha comprises of nine major river systems namely the Mahanadi, the Brahmani, the Baitarani, the Subarnarekha, the Budhabalanga, the Vansadhara, the Rusikulya, the Nagabali, the Indravati, the Jambhira and Bahuda and their tributaries and distributaries.

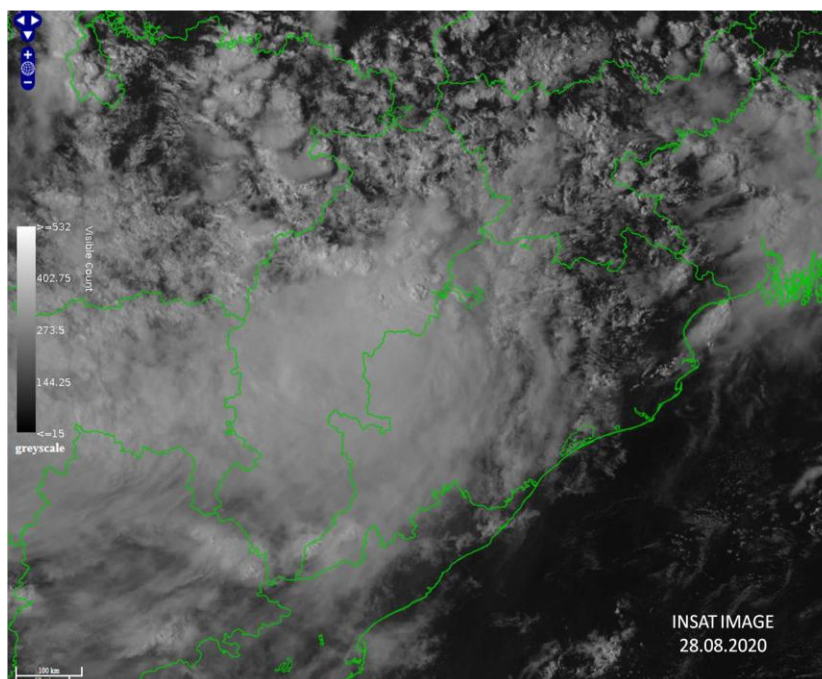
River basin map of Odisha



Chapter-II

Cause & Occurrence

Monsoon 2020 witnessed spates of heavy to very heavy rainfall in different parts of the State during July & August,2020. Especially, Almost all the districts received substantial rainfall from 26.8.2020 to 28.08.2020 due to Low pressure over Bay of Bengal and active Monsoon.



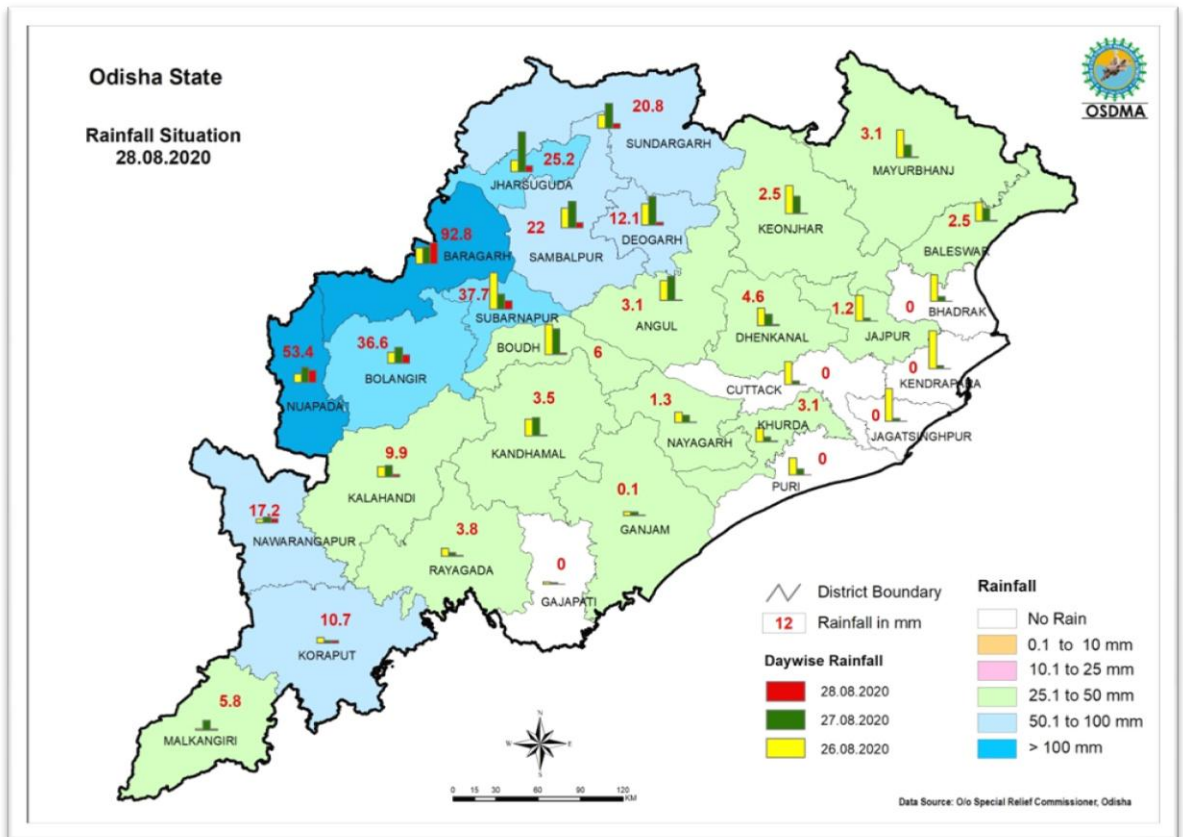
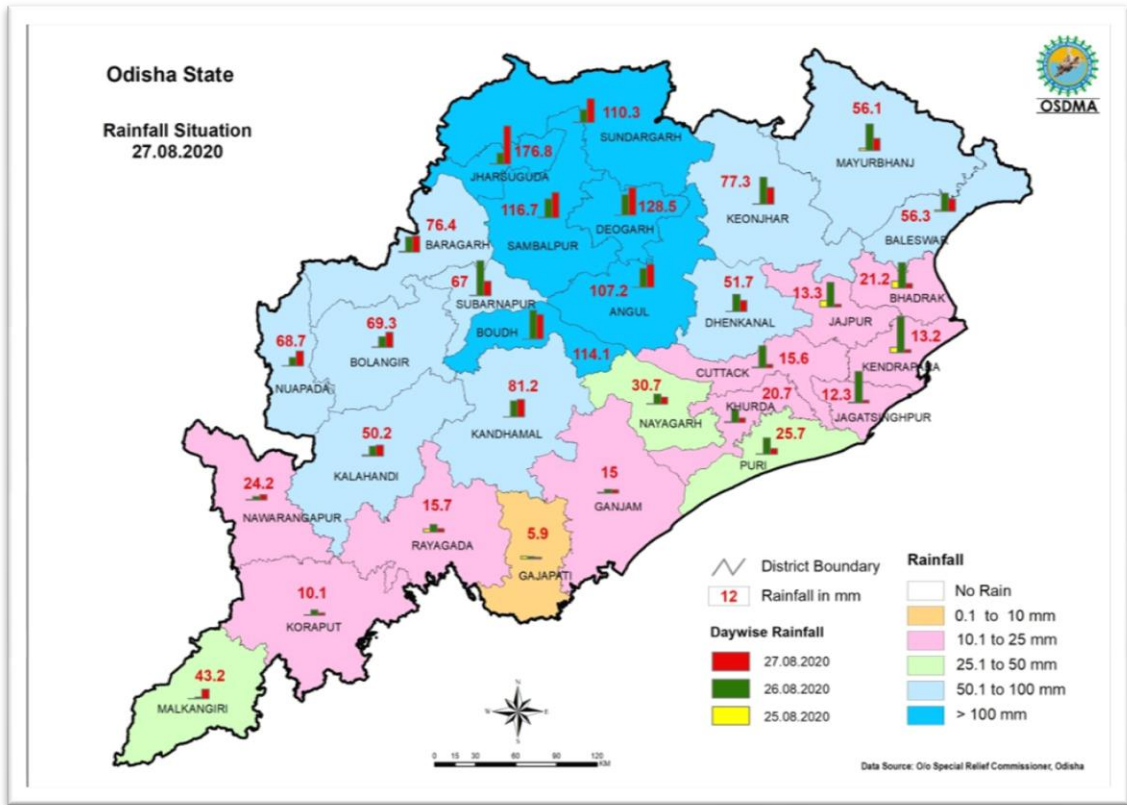
Rainfall

Heavy rainfall occurred in the lower as well as upper catchments of Mahanadi, Brahmani, Baitarani, Budhabalanga & Subarnarekha River Systems from 26.8.2020. During this period also lower catchment of Mahanadi River System, received heavy rainfall which caused severe floods. The average rainfall in the districts from 26.8.20 to 28.8.20 is given below:

DISTRICT AVERAGE RAINFALL					
(Rainfall in mm.)					
Sl. No.	District	26.8.2020	27.8.2020	28.8.2020	Total
1	Subarnapur	162.3	67.0	37.7	267.0
2	Boudh	133.3	114.1	6.0	253.4

3	Jharsuguda	50.9	176.8	25.2	252.9
4	Bargarh	71.3	76.4	92.8	240.5
5	Deogarh	94.9	128.5	12.1	235.5
6	Sambalpur	87.0	116.7	22.0	225.7
7	Angul	95.5	107.2	3.1	205.8
8	Keonjhar	124.8	77.3	2.5	204.6
9	Sundargarh	60.1	110.3	20.8	191.2
10	Kendrapara	168.3	13.2	0.0	181.5
11	Mayurbhanj	122.2	56.1	3.1	181.4
12	Nuapada	37.6	68.7	53.4	159.7
13	Jagatsinghpur	146.5	12.3	0.0	158.8
14	Kandhamal	73.0	81.2	3.5	157.7
15	Balangir	48.1	69.3	36.6	154.0
16	Balasore	84.3	56.3	2.5	143.1
17	Bhadrak	117.0	21.2	0.0	138.2
18	Dhenkanal	78.3	51.7	4.6	134.6
19	Jajpur	115.0	13.3	1.2	129.5
20	Cuttack	101.9	15.6	0.0	117.5
21	Kalahandi	44.5	50.2	9.9	104.6
22	Puri	76.1	25.7	0.0	101.8
23	Nayagarh	52.3	34.7	1.3	88.3
24	Khordha	60.6	20.7	3.1	84.4
25	Nawarangpur	15.3	24.2	17.2	56.7
26	Malkanagiri	7.1	43.2	5.8	56.1
27	Rayagada	33.9	15.7	3.8	53.4
28	Koraput	23.3	10.1	10.7	44.1
29	Ganjam	16.4	15.0	0.1	31.5
30	Gajapati	10.9	5.9	0.0	16.8
State Average		77.1	55.9	12.6	145.6

(Note: The rainfall recorded at 08.30 AM for the past 24 hours)



Hirakud Reservoir Position

Commencing on 27th August there was heavy rainfall for about six days in the upper catchments of river Mahanadi in the neighboring Chhattisgarh State. From 9.00 AM of 27.08.20 onwards the Hirakud reservoir started receiving more than 4.00 lakh cusecs of water and on 28.08.2020 the inflow into the reservoir dangerously exceeded 4- 5 lakh cusecs. As the reservoir level steadily approached the Full Reservoir Level (FRL) i.e., 630 feet, commensurable flood water had to be discharged into river Mahanadi. There was also heavy rain in the upper catchment of the tributaries of river Mahanadi and the tributaries rose in flood; adding to the outflow from Hirakud Reservoir.

Due to enormous inflow into the reservoir, the level of dam was maintained nearing FRL at 630.00 ft for safety of the dam. The inflow into the reservoir increased from 7.71 lakh cusecs on 29.8.20 to a peak of 8.98 lakh cusecs on 29.8.20. On the same day at 3.00 PM the reservoir level was 627.04ft with an inflow of more than 8 lakh cusecs. The outflow from Hirakud reservoir had to be balanced with the inflow keeping in view the safety of dam and also the flood situation in delta area. Due to heavy discharge of water, the mighty Mahanadi created floods in delta areas. The peak flood discharge at Mundali i.e., delta head was more than 10.26 lakh cusecs on 31.08.2020.

The inflow and outflow of water of Hirakud Reservoir was as follows:

Date	Time	Water level (in ft.)	Inflow (cusecs)	Out flow (cusecs)	No. of Gate opened
29.8.20	3.00 AM	626.02	7,71,233	6,63,232	42
	6AM	626.27	8,53,029	6,94,200	42
	9AM	626.56	8,79,407	6,95,172	42
	12Noon	626.81	8,83,855	7,25,026	44
	3PM	627.04	8,98,042	7,51,922	46
	6PM	627.23	8,82,743	7,62,034	46
	9PM	627.41	8,76,982	7,62,629	46
	12.00 Midnight	627.60	8,83,917	7,63,207	46
30.8.20	3.00 AM	627.79	8,84,665	7,63,959	46

	6AM	627.85	8,02,598	7,64,479	46
	9AM	627.95	8,28,569	7,65,040	46
	12Noon	628.00	7,97,078	7,65,311	46
	3PM	628.00	7,65,402	7,65,402	46
	6PM	627.89	6,88,989	7,16,368	43
	9PM	627.79	6,46,249	7,09,782	40
31.8.20	6AM	627.29	4,94,094	6,65,624	40
	9AM	627.21	5,69,531	6,20,355	36
	12Noon	627.08	5,16,256	5,98,847	36
	3PM	626.89	4,74,689	5,93,395	34
	6PM	626.71	4,49,600	5,63,957	32
	9PM	626.54	4,26,277	5,34,278	32
	12.00 Midnight	626.43	4,00,410	5,33,830	32
	3.00 AM	626.17	4,06,780	5,33,842	32
1.9.20	6AM	625.91	3,62,884	5,28,061	32
	9AM	625.79	4,37,643	5,13,881	28
	12Noon	625.77	3,90,896	4,03,601	24
	3PM	625.71	3,65,897	4,04,016	24
	6PM	625.65	3,66,663	4,04,782	24
	9PM	625.56	3,47,417	4,04,594	24
	12.00 Midnight	625.43	3,21,859	4,04,450	24
	3.00 AM	625.35	3,44,370	3,95,194	24

Downstream flood water of Hirakud reservoir coupled with huge inflow from the neighbouring State Chhattisgarh caused severe damages in Sambalpur, Baragarh, Boudh, Subarnapur, Nayagarh Cuttack, Jagatsinghpur, Kendrapara, Jajpur, Puri and Khurda districts in the Mahanadi basin. It is worth mentioning that the safe carrying capacity of Mahanadi river system is around 9 lakh cusecs at delta head (Naraj / Mundali) against which the peak discharge went up continuously to **10.26 lakh cusecs** approximately on **31.8.20 and 1.09.2020**.

Discharge to Coastal Plain

The volume of water discharged at Mundali causes floods in Mahanadi delta areas. The water discharges at Khairmal, Barmul and Mundali in Mahanadi river system since 29.8.2020 are as follows.

Date	TIME	Discharge in cusec during August 2020		
		Khairmal	Barmul	Mundali
29.8.20	3.00AM	10,02,000	8,81,500	8,43,086
	6AM	10,11,000	8,70,000	8,95,708
	9AM	10,02,000	8,67,500	9,18,383
	12Noon	10,02,000	8,67,500	9,41,203
	3PM	9,93,000	8,75,000	9,48,905
	6PM	9,93,000	8,88,000	9,48,905
	9PM	10,02,000	8,97,750	9,48,905
	12.00 Midnight	10,02,000	8,97,750	9,72,013
30.8.20	3.00AM	10,11,000	8,97,750	9,79,715
	6AM	10,11,000	8,91,250	9,79,715
	9AM	10,02,000	8,91,250	9,87,418
	12Noon	10,02,000	8,91,250	10,02,823
	3PM	9,93,000	8,97,750	10,02,823
	6PM	9,84,000	9,23,750	10,02,823
	9PM	9,84,000	9,33,500	10,02,823
31.8.20	6AM	9,10,000	9,23,750	10,18,372
	9AM	8,80,000	9,23,000	10,26,218
	12Noon	8,50,000	9,23,750	10,26,218
	3PM	8,30,000	9,14,000	10,26,218
	6PM	8,14,000	8,88,000	10,26,218
	9PM	7,90,000	8,62,218	10,26,218
	12.00Midnight	7,74,000	8,47,500	10,26,218
1.9.20	3.00AM	7,42,000	8,25,000	10,26,218
	6AM	7,10,000	8,03,000	10,02,823
	9AM	6,94,000	7,75,500	9,79,715

Date	TIME	Discharge in cusec during August 2020		
		Khairmal	Barmul	Mundali
	12Noon	6,70,000	7,53,500	9,72,013
	3PM	6,38,000	7,20,500	9,48,905
	6PM	6,06,000	7,03,750	9,25,942
	9PM	5,48,000	6,90,250	8,95,708

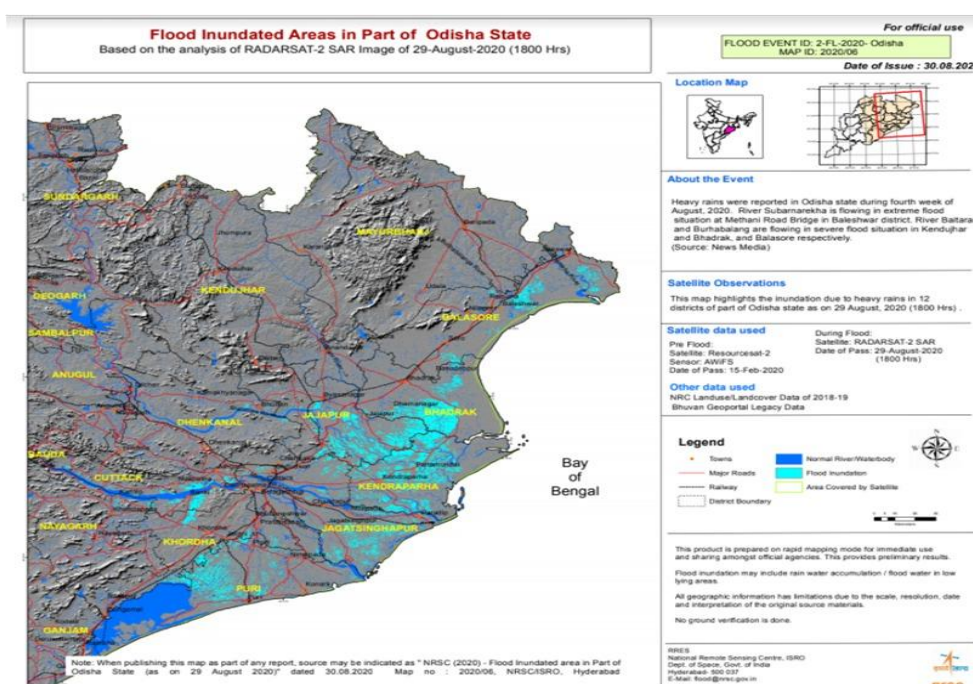
Water Level of Rivers

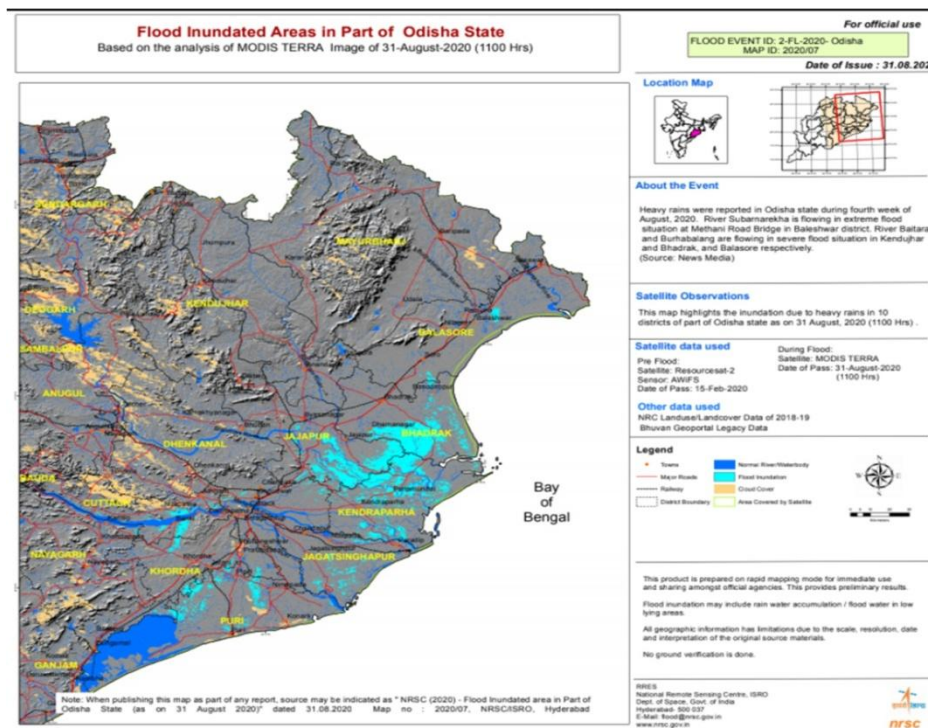
Due to heavy discharge at coastal plains in river Mahanadi, the water level of Mahanadi and its tributaries at coastal districts rose and crossed the danger level. The water level above danger level continued for **five days**. Further, due to heavy rainfall under the impact of low pressure over North Odisha during August, the rivers Subarnarekha, Brahmani, Baitarani and Budhabalanga crossed their respective danger levels affecting the downstream areas of the districts namely Balasore, Bhadrak, Mayurbhanj, Keonjhar and Jajpur.

Impact of Full Moon:

Due to full moon on 2.9.20 and extremely turbulent sea, there was reduced discharge of flood water into sea resulting in submergence of delta area for three days that multiplied the miseries to the affected people.

Satellite Observation on Flood Inundation





Duration of flood and affected area

Sl. No	River	Duration of Flood
1	Budhabalanga	26 th August to 28 th August,2020
2	Baitarani	26 th August to 28 th August,2020
3	Brahmani	27 th August & 28 th August,2020
4	Subarnarekha	27 th August & 28 th August,2020
5	Mahanadi	29 th August to 3 rd September,2020
6	Jalaka (Balasore)	26 th August to 30 th August,2020

18 out of 30 districts of Odisha were affected by flood in different river systems which commenced on 26th of August and continued up to 3rd September, 2020. Similarly, 19 districts were affected by heavy rain during July & August of 2020. So, cumulatively, 10 districts suffered damage by both flood and heavy rain, 8 districts by only flood and 9 districts by only heavy rain. The table below indicates the districts affected by Flood/ Heavy Rain in July & August 2020.

Sl.No	Name of District	Affected by Flood	Affected by Heavy Rain
1	Angul	✓	✓
2	Bargarh	✓	✓
3	Boudh	✓	✓
4	Dhenkanal	✓	✓
5	Jagatsinghpur	✓	✓
6	Jharsuguda	✓	✓
7	Kendrapara	✓	✓
8	Keonjhar	✓	✓
9	Sambalpur	✓	✓
10	Subarnapur	✓	✓
11	Balasore	✓	
12	Bhadrak	✓	
13	Cuttack	✓	
14	Jajpur	✓	
15	Khordha	✓	
16	Mayurbhanj	✓	
17	Nayagarh	✓	
18	Puri	✓	
19	Bolangir		✓
20	Deogarh		✓
21	Kalahandi		✓
22	Kandhamal		✓
23	Koraput		✓
24	Malkangiri		✓
25	Nabarangpur		✓
26	Nuapada		✓
27	Sunadargarh		✓

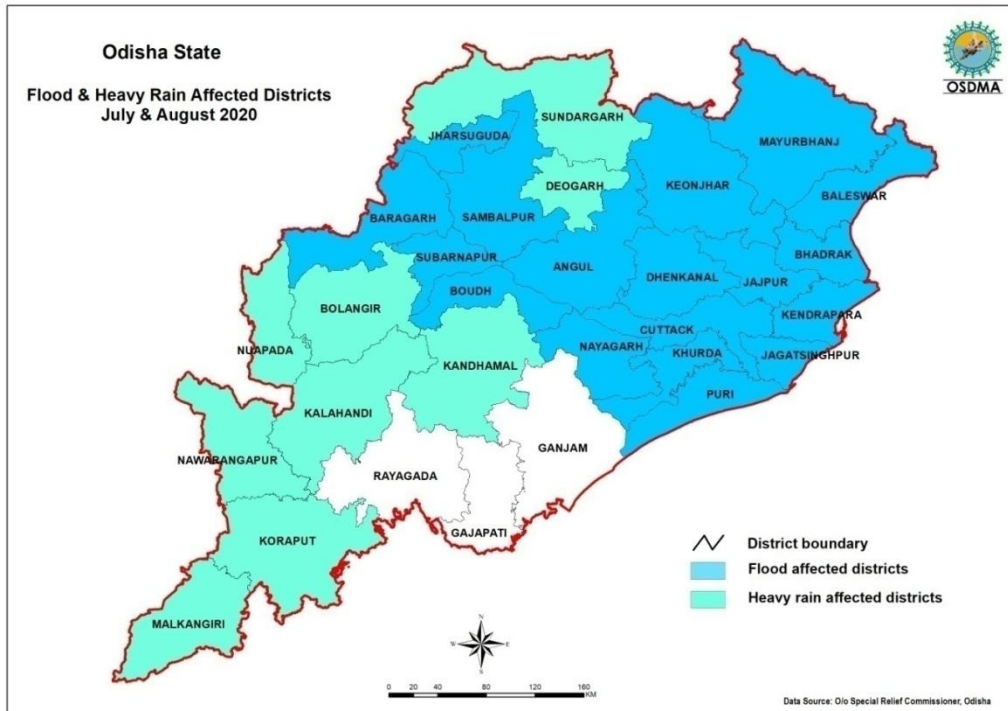
Breaches

Due to floods, heavy damages occurred to river and canal embankments, service roads on embankments, drainage channels, M.I. Projects, Lift Irrigation Points and field channels. All necessary preventive measures were taken at identified vulnerable points along river embankments prior to floods. Because of this, breaches were avoided in delta area of Mahanadi river system up to 9.50 lakh cusecs of floods discharge. However, there were 38 nos. of breaches in river/saline embankments and 93 nos. of breaches in canal embankments of Minor Irrigation. The breaches that occurred in river/ canal embankments submerged human habitations and vast area of the agricultural land.

Due to the floods in August, 2020 in Mahanadi River System extensive damage has occurred in the districts of Sambalpur, Baragarh, Subarnapur, Boudh, Angul, Nayagarh, Dhenkanal, Cuttack, Jagatsinghpur, Kendrapara, Puri, Khurda and Jajpur severely impacting the normal life, livelihood and infrastructure.

Besides the flood in the Mahanadi system, the State experienced floods in river Brahmani, Subarnarekha, Budhabalanga and Baitarani in August affecting the districts of Angul, Balasore, Bhadrak, Kendrapara, Jajpur, Keonjhar and Mayurbhanj.

The flood & heavy rain affected Districts have been delineated in the following map:



Chapter- III

Preparedness & Response

Preparedness Activities

Among others, the following immediate preparedness measures were undertaken:

- Hon'ble Chief Minister took review of the status of preparedness for the possible flood through Video Conferencing with Collectors & Secretaries of concerned Departments.
- Addl. Chief Secretary, Disaster Management & Special Relief Commissioner held video conferencing with Collectors of all districts and took stock of the preparedness measures.
- Information on weather warnings / flood warnings was disseminated to all Collectors / Departments / Blocks / Tahashil / Gram Panchayats well in advance.
- District Collectors were instructed to hold advance preparedness meeting.
- Foodstuff in inaccessible, vulnerable and strategic locations were pre-positioned by the District Administration.
- High alert was issued to Cuttack, Puri, Kendrapara, Jagatsinghpur before occurrence of flood.
- Collectors of Cuttack, Puri, Kendrapara, Jagatsinghpur, Jajpur were instructed to evacuate the people from low lying areas and shift them to nearby school buildings and cyclone/ flood shelters.
- Regular Coordination with the IMD, Flood Cell of DoWR, CWC and with the authority of the Hirakud Dam Division was made.
- ODRAF, NDRF, Fire Service units were mobilised and pre-positioned in the vulnerable locations prone to flood well in advance.
- Senior officers were deployed to the districts of Kendrapara, Cuttack, Balasore, Bhadrak, Jajpur, Jagatsinghpur & Puri to assist the District Administration in management of flood.

Rescue & Relief Operation:

Evacuation

1.73 lakh people were evacuated to safe shelters including multipurpose cyclone/ flood shelters and provided with dry/ cooked food. Besides, free kitchen service was provided to the people in inundated and marooned villages. In all, 980 no. of relief camps were opened for 4.84 lakh people.

Deployment of Boats

For relief and rescue operation, NDRF/ODRAF/State Fire Service personnel with their equipment were pressed into action. 160 power boats of State Port Engineering Organization were also deployed in the flood affected districts. Besides, hired boats were utilized for rescue and relief operation by the district authorities. In total, 462 boats have been engaged in relief & rescue operation.

Rescue Operation

17 units of ODRAF, 14 Teams of NDRF were deployed to the affected districts for rescue & relief operation. The district wise deployment is given below.

Sl. No.	Name of the District	ODRAF	NDRF
1.	Balasore	-	01
2.	Bhadrak	01	01
3.	Jajpur	04	03
4.	Kendrapada	04	04
5.	Jagatsinghpur	01	01
6.	Puri	01	03
7.	Dhenkanal	01	-
8	Angul	01	-
9	Bolangir	01	-
10	Jharsuguda	01	-
11	Nayagarh	-	-
12	Khurdha	01	-
13	Cuttack	01	01
	Total	17	14

Besides, 116 Fire Service teams with powerboats & ancillary rescue equipment were also pressed into service by the Fire Service under the supervision of District Administration.

Relief Package:

(A) To ameliorate the sufferings of the people, Hon'ble Chief Minister on 31.08.2020 announced the following immediate assistance for the affected people.

1. Cooked/ Dry food shall be provided to all the people who have been evacuated, for the period they are housed in shelters.
2. 50 Kg. of rice and Rs.500/- will be provided to all families in the villages which have been severely affected/ inundated/ marooned due to the flood.
3. One polythene sheet to each deserving household whose house has been damaged.
4. House Damage Assistance as per SDRF norms. Collectors will take steps for assessment of house damage within 15 days and disburse the assistance in next 7 days.
5. Assistance for clothing and utensils as per SDRF Norms.
6. Cattle feed assistance to dairy farmers as per SDRF Norms.
7. Exemption of User Fees for vaccination and treatment of animals in flood affected areas.
8. Free animal check-up camps in affected areas.

(B) On 11.09.2020, Hon'ble Chief Minister announced a special livelihood package of Rs.300 crore for the affected farmers as follows:

Agriculture Sector:

1. Agriculture input subsidy will be provided to the small and marginal farmers who have sustained crop loss of 33% and above @Rs. 6,800/- per hectare of land in rain-fed/non-irrigated areas, Rs.13,500/- per hectare of land in areas under assured irrigation, and Rs.18,000/- per hectare for all types of perennial crops. Perennial crops will include mango, cashew, coconut, kewra, betel vine etc. The assistance shall be provided to the actual cultivators. Agricultural

input subsidy to any affected farmer shall not be less than Rs.2000/- for perennial crops and Rs.1000/- for other crops.

2. 20,000 pulse seed mini kits will be provided to the Flood affected farmers during Rabi 2020.
3. 60,000 acres of demonstration programmes of different crops will be taken up in affected districts in the ensuing Rabi season.
4. 2,000 pump sets shall be provided with 50% subsidy limited to a maximum of Rs.15,000/-.
5. 5,000 power sprayers will be made available to the Flood affected farmers at a subsidy of 50% limited to maximum of Rs.3,000/- for battery operated sprayers and Rs.600/- for hand operated sprayers.
6. One lakh farmers will be trained on seed treatment programme with free supply of seed treatment chemicals /bio-pesticides to cover one lakh acres for increasing production in Rabi crops.
7. Immediate steps will be taken to arrange and distribute quality certified seeds in sufficient quantity for the Rabi season. Special assistance will be provided to the farmers with higher subsidy around 75% on Certified Quality Seeds.
8. Farm Mechanization Subsidy of Rs.10 crore will be disbursed to the affected districts.
9. Expeditious steps will be taken for crop loss assessment and steps will be taken for invoking mid-season adversity under the Crop Insurance Scheme.
10. One lakh farmers will be provided with vegetable kits involving seeds of Palak, Beans, Cowpea, Tomato, Chilli and Radish etc. to meet their immediate needs through kitchen garden @ Rs.130/- per kit.
11. 75,000 farmers will be provided with 10 nos. of quick growing fruit species like Papaya, Banana and Drumstick @ Rs.160/- per affected farmers to raise backyard garden in the flood affected districts.
12. Rs.500/Unit will be provided for Shade Net/ Thatched Structure for renovation of 10,000 Mushroom Units affected by flood to farmers/ WSHGs for livelihood support.

Farm Credit:

13. Short Term Kharif loans advanced in the flood affected areas having crop loss of 33% and above shall be converted into Medium Term (Conversion) loans.
14. Due date of Short Term Kharif loans advanced in the affected areas shall be extended by one year from the date of financing (maximum upto

30thSeptember 2022) to facilitate conversion of such loans into Medium Term (Conversion) loans.

15. Affected farmers shall be provided fresh finance for Rabi cultivation during coming Rabi season commencing from 01.10.2020.

Animal Resources Development Sector:

16. Assistance for replacement of animals shall be provided towards loss of animals @ Rs. 30,000/- per milch cow and buffalo, Rs. 25,000/- per draught animal (upto 3 animals), Rs. 16,000/- per calf (upto 6 animals), Rs.3,000/- per goat (upto 30 animals), Rs. 50/- per poultry bird (maximum Rs. 5000/-)

Fisheries sector:

17. Financial assistance of Rs.12,200/- per hectare will be provided to fish farmers (Freshwater/ Brackish water) for repair of damaged fish ponds/ dykes.
18. Input subsidy @ Rs. 8,200/- per hectare will be given for de-silting/ restoration/ repair of damaged fish seed farm.

Handloom & Handicrafts Sector:

19. Assistance of Rs.4,100/- per weaver/ handicrafts artisan will be provided for replacement tools/ equipment and Rs.4,100/- per weaver/ handicrafts artisan towards loss of raw materials/ goods in process/ finished goods.

Employment Generation:

20. Works under MGNREGS will be intensified once flood water subsides. The focus will be given on works like repair and maintenance of GP roads, Playfields, canals, earthen bunds, goat shed, cowshed, and fodder cultivation.

Temporary Shelters:

54170 polythene sheets have been distributed to the affected families for temporary shelters.

Emergent Relief (Flood)

244770.52 Qtl. of rice, 5247.77 Qtl. of Chuda (flattened rice), 562.5 Qtl. of Guda (Juggery) were distributed as emergent relief to the affected people. In addition to that, candles, matchboxes, kerosene oil and other materials have also been distributed.

Sl. No.	District	Emergent Relief Distributed		
		Rice (in Qtl)	Chuda (in Qtl)	Gud (in Qtl)
1	Angul	0	14.2	2.5
2	Balasore	31215.75	167.4	16.68
3	Bargarh	0	5.0	1.1
4	Bhadrak	43755	82.55	12.93
5	Boudh	0	0.5	0.14
6	Cuttack	3345	38.64	3.8
7	Dhenkanal	1.0	14.0	3.0
8	Jagatsinghpur	2851.5	5.25	1.55
9	Jajpur	98760.5	2728.06	275.32
10	Jharsuguda	8.65	7.1	1.83
11	Kendrapada	43902.5	1598.32	112.05
12	Keonjhar	49.6	35.8	7.38
13	Khordha	1678.5	34.5	3.5
14	Mayurbhanj	4.5	45.0	9.5
15	Nayagarh	0	11.0	2.0
16	Puri	19132.5	227.25	28.55
17	Sambalpur	0	20.0	10.0
18	Subarnapur	0	0.42	0.11
19	Malkangiri	65.52	2.78	0.56
20	Nawarangpur	0	210.0	70.0
	TOTAL	244770.52	5247.77	562.5

Health and Sanitation:

In addition to the stock of medicines in the district headquarters prior to the floods, essential drugs like halogen tablets, antibiotics, paracetamol tablets, antacids, ASVs, bleaching powder and ORS packets were provided to all the affected districts. Medical teams were deployed in flood-affected districts. Doctors and paramedics from non-affected districts as well as from the Medical Colleges were mobilized to serve in the flood-affected areas. Essential medicines and vaccines were distributed in the affected areas to prevent epidemics. Dis-infection of drinking water sources carried out regularly. The detailed health care measures undertaken by Health Department are as follows.

Medical Relief Centers opened	:	205
Mobile Teams with Doctor deployed	:	106
Tube wells disinfected	:	21738
Wells disinfected	:	10097
ORS packets distributed	:	580293
Halogen tablets distributed	:	519723
Bleaching Power (Bags) supplied	:	2797

Animal Care:

Due to flood, the entire livestock and poultry population of 12 districts were severely affected. As per the preliminary estimation, 8.80 lakh livestock have been affected. To meet the requirement of cattle feed in the affected areas, the measures undertaken in veterinary sector were as follows.

Cattle feed arranged for distribution	:	1693.50 MT
Animals vaccinated	:	334515
Animals treated	:	131600
Veterinary Teams deployed	:	154

Drinking Water:

Piped water supply sources in rural as well as urban areas were submerged under floodwater. The pumps and pipes were filled with sand in some places causing severe damage to the water supply system. However, efforts were made to restore the system either temporarily or permanently. Drinking water supplied through 44 tankers in rural areas. Mobile vans were deployed for disinfections and repair of tube wells. 27,43,300 water pouches were distributed in the affected rural areas. Similarly, 85 water tankers were deployed in urban areas. 16000 water pouches have been distributed in the affected urban areas.

Restoration Measures:

Extensive damage has been caused to public properties, mainly roads, river/canal embankments, power supply and water supply installations. The concerned departments have been advised to take up restoration work on war-footing with the available funds.

Chapter- IV

Impact

Extent of Damages:

Abstract of extent of damages due to floods & heavy rain is indicated below:

	Total
No. of Districts affected	27
No. of Blocks affected	208
No. of GPs affected	2264
No. of Villages affected	10350
No. of ULBs Affected	30
Population affected (in lakh)	38.90
Population Marooned (in lakh)	13.87
Crop Area Affected (in lakh hect.)	3.14
Crop Area Sand Cast (in hect.)	2553.28
No. of Human lives lost	38
No. of Houses damaged including cowshed	78137

SI	District	Blocks Affected	GPs Affected	Villages Affected	No. of ULBs Affected	Population Affected	Human Casualty	House Damage including cow shed
1	Angul	8	114	319	1	32500	1	2250
2	Balasore	7	77	361	1	262223	2	474
3	Bargarh	7	19	92	0	4783	1	2868
4	Bhadrak	7	126	618	4	432000	3	2862
5	Bolangir	12	120	750	1	20468	1	2667
6	Boudh	3	43	278	1	5455	0	1765
7	Cuttack	12	179	711	1	71774	4	139
8	Deogarh	3	63	174	1	1763	1	446
9	Dhenkanal	8	146	385	1	25000	1	414

10	Jagatsinghpur	7	23	233	0	38833	0	373
11	Jajpur	10	258	1244	1	995947	10	41935
12	Jharsuguda	5	74	200	3	16248	1	1128
13	Kalahandi	4	31	45	0	348	0	89
14	Kandhamal	7	31	96	1	1430	0	215
15	Kendrapada	9	249	1592	2	1522901	2	4907
16	Keonjhar	8	81	397	1	97796	2	4599
17	Khordha	6	29	120	0	10647	0	0
18	Koraput	11	11	194	0	6840	0	350
19	Malkangiri	7	74	351	2	106999	0	1363
20	Mayurbhanj	16	68	470	2	11826	7	1671
21	Nayagarh	2	12	66	0	28406	0	13
22	Nabarangpur	6	72	143	0	1502	0	372
23	Nuapada	2	10	10	1	1180	0	33
24	Puri	9	62	237	1	133121	1	413
25	Sambalpur	9	107	406	2	7845	0	2108
26	Subarnapur	6	64	511	2	44809	0	2578
27	Sundargarh	17	121	347	1	8000	1	2105
	Total	208	2264	10350	30	3890644	38	78137

Livestock Affected:

Sl No	Name of the District	No. of animals affected			
		LA	SA	Poultry	Total
1	Angul	1318	1305	624	3247
2	Balasore	111383	48086	6767	166236
3	Bhadrak	116261	28229	612	145102
4	Boudh	4877	5413	1823	12113
5	Cuttack	45573	19919	500	65992
6	Dhenkanal	2382	812	1039	4233
7	Jagatsinghpur	9549	3088	1200	13837
8	Jajpur	175173	50565	83744	309482

9	Jharsuguda	405	293	0	698
10	Kendrapada	43727	13748	7500	64975
11	Khordha	5133	2643	3000	10776
12	Puri	47224	14468	22502	84194
TOTAL		563005	188569	129311	880885

Livestock Casualty

Sl No	Name of the District	Animal Casualty			
		LA	SA	Poultry	Total
1	Angul	0	6	0	6
2	Bhadrak	4	0	2000	2004
3	Cuttack	0	0	500	500
4	Dhenkanal	3	0	0	3
5	Jajpur	3	0	22909	22912
6	Kendrapada	5	3	600	608
7	Khordha	1	0	100	101
8	Puri	1	0	7120	7121
TOTAL		17	9	33229	33255

Crop Damage:

Sl. No.	Name of the district	Total agriculture/ horticulture crop area affected (in Ha.)	Total agriculture/ horticulture crop area where crop loss is >33% (in Ha.)
1	2	3	4
1	Angul	1970	1669
2	Balasore	11385	3888.3
3	Bargarh	1724.07	320.92
4	Bhadrak	42755	29956.4
5	Boudh	1154	1154

6	Cuttack	35574.3	32156.3
7	Dhenkanal	6442.6	4260.5
8	Jagatsinghpur	19125	12100
9	Jajpur	73514	63253
10	Jharsuguda	955.05	880.65
11	Kendrapara	56590	44941
12	Keonjhar	3805	2819.07
13	Khordha	7903.35	7903.35
14	Mayurbhanj	8102	883.78
15	Nayagarh	2802	2662.27
16	Puri	35312	23223.24
17	Sambalpur	550.73	519.73
18	Subarnapur	2285.103	1907.103
19	Bolangir	660	660
20	Kalahandi	0.23	0.23
21	Koraput	1.2	1.2
22	Malkangiri	1040.08	765.45
Total		313650.713	235925.493

Sand Cast

Agricultural lands of 2553.28 hectares have been sand casted due to flood and heavy rain.

Sl.	District	Crop Area Sand Cast more than 3 inch (in hect.)
1	Jajpur	378.0
2	Jharsuguda	2.0
3	Nayagarh	1389.0

4	Sambalpur	555.13
5	Bolangir	54.0
6	Kalahandi	0.23
7	Koraput	1.2
8	Malkangiri	152.34
9	Sundargarh	21.38
	Total	2553.28

Loss of livelihood of traditional craftsmen:

Due to floods, 905 handicraft artisans have been affected due to damage to their equipment and raw materials. Similarly, 403 handloom weavers&1230 sericulture farmers have been affected.

Damage to Nets and Boats of Fishermen:

107 boats and 277 fishing nets have been damaged.

SI	District	No. of Boats damaged		No. of Nets damaged	
		Fully	Partially	Fully	Partially
1	Dhenkanal			3	
2	Cuttack			25	
3	Sambalpur	1			
4	Bargarh	3			22
5	Jharsuguda	97	6	227	
	Total	101	6	255	22

Damage to Drinking Water Supply System:

There is extensive damage to the rural water supply and urban water supply systems. 635 piped water supply systems and 11939 tube wells in rural areas and 85 tube wells in urban areas have been affected.

Chapter – V

Damage to Public Properties

Damage assessment to public properties:

Massive damage has been caused to public properties like canal / river embankments, roads, bridges, culverts, drains, water works, tube wells, LI points, electrical installations, telecommunications infrastructure, Government buildings etc.

The damage to public properties in other sectors along with approximate loss is given below:

Sl.	Departments/ damaged Property	Quantity	Total Loss (Rs. in lakh)
1	Water Resources Department		
	Damage to river/ saline embankment	1302 Nos./ 996.90 kms.	21281.39
	Breaches in river/ saline embankment	38 Nos./ 3.35 kms.	3506.00
	Partial damage to canals	383 Nos./ 457.58 kms.	3587.32
	Repair/ restoration/ clearance of drainage cannels	863.63 kms.	1648.37
	Damage to Lift Irrigation Projects	3856 Nos.	2614.81
	Damage to Minor Irrigation Projects	93 Nos.	223.07
	Sub-Total		32860.96
2	Works Department		
	PWD roads damaged	1714.72 kms.	9688.95
	Breaches in PWD roads	42 Nos/ 1.61 kms.	398.75
	CD/ Bridges damaged/ washed away in PWD roads	192 Nos.	1630.53
	Drains damaged	300 kms.	50.00
	NH damaged (Maintained by state)	10.09 kms.	163.90
	Breaches in NH	11 Nos.	34.00
	CD/ Bridges damaged/ washed away in NH	14 Nos.	122.00
	Secondary School Building damaged	10 Nos.	48.25
	CHCs damaged	3 Nos.	12.00
	Damage to residential buildings	20 Nos.	105.20

	Damage to non-residential buildings	35 Nos.	183.50
	Sub-Total		12437.08
3	Rural Development Department		
	Home Department building damaged	45 Nos.	140.30
	RD Department Building damaged	58 Nos.	226.15
	Revenue Dept. Building damaged	157 Nos.	542.65
	Other Department building damaged	9 Nos.	26.30
	Residential Building damaged of all Department	113 Nos.	332.35
	Damage to rural roads	1728.85 kms.	15423.69
	Breaches in rural roads	267 Nos./ 6.84 kms.	
	CD/ Bridges damaged/ washed away	473 Nos.	3423.96
	Sub-Total		20115.40
4	Housing & Urban Development Department		
	Road damaged	151.32 kms.	2447.99
	Drain damaged	44.28 kms.	537.02
	Culverts damaged	7 Nos.	47.00
	Other infrastructure damaged		260.00
	Tube Well/ Platform damaged	85 Nos.	30.50
	Piped water supply system damaged	92 Nos.	161.50
	Sub-Total		3484.01
5	Panchayati Raj & DW Department		
	Anganwadi Center damaged	282 Nos.	440.60
	Primary School Buildings damaged	540 Nos.	959.37
	GP/ PS Building & Community Hall damaged	101 Nos.	182.21
	GP/ PS road damaged	8316.51 kms.	12265.56
	Piped Water Supply System/ Tube well damaged	543 Nos.	320.29
	Sub-Total		14168.03
6	Energy Department		
	FeederTransformer damaged	14 Nos.	347.24
	33 KV conductor damaged	48.5 kms.	24.57
	33KV Poles damaged	134 Nos.	6.22
	33KV. & 11 KV. VCB damaged	28 Nos.	131.25
	11KV Transformer damaged	45 Nos.	39.11
	11KV poles damaged	982 Nos.	41.66
	11KV conductor damaged	331.64 kms.	167.69

	Distribution Transformer damaged	571 Nos.	563.53
	LT line pole damaged	1172 Nos.	47.08
	LT Line conductor damaged	219.17 kms.	118.27
	Minor material& civil work		29.70
	Erection charge		106.30
	Sub-Total		1622.62
7	Handlooms, Textile & Handicrafts Department		
	Damage to workshed of handloom weaver	1 No.	0.15
	Damage to infrastructure in handloom Sector	11 Nos.	205.00
	Loss to Seed (DFL) of Sericulture Sector	93910 Nos.	11.27
	Rearing loss of Sericulture Sector	755 Nos.	15.08
	Damage to infrastructure in Sericulture Sector	1 No.	1.00
	Sub-Total		232.50
8	Fisheries & ARD Department		
	Damage to infrastructure of fisheries sector		15.60
	Damage to infrastructure of ARD sector		41.00
	Sub-Total		56.60
9	Forest & Environment Dept.		
	Damage to plantation, road, fencing, seedling etc.		94.22
	Sub-Total		94.22
10	Agriculture & FE Department		
	Damage to individual/ Community Farm Pond, earthenembankment, check dam etc.	211 Nos.	740.32
	Sub-Total		740.32
	Total (Public Properties)		85811.73
11	Estimated loss to crops		54229.94
12	Estimated value of damage to houses		10891.56
13	Relief Measures		
	Ex-gratia for loss of life		152.00
	Clothing & Utensils		109.02
	Gratuitous Relief		10195.52
	Cost of evacuation, search & rescue measures		239.21
	Temporary accommodation		402.14
	Temporary shelter		866.72

	Emergency supply of drinking water		163.50
	Clearance of debris		155.10
	Disposal of dead bodies/Carcasses		0.16
	Repair/restoration of fish ponds		62.49
	De-silting of Agriculture land (sand cast)		311.50
	Replacement of Milch/ Draught animals		5.873
	Provision of fodder and cattle health care		470.265
	Assistance to fisherman		17.034
	Input subsidy-Fish seed farm		34.54
	Assistance for Artisan-Traditional crafts & Handloom weavers		107.26
	Total		13292.332
	GRAND TOTAL (Damage to Public Infrastructure, Dwelling Houses, Crops & Relief Expenditure)		164225.56

Chapter- VI

Assistance Sought For

Ex-gratia Payment to the families of deceased persons: *[Item -1(a) of SDRF Norms].*

38 Persons have lost their lives due to Floods & wall collapsed due to heavy rain in the State. Ex-gratia assistance @ Rs.4.00 lakh per person as per SDRF Norms has been disbursed to the NoKs of deceased persons. The requirement of funds for the purpose comes to **Rs.152.00 lakh**.

Clothing and utensils for families: *[Item -1 (d) of SDRF Norms]*

2869 families whose houses have been fully damaged or severely damaged are to be provided with clothing and utensils as per the SDRF Norms. An amount of **Rs. 109.02 lakh** is required for the purpose.

Gratuitous Relief for families in dire need of immediate sustenance after a calamity: *[Item -1 (e) of SDRF Norms]*

The affected persons of who were in dire need of immediate sustenance after the Floods were provided with Gratuitous Relief. Emergent relief has been distributed in the flood affected villages. 244770.52 Qtl. of rice, 5247.77 Qtl.ofChuda (flattened rice), 562.5 Qtl.ofGuda (Juggery) have been distributed to the affected people. In addition to that the dry foods, candles, matchboxes, kerosene and other materials have also been distributed. The total expenditure incurred towards providing gratuitous relief comes to **Rs.10195.52 lakh**.

Cost of Search, Rescue and Evacuation of affected people: - (Item 2(a) of SDRF norms)

17 units of ODRAF, 14teams of NDRF and 22 Fire Service teams were deployed in the vulnerable/ affected areas for search & rescue operation and for post flood relief line clearance. 1.73 lakh people were evacuated and placed in cyclone/ flood shelters as well as earmarked school buildings. An amount of **Rs.239.21 lakh** has been spent on deployment of response forces, use of vehicles and ancillary expenditure for evacuation of the people.

Provision for temporary accommodation, food, clothing and medical care:*[Item -3(a) of SDRF Norms]*

a) 980nos.of relief camps were opened to accommodate 4.84 lakh people. An amount of **Rs.402.14 lakh** has been spent towards cost of providing temporary

accommodation, food, clothing and medical cares in the relief camps. The district-wise detail is given in **Appendix- III**.

b) 54170 families were provided with polythene sheets for use as temporary shelter materials. The total amount spent for polythene sheets @ Rs.1600/- per family comes to **Rs.866.72 lakh**.

Emergency supply of drinking water in rural areas [Item -3 (c) of SDRF Norms]

44 nos. of water tankers were engaged for emergency supply of drinking water in the flood affected areas. Besides, 2743300 water pouches were also distributed. An amount of **Rs.163.50lakh** has been spent for the purpose.

Clearance of Debris in the public areas: [Item 4(a) of SDRF norm]

An amount of **Rs.155.10 lakh** has been spent by the concerned departments for clearance of debris from public places in the flood affected areas.

Disposal of Carcasses: [Item 4(c) of SDRF norm]

An amount of **Rs.0.16 lakh** has been spent for disposal of carcasses in the flood affected areas by the Fisheries & ARD Department.

Assistance for repair/ restoration of fish ponds: [Item -5 (i) A (c) of SDRF Norms]

512.18 hectares of fish ponds have been damaged due to the Floods. The requirement of fund for providing assistance for repair and restoration of damaged fish ponds @Rs 12200/- per hectare comes to **Rs.62.49 lakh**.

De-silting of Agriculture Land: [Item -5(i)A(a) of SDRF Norms]

2553.28 hectares of agriculture land have been sand cast of more than 3 inch. An amount of **Rs.311.50 lakh** is required to de-silt these lands.

Agriculture input subsidy to Small and Marginal Farmers where crop loss is 33% and above: [Item -5(i)B of SDRF Norms]

Agriculture Crop Loss:

Out of 3.13 lakh hectares of cropped area affected by flood and heavy rain, 2.36 lakh hectares have sustained crop loss to the extent of 33% and above. Of these, 234616.803 hectares belong to small and marginal farmers (SMF). An amount of **Rs.19576.44 lakh** is required for providing agriculture input subsidy to the said affected farmers belonging to SMF category.

The District wise requirement of funds is given under **Appendix- IV.**

Input subsidy to farmers other than small & marginal farmers: [Item -5(ii) of Revised SDRF Norms]

0.68 hectares of crop land of farmers other than small and marginal farmers have sustained crop loss to the extent of 33% and above due to the floods. An amount of **Rs.177.19 lakh** is required for providing input subsidy to affected farmers.

The District wise requirement of funds is given under **Appendix- V.**

Replacement of draught & milch animals: [Item -6(i) of SDRF Norms]

17 large milch & draught animals and 9 nos. of small milch animals have lost their lives due to floods. The total expenditure for replacement of these animals along with poultry birds (33229 nos) as per the norms and guidelines of SDRF comes to **Rs.5.8725 lakh.** The detailed calculation is given at **Appendix-VI.**

Provisions of fodder / feed concentrate including water supply and medicines in cattle camps: [Item -6 (ii) of SDRF Norms]

Cattle were accommodated in cattle camps and provided with fodder/ feed concentrate. Vaccinations of Livestock were made to reduce the morbidity and mortality of the livestock. Health and De-worming camps were also conducted to check different contagious and infectious diseases. An amount of **Rs. 470.265 lakh** has been spent for the purpose.

Assistance to fishermen: [Item -7(i) of SDRF Norms]

101 nos. of boats, 255 nos. of nets have been fully damaged and 6 nos. of boats, 22 nos. of nets have been partially damaged due to floods. An amount of **Rs.17.034 lakh** is required for providing assistance to the affected fishermen.

Input subsidy for fish seed farms: [Item -7(ii) of SDRF Norms]

421.21 hectares of fish seed farms have been damaged due to flood. The requirement for providing input subsidy @Rs 8200/- per hectare comes to **Rs.34.54 lakh.**

Assistance to Artisans in handicrafts sector by way of subsidy for repair / replacement of damaged equipments: [Item -8 of SDRF Norms]

905 artisans have been affected due to floods. Extensive damages have been caused to their equipment. 403 handloom weavers have also lost their raw

materials, finished goods, goods in process, tools and equipments. An amount of **Rs.107.26 lakh** is required for replacement of damaged tools/equipment and purchase of raw materials as per the revised SDRF Norms.

Assistance for repair / restoration of damaged houses: *[Item -9 of SDRF Norms]*

2869 pucca and kutcha houses have been fully/ severely damaged due to the flood & heavy rain. Besides, 632 pucca houses and 53499 kutcha houses have been partially damaged. Similarly, 3910 huts and 17227 cowshed attached to houses have been damaged. An amount of **Rs.5007.36 lakh** is required for providing assistance for repair/ restoration of the damaged houses of affected people. The detailed requirement of fund as per SDRF/ NDRF Norms is given in **Appendix- VII.**

Repair/ restoration of immediate nature of the damaged infrastructure in eligible sectors: - *[Item -10 of SDRF Norms]*

A sum of **Rs.33537.25 lakh** is required for repair / restoration of immediate nature of the damaged infrastructure in eligible sectors. The sector-wise details requirement is given at **Appendix- VIII.**

**ASSISTANCE SOUGHT FOR
ABSTRACT (Rs. in lakh)**

Sl. No.	Item	Total Amount required
1	Ex-gratia for loss of life	152.00
2	Clothing & Utensils	109.02
3	Gratuitous Relief	10195.52
4	Cost of evacuation, search & rescue measures	239.21
5	Temporary accommodation	402.14
6	Temporary shelter	866.72
7	Emergency supply of drinking water	163.50
8	Clearance of debris	155.10
9	Disposal of dead bodies/Carcasses	0.16
10	Repair/restoration of fish ponds	62.49
11	De-silting of Agriculture land (sand cast)	311.50
12	Agriculture input subsidy-SMF	19576.44
13	Agriculture input subsidy-other than SMF	177.19
14	Replacement of Milch/ Draught animals	5.873
15	Provision of fodder and cattle health care	470.265
16	Assistance to fisherman	17.034
17	Input subsidy-Fish seed farm	34.54
18	Assistance for Artisan-Traditional crafts & Handloom weavers	107.26
19	HB assistance	5007.36
20	Repair of Roads & Breaches	20257.95
21	Repair of CD/Bridges	1691.98
22	Repair of drains on roads	128.84
23	Repair of Water Supply System (Urban & Rural)	488.79
24	Repair of river/canal embankments	3189.17
25	Repair of Drainage System	2453.82
26	Repair of Minor/ Lift Irrigation points	2754.31
27	Repair of CHCs	6.00
28	Repair of AWC buildings	440.60
29	Repair of Primary/ Secondary School Buildings	979.37
30	Repair of Community Buildings/ Panchayat Ghars	182.21
31	Restoration of Power supply	964.21
	Total	71590.572

Chapter-VII

State Disaster Response Fund

Status of Expenditure from State Disaster Response Fund (SDRF) Account (As on 15.10.2020)

Year – 2020-21

State – Odisha

(Rs. in crore)

Sl. No.	Item	Amount
	(I) Receipts	
1	Opening balance in SDRF account as on 1.4.2020	984.22
	SDRMF Releases made during instant financial year (Central and State share)	
	(a) First instalment (SDRF)	
2	(i) Central share	802.00
	(ii) State share	267.50
	(b) Total (i + ii)	1069.50
3	NDRF releases during the instant financial year, if any	500.00
4	Interest received on investments made	0.000
5	Total funds available in the SDRF account(1+2+3+4)	2553.720
	(II) Expenditure	
	Expenditure incurred as per norms on approved natural calamities as per the scheme of SDRF/NDRF(indicate calamity-wise expenditure)	
	(a) Cyclone	337.578
	(b) Flood	358.602
	(c) Fire	5.165
6	(d) Pest Attack	0.079
	(e) State Specific disasters	66.203
	(f) Expenditure incurred on Capacity building activities	49.055
	(g) Expenditure incurred on procurement of search and rescue equipment etc.(as per extant approved items)	105.350
	(h)Expenditure towards combating COVID-19 outbreak	773.463
7	Expenditure incurred (a+ b+ c+ d+ e+ f + g+ h)	1695.494
8	Committed expenditure towards combating COVID-19 & others calamities	315.000
9	Grand Total (7 + 8)	2010.494
10	Balance available in SDRF (5-9)	543.226

Visit of the Inter-Ministerial Central Team:

An Inter-Ministerial Central Team led by Sri Praveen Vasistha, Joint Secretary (LWE), Ministry of Home Affairs, Government of India visited the State from 16.9.2020 & 17.9.2020 for on the spot assessment of damages. The Team visited the flood affected areas of Bhadrak, Jajpur, Kendrapada and Puri district. A Preliminary Memorandum indicating the requirement of Rs. 1124.10 crore out of NDRF has been submitted to the Team.

Chapter- VIII

Mitigation Measures

WORKS DEPARTMENT

Mitigation proposal for improvement with widening, raising & strengthening of roads to provide all-weather connectivity to Bari town in the District of Jajpur, Odisha.

Bari is the headquarter of Bari Block in Jajpur District, located at a latitude and longitude of 20^o41'26"N and 86^o20'48"E respectively. It is surrounded by the rivers Brahmani and Birupa on one side and Kharasrota on the other, with a large network of tributaries and distributaries of these rivers. Due to its location in such geographical condition, Bari remains cutoff from the mainstream many times in a year whenever there is a cyclone or flood in this part of the state, as the rivers and rivulets act as drainage system for plain area on the eastern coast of Odisha.

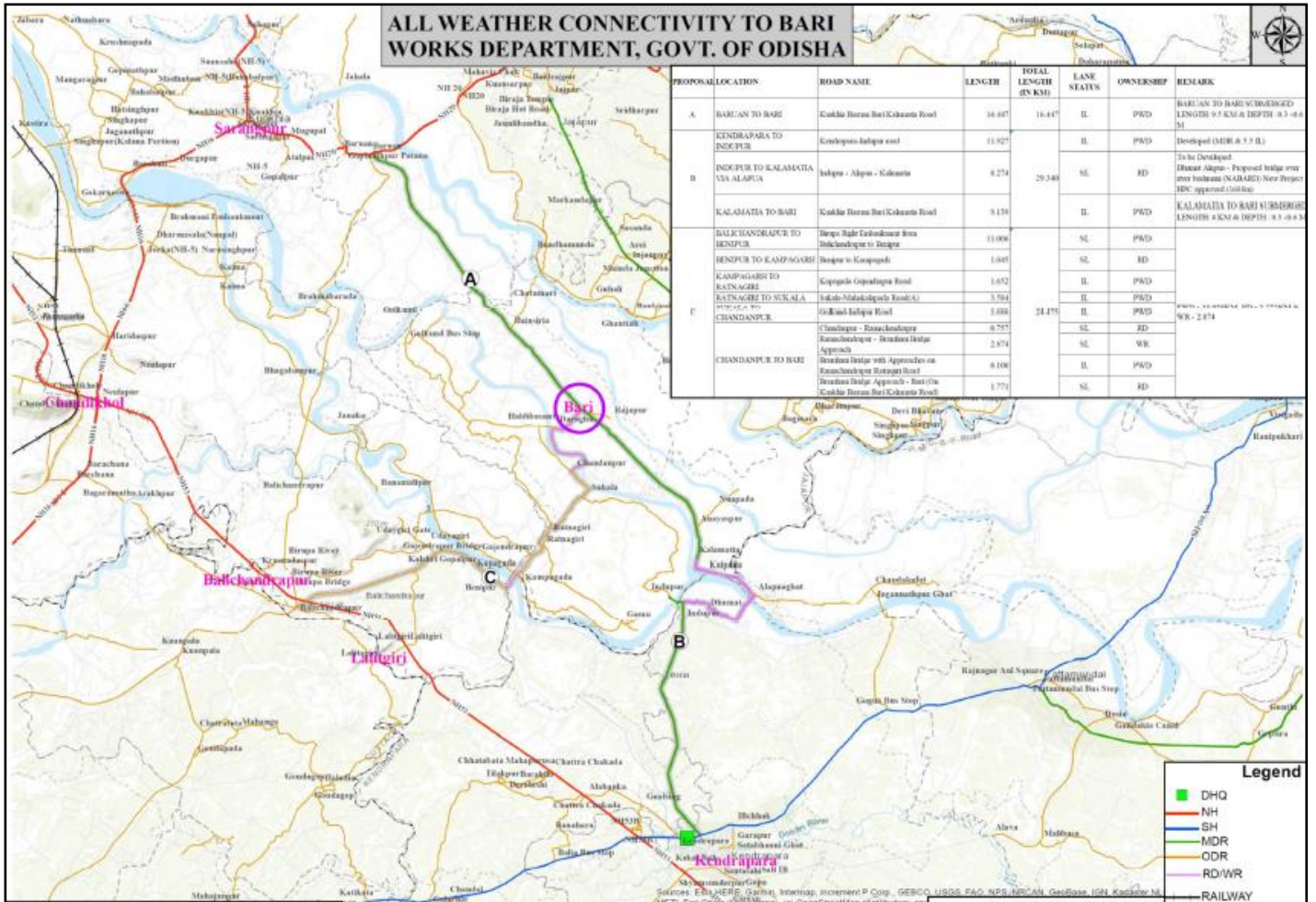
During the recent flood in the month of July & August, Bari remained cutoff for almost four days from Jajpur, the district head quarter and the State capital, as all the connecting Roads to Bari town were overtopped/ submerged with flood water. Connectivity from the NH-16 is the main lifeline to Bari. This road was submerged for a length of about 10 Km. This affected normal and essential supplies of food, medicine and emergency relief materials besides affecting the rescue operations during the flood.

Bari is connected to the main arterial roads of the state at three major locations namely, Kuakhia on NH-16, Kendrapara on SH-9A and Balichandrapur on NH-53. A detailed feasibility study was carried out on the above three routes and based on the submergence data and feasibility report, three (03) projects with widening, raising & strengthening have thus been proposed by the Works Department for providing a network of all-weather connectivity to Bari town in the district of Jajpur, Odisha.

Snapshots of Submerged Connecting Roads to Bari Town during the Latest Flood of 2020



The salient features of the proposed projects are described below:-



1. Improvement to Baruan-Bari-Kalamatia Road

The Baruan-Bari-Kalamatia Road is the main road connecting the Bari town, which also links Bari town with NH-16. It provides transportation of agricultural products such as rice, pulses, vegetables and fish to the urban areas in the district and to the nearby districts. Total length of the Road is 26 Km of intermediate lane standard (5.5m width), out of which about 22.0 km length gets affected by submergence/ inundation due to flood.

The proposed project road includes improvement of the existing intermediate lane to double lane standard with paved shoulder and raising of existing carriageway based on the HFL data.

The project road originates from Baruan (0/0 km), passes through 20 nos. of thickly populated villages and terminates at upper Kaipada (26/0 km). The Estimated cost of the project is **Rs. 86.186 Crore.**

2. Improvement to Kendrapada - Kalamatia Road via Alapuaghat

The Kendrapada-Kalamatia Road via Alapuaghat is an inter-district road, which connects the Kendrapada district with Jajpur district. This Road is important in providing an all-weather access to Bari as the road connects the Bari town with SH-9A via Kalamatia. Total length of the project road is 20.201 km of Single lane (3.75 m width) standard, out of which about 12.0 Km length gets affected by submergence/ inundation due to flood.

The proposed project Road includes improvement of the existing Single lane to intermediate lane standard and raising of existing carriageway based on the HFL data. The Estimated cost of the project is **Rs. 25.585 Crore.**

3. Improvement to Balichandrapur (NH-53) - Bari Road via Benipur

The Balichandrapur to Bari Road via Benipur, is a main arterial road of Bari Town, as it connects the Bari town with NH-53 at Balichandrapur. The total length of the Road is 24.500 km of mixed lane standard (a mix of single lane and intermediate lane).

The proposed project Road includes improvement of the existing Road to double lane standard with paved shoulder and raising of existing carriageway based on the HFL data. The project road originates at Balichandrapur on NH-53 (0/0 Km) and terminates at Bari (24/5 Km). The Estimated cost of the project is **Rs. 92.928 Crore.**

Abstract of Proposed Projects:

Sl No.	Name of the project	Length of the proposed Project	Improvement Details	Estimated Cost of the Project in Lakhs
1	Improvement to Baruan-Bari-Kalamtia Road to 2-Lane Standard with paved Shoulder in Jajpur District	26.000 Km	Double lane with Paved Shoulder	8618.59
2	Improvement to Kendrapada to Kalamatia Road via AlapuaGhat from 0.000 Km to 20.201 Km in Kendrapada District	20.201 Km	Intermediate Lane	2558.51
3	Improvement to Balichandrapur (NH-53) to Bari via benipur Road to 2-lane with paved Shoulder in Jajpur District	24.500 Km	Double lane with Paved Shoulder	9292.82
	Total	70.701 Km		20469.92

Total fund requirement for the proposed mitigation proposals comes to Rs. 204.70 crore.

WATER RESOURCE DEPARTMENT

Flood 2020- Mitigation Proposals for strengthening of Flood Embankments

The unique geo-climatic conditions of Odisha make the State vulnerable to natural hazards, especially, flood. Heavy, erratic and concentrated rainfall cause recurrent floods every year in almost all major river systems of the State and the problem is accentuated in the coastal areas when flood converges with high tides due to astronomical timings or cyclonic events in the sea.

During the current year, from 20th-31st August 2020, Odisha experienced medium to high floods in 5 major river Basins, such as Mahanadi, Brahmani, Baitarani, Subarnarekha & Budhabalanga simultaneously. The State experienced heavy and widespread rainfall in upper and lower catchments of the above 5 river basins simultaneously. The flood discharges as experienced in the major rivers are stated below:

Maximum Observed River Gauge Positions During Flood In August 2020

River	Station	Warning Level (m)	Danger Level (m)	Maximum Level observed at Peak flow	Date
Mahanadi	Naraj	25.41	26.41	26.96	31.08.2020
Brahmani	Panposh	177.51	178.42	176.96	27.08.2020
	Jenapur	22.00	23.00	23.46	28.08.2020
	Indupur	7.23	8.23	8.94	28.08.2020
Baitarani	Anandapur	37.45	38.36	40.83	27.08.2020
	Akhuapada	16.83	17.83	20.04	27.08.2020
Subarnarekha	Rajghat	9.45	10.36	10.96	28.08.2020
Budhabalanga	NH5, Govindpur	7.21	8.13	8.40	27.08.2020

Observed Peak Discharges in Mahanadi & Brahmani during Aug 2020

River Basin	Station	Observed Peak Discharges in Cusecs	Date
Mahanadi	Mundali	10,26,218	31.08.2020
Brahmani	Pankapal	4,15,350	28.08.2020

Existing Structural Measures for flood control:

The structural measures for flood management/erosion control such as Flood Embankments, bank erosion control structures of revetments with launching aprons, spurs and groynes, which bring relief to the flood prone areas to manage the flood flow, are already constructed by the Government in all river basins. 7470.166 km length of flood embankments have been constructed in the river basins as stated below :

BASIN WISE ABSTRACT OF EXISTING EMBANKMENT LENGTH

Sl. No.	Name of Basin	Existing Embankment Length in Km.				Total Length (Km)
		Capital Embankment (C.E.)	Other Agricultural Embankment (O.A.E.)	Test Relief Embankment (T.R.E.)	Saline Embankment (S.E.)	
1	Bahuda	0.000	15.100	0.000	0.000	15.100
2	Baitarani	166.316	154.613	321.286	117.350	759.565
3	Brahmani	181.256	312.790	260.975	374.485	1129.506
4	Budhabalanga	0.000	13.300	123.050	17.300	153.650
5	Mahanadi	1267.685	1411.016	445.812	931.610	4056.123
6	Nagavali	0.000	1.370	2.880	0.000	4.250
7	Rushikulya	63.890	548.070	227.820	33.200	872.980
8	Subarnarekha	30.000	27.700	148.650	94.500	300.850
9	Vamsadhara	8.141	9.152	87.349	0.000	104.642
10	Directly outfalls to Sea	0.000	0.000	6.000	67.500	73.500
	Total :	1717.288	2493.111	1623.822	1635.945	7470.166

Occurrence of Breaches, Piping and Over-topping in River Embankments in various river basins as experienced during current year's flood

(i) Occurrence of Breaches :

Sl. No.	District	No. of Breaches occurred in different River Systems					Total
		Mahanadi system	Brahmani system	Baitarani system	Subarnarekha system	Budhabalang system	
1	Puri	2					2
2	Khurda	1					1
3	Kendrapara	1	4				5

4	Jajpur		22	4			26
5	Mayurbhanj					3	3
6	Balasore				1		1
	Total :	4	26	4	1	3	38

(ii) Abstract of 'Piping Points' in embankments arrested during current year's flood

Sl. No.	District	No. of Piping Arrested in different River System				Total
		Mahanadi	Brahmani	Baitarani	Salandi	
1	Puri	226				226
2	Khurda	13				13
3	Cuttack	25				25
4	Jagatsinghpur	22				22
5	Kendrapara	34	60			94
6	Jajpur	1	295	58		354
7	Bhadrak			58	3	61
	Total :	321	355	116	3	795

(iii) Construction of Dowels using sand bags to check overtopping of Flood Water

Sl. No.	District	No. of Dowel Embankment constructed in different River System				Total
		Mahanadi	Brahmani	Baitarani	Salandi	
1	Puri	36				36
2	Khurda	3				3
3	Cuttack	21				21
4	Jagatsinghpur	76				76
5	Kendrapara	31	43	2		76
6	Jajpur	6	48	23		77
7	Bhadrak			38	7	45
	Total :	173	91	63	7	334

Proposal for raising and strengthening of Embankments in order to mitigate the possible flood damages in future:

The embankments in various major river basins are originally constructed in pre-independence period and gradually improvised to certain levels in later time. The river beds are gradually getting silted up and during flood time, the High flood Level rises as compared to earlier times. It is seen that strengthening of embankments in critical zones need to be strengthened to match the flooding conditions.

The Embankments are susceptible to failures/breaches during flood due to various major causes as stated below:

- (i) Settlement of embankment & transverse cracks due to unequal settlement
- (ii) Erosion of riverside slope due to river current and wave wash
- (iii) Caving in the banks due to rat holes, jackal holes leading to piping and collapse of bank
- (iv) Overtopping of flood water during high flood
- (v) Failure of foundation

During current flood, the breaches have mostly occurred due to overtopping of embankments. The timely actions for arresting piping in 795 locations and arresting overtopping in 334 locations have averted major probable breaches. In spite of best efforts, in 38 locations, though timely actions for construction of dowels by sand bags were taken up, the breaches occurred. The action is taken up on war footing to close the breaches, which are completed by now.

In order to ensure safety of the embankment, it has been recommended that the top level is to be so fixed that there is no danger of overtopping. It has also been recommended by "BIS Code 12094-2000- Design of Embankment" that there should be a free board of 1.00 m to 1.50 m over the High Flood Level with a 35 year return period.

During the flood, it has been observed that

- (i) The river bank flood embankments in many locations are not having requisite free board as recommended by IS Code and as per Central Water Commission Guidelines.
- (ii) River side Slopes and country side slopes are inadequate in many locations. The hydraulic gradient line (HGL) is getting exposed and causing leakage and piping.
- (iii) In the locations of strong currents nearer to bank, there is no adequate provision of launching aprons, revetments, ripraps or spurs.

Hence it is proposed that the weak and vulnerable reaches need to be protected with construction of launching aprons, revetments, spurs along with raising and strengthening of embankments to provide proper free board, so that the threat of breaches of embankments shall be minimized.

The Executive Engineers of various Divisions under various basins which are affected by flood this year, have prepared the mitigation proposals for protection, raising and strengthening of embankments as stated below. The vulnerable locations which are very close to deep channel flow are proposed to be provided with spurs and launching aprons or both as per the technical requirement of the sites. The land required for the works are handed over by the local public to the Department free of cost. Hence there is no need for Land acquisition to strengthen the embankments.

(i) Division Wise Abstract Of Mitigation Proposal For Strengthening Of Embankments

Sl. No.	Name of Division	No. of Project	Affected length in Km.	Amount in lakhs
1	Puri Irrigation Division	21	32.00	2598.00
2	Prachi Division	22	26.10	1150.00
3	Nimapara Irrigation Division	20	8.15	980.00
4	Khurda Irrigation Division	7	20.27	1915.00
5	Nayagarh Irrigation Division	1	1.75	400.00
6	Mahanadi North Division	31	34.09	3867.00
7	Mahanadi South Division	14	10.02	960.00
8	Kendrapara Irrigation Division	33	23.14	4410.00
9	Jagatsinghpur Irrigation Division	19	7.97	4871.00
10	Aul Embankment Division	16	95.20	27000.00
11	Jajpur Irrigation Division	8	2.05	610.00
12	Jaraka Irrigation Division	36	27.65	1600.00
13	Balasore Irrigation Division	49	37.90	2350.00
14	Salandi Canal Division	4	8.70	1250.00
15	Mayurbhanj Irrigation Division	23	15.91	10873.60
16	Angul Irrigation Division	2	0.65	55.00
	Total	306	351.53	64889.60

(ii) DISTRICT WISE ABSTRACT OF MITIGATION PROPOSAL FOR STRENGTHENING OF EMBANKMENTS

Sl. No.	Name of District	No. of Project	Affected length in Km.	Amount in lakhs
1	Balasore	40	30.94	1500.00
2	Bhadrak	17	16.16	2400.00
3	Cuttack	29	37.66	3590.00
4	Dhenkanal	2	0.65	55.00
5	Jagatsinghpur	26	12.79	3696.00
6	Jajpur	43	38.61	2160.00
7	Kendrapara	60	127.79	32337.00
8	Khurda	14	10.80	1250.00
9	Mayurbhanj	23	15.91	10873.60
10	Nayagarh	1	1.75	400.00
11	Puri	51	58.48	6628.00
	Total	306	351.53	64889.60

The State has taken up both structural and non-structural measures for proper management of floods. Important non-structural measures such as operation of reservoir inflow and outflow considering the anticipated run-off in upper and lower catchments, the travel time of flood from reservoir to the deltaic head and from upper catchment to the reservoir itself is being monitored meticulously. The action of retaining the huge inflow in Rengali reservoir and Hirakud Reservoir for a certain period by releasing a part of the inflow, routing the reservoirs and releasing the water as additionally built-up after a safe gap of time, could be able to avert a far more serious flood situation in Deltaic Districts. The embankments needed to be upgraded to the recommended design standard in some critical reaches are identified above. Hence the fund as above if made available can be properly utilized to create a safer environment in deltaic areas of these major river basins and the flood threat shall cease to trigger panic among hundreds of villages where houses are located near weak river embankments and its surrounding areas.

Thus the total requirement for mitigation proposal is Rs.85359.52 lakh or say **Rs.853.60 crore.**

Sl. No	Department	Amount Required for Mitigation proposal (Rs. in lakh)
1	Works	20469.92
2	Water Resources	64889.60
	Total	Rs. 85359.52 lakh or say Rs.853.60 crore

Chapter- IX

Conclusion

Odisha has been severely affected by heavy rain and flood occurred during July & August, 2020. The State encountered high flood situation in five major rivers simultaneously which was unprecedented. Nearly 38.90 lakh people in 10350 villages under 208 Blocks and 30 ULBs have been affected by this disaster.

The State took all required measures to tackle the situation. Search and rescue has been carried out in a systematic and timely manner. The Government has also provided required immediate assistance on war footing to the people in distress. Steps have already been taken to provide house building assistance to enable the affected households to repair/ reconstruct their damaged houses. The Government has announced a package of assistance for restoration of livelihood of the flood victims which will be funded under SDRF/ NDRF and different schemes & budget of concerned departments.

The total loss due to the disaster has been assessed to be Rs.1642.26 crore (Details at **Chapter-V**). The requirement of funds to undertake immediate relief and restoration of damaged infrastructure in eligible sectors as per the norms of SDRF/ NDRF comes to **Rs.715.90 crore**.

Flood is a regular phenomenon in the State. The coastal plain usually experiences high floods for longer duration having severe impact on livelihood of the people and infrastructure which involves huge expenditure on restoration of damaged infrastructure and livelihood support to the people. Being surrounded by rivers of Brahmani and Batarani systems and located in low elevation, most of the villages under Bari Block of Jajpur district are inundated every time it experiences flood. The riverine island also remains cut off for a considerable period which poses serious problem for the Government for sending relief supplies for the affected people.

To overcome such difficulties, the State Government proposes for developing the existing three major roads ensuring all weather communication to Bari Block headquarters so that riverine island area can be approached with relief supplies and other necessitates during high flood situation. Besides, the State Government proposes to strengthen the river/ canal embankments to prevent flooding. Accordingly, two mitigation proposals amounting to **Rs.853.60 crore** are submitted for construction of all-weather roads to Bari Block headquarters and strengthening the embankments in the delta areas.

The Government of India may consider the above proposals for sanction of required funds out of National Disaster Response Fund towards relief and restoration measures relating to Flood and heavy rain during July and August, 2020 and providing required funding support out of NDRMF for implementing the above mitigation proposals.

Thus the total requirement is as follows:

For Relief & Immediate repair/ restoration as per SDRF/ NDRF Norms	Rs.715.90 crore
For Mitigation Measures from NDRMF	Rs.853.60 crore
Total Requirement	Rs.1569.50 crore

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Appendix – I

Statement showing up to date district wise actual (average) rainfall during the Month of August, 2020

Sl.	District	Monthly Normal	DATE																															Up to 31st Aug.20 Total (Actual)
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
1	Angul	357.5	2.5	14.2	40.5	14.2	68.6	8.2	1.6	0.6	14.1	12.7	7.3	0.0	2.4	26.2	44.8	31.3	0.9	7.2	1.1	47.3	9.9	7.4	5.4	5.8	0.3	95.5	107.2	3.1	1.8	4.8	0.0	586.5
2	Balasore	332.1	0.0	0.7	4.9	28.2	23.0	25.6	9.1	17.1	4.0	3.5	0.1	0.0	4.6	9.3	17.4	4.9	1.3	0.4	48.9	38.1	14.4	1.8	2.6	4.5	6.8	84.3	56.3	2.5	0.0	0.0	0.0	414.3
3	Bargarh	374.4	0.0	23.6	19.5	16.2	37.5	3.8	1.7	3.1	18.1	1.0	2.1	0.3	2.1	14.3	2.4	94.8	18.6	11.4	9.7	36.0	24.7	7.1	16.9	3.1	4.1	71.3	76.4	92.8	0.5	7.0	0.0	620.2
4	Bhadrak	311.7	11.6	23.1	0.1	36.4	76.6	25.0	3.1	18.2	3.1	0.0	5.0	0.0	0.9	5.4	132.3	12.2	1.7	0.6	17.0	85.3	12.8	0.0	8.0	0.9	31.6	117.0	21.2	0.0	0.0	0.0	649.0	
5	Balangir	333.6	1.3	10.3	2.2	2.1	15.3	24.7	3.3	3.3	12.7	7.0	0.9	1.3	0.9	7.3	3.0	73.4	9.4	0.7	4.3	59.0	3.6	2.6	2.7	2.6	1.1	48.1	69.3	36.6	7.1	1.2	12.7	430.0
6	Boudh	488.8	0.0	13.0	6.7	9.3	47.1	12.7	2.0	2.0	5.7	0.0	6.7	0.3	0.0	29.5	10.4	97.2	1.0	0.0	3.8	25.7	2.0	5.4	0.7	0.0	0.0	133.3	114.1	6.0	2.7	0.0	8.7	546.2
7	Cuttack	339.1	0.2	0.5	17.1	8.8	87.7	9.1	0.8	14.1	17.5	6.2	2.9	2.9	14.9	43.2	105.1	8.2	8.6	0.9	24.9	117.2	5.5	0.0	5.3	13.0	2.9	101.9	15.6	0.0	0.0	0.0	0.0	635.1
8	Deogarh	443.4	1.2	10.4	26.8	37.7	71.5	16.1	0.0	2.7	17.9	20.9	11.6	0.0	0.0	18.9	97.7	69.5	4.5	2.6	0.6	25.1	27.2	29.3	8.9	6.6	0.3	94.9	128.5	12.1	7.9	5.6	0.0	756.9
9	Dhenkanal	344.8	1.8	4.3	15.8	1.6	95.5	9.7	1.3	17.5	7.3	4.5	1.8	0.3	8.6	55.5	126.5	9.2	1.6	12.1	5.0	87.0	12.0	0.3	5.0	2.3	0.6	78.3	51.7	4.6	0.2	3.5	0.5	625.7
10	Gajapati	253.6	1.5	7.5	15.0	4.6	6.8	2.1	2.0	0.0	1.8	38.4	15.4	2.4	21.0	7.7	3.1	1.4	0.5	1.5	7.5	14.4	3.6	1.1	1.5	3.8	11.5	10.9	5.9	0.0	2.0	0.0	1.3	196.0
11	Ganjam	246.8	1.0	6.1	13.8	5.7	11.5	6.4	2.9	4.8	10.7	13.6	2.0	0.1	7.2	20.2	10.7	0.7	0.0	0.9	1.3	10.2	5.2	1.1	0.0	10.0	3.4	16.4	15.0	0.1	0.0	0.3	1.3	182.6
12	Jagatsinghpur	379.1	0.0	3.8	3.5	5.7	70.5	17.8	0.3	7.9	2.7	0.0	1.1	1.0	1.9	20.8	125.4	0.0	0.0	0.0	62.8	86.3	0.9	0.3	0.0	10.0	3.9	146.5	12.3	0.0	0.0	0.0	0.0	585.1
13	Jajpur	341.2	0.9	2.9	1.7	11.5	47.5	37.0	5.0	7.7	1.8	5.5	4.5	0.0	0.0	10.6	245.2	4.9	2.3	6.4	13.7	111.8	8.8	0.0	6.4	0.5	29.7	115.0	13.3	1.2	0.0	0.0	0.0	695.8
14	Jharsuguda	382.9	3.3	33.0	5.0	5.9	44.3	12.3	3.9	1.4	12.1	8.0	5.2	0.0	0.0	9.3	28.5	39.4	2.5	4.1	2.9	27.7	31.6	10.9	9.9	12.8	1.4	50.9	176.8	25.2	1.1	0.2	0.0	569.5
15	Kalahandi	355.4	1.0	0.6	1.6	7.4	11.6	9.1	0.2	2.0	20.8	5.0	1.8	2.1	31.5	29.1	15.5	17.4	15.0	0.5	7.9	88.7	14.3	2.1	0.1	0.4	4.8	44.5	50.2	9.9	0.4	1.6	0.6	397.8
16	Kandhamal	330.8	7.4	6.4	1.7	4.1	29.8	18.6	1.5	8.0	6.7	8.0	12.4	3.5	13.1	15.1	15.2	18.5	1.4	1.2	5.3	71.3	5.8	3.4	2.0	1.8	0.3	73.0	81.2	3.5	0.4	0.5	0.9	421.7

17	Kendrapara	333.3	0.0	0.0	3.6	26.1	89.7	26.0	0.3	16.2	36.0	0.9	0.6	1.9	24.9	6.8	140.4	2.7	0.0	0.0	63.4	100.2	5.2	0.4	0.0	5.1	23.4	168.3	13.2	0.0	0.0	0.0	0.0	755.4
18	Keonjhar	343.6	23.4	21.3	8.9	22.7	30.5	28.1	7.6	2.1	3.0	16.7	1.6	1.3	3.8	23.0	54.4	13.4	0.5	3.2	5.6	66.4	21.3	19.9	7.1	8.9	3.4	124.8	77.3	2.5	2.3	0.8	0.0	605.7
19	Khordha	320.6	0.6	1.3	18.6	26.9	52.6	12.1	0.0	13.2	1.6	3.3	0.5	0.0	1.4	23.1	54.3	1.2	1.6	1.4	22.5	27.8	1.1	0.0	0.0	22.1	3.5	60.6	20.7	3.1	0.0	0.0	0.0	375.1
20	Koraput	393.6	4.8	15.8	1.9	14.4	42.9	14.2	4.0	5.1	28.2	7.0	3.9	15.3	22.6	27.0	23.3	32.7	17.5	4.8	8.9	100.8	14.6	10.8	0.1	0.9	1.4	23.3	10.1	10.7	4.5	1.4	0.3	473.4
21	Malkangiri	472.8	4.2	8.1	33.1	14.2	15.4	30.1	4.3	30.1	21.8	28.1	17.8	13.8	118.8	70.1	94.0	99.5	80.8	19.3	21.4	98.5	62.5	12.6	0.0	5.1	0.0	7.1	43.2	5.8	19.8	0.0	0.0	979.6
22	Mayurbhanj	359.9	0.0	4.5	4.9	23.7	20.8	23.9	8.4	4.5	8.7	5.0	0.8	1.3	6.3	12.4	13.2	38.7	1.4	1.0	41.9	41.9	19.7	3.3	8.9	11.5	10.7	122.2	56.1	3.1	1.7	0.0	0.0	500.3
23	Nawarangpur	407.5	1.9	4.3	17.1	7.4	20.7	1.2	11.1	0.0	14.4	4.7	3.3	6.7	4.7	13.7	14.3	35.3	26.1	3.5	4.2	130.6	51.4	9.5	0.0	2.4	0.7	15.3	24.2	17.2	3.9	2.5	0.8	453.1
24	Nayagarh	288.2	2.7	1.3	3.8	1.3	11.8	10.3	3.9	15.7	14.7	5.0	0.0	8.4	4.1	27.5	42.8	6.8	1.1	11.7	7.9	23.4	3.7	1.9	2.4	11.6	1.6	52.3	34.7	1.3	0.0	0.9	0.4	314.5
25	Nuapada	327.8	4.0	0.9	4.1	0.0	5.4	3.1	5.6	3.4	5.4	9.0	1.0	0.0	1.0	4.0	0.0	20.0	16.1	0.0	0.2	42.6	25.5	5.5	0.2	1.4	0.0	37.6	68.7	53.4	4.5	0.6	0.0	323.1
26	Puri	297.9	0.0	0.0	9.9	51.5	86.8	12.4	0.0	2.8	3.5	0.3	0.0	1.2	1.1	30.4	40.8	0.7	0.0	0.0	33.9	54.5	0.0	0.0	0.0	2.0	2.3	76.1	25.7	0.0	0.0	0.0	0.0	435.9
27	Rayagada	273.7	0.9	5.1	1.6	8.1	9.3	1.9	4.4	2.5	3.9	8.4	3.2	2.2	33.1	13.0	6.8	4.9	2.1	0.3	4.8	38.8	8.8	3.6	0.0	4.2	12.7	33.9	15.7	3.8	0.3	5.0	1.3	244.5
28	Sambalpur	442.4	0.8	4.6	19.1	16.1	107.1	7.1	5.4	0.6	28.7	7.8	1.2	0.8	5.6	13.2	21.6	85.2	7.9	3.4	14.7	26.2	26.8	11.9	15.8	3.9	3.0	87.0	116.7	22.0	0.7	3.5	0.0	668.4
29	Subarnapur	408.9	0.3	9.6	6.8	25.2	79.4	11.8	4.2	0.6	11.1	0.2	10.3	0.2	0.7	21.0	2.7	125.4	8.4	1.1	4.1	50.6	9.4	0.3	7.0	3.0	1.9	162.3	67.0	37.7	4.9	1.4	14.0	682.4
30	Sundargarh	393.9	1.5	9.5	15.5	15.8	53.5	42.1	2.8	3.0	1.4	12.6	3.9	0.1	4.1	18.2	20.6	31.2	2.4	3.3	0.7	22.3	50.1	20.4	22.2	4.2	2.5	60.1	110.3	20.8	6.9	2.2	0.0	564.2
Total			78.7	246.8	324.7	452.7	1370.6	462.4	100.6	210.1	339.2	243.4	128.9	67.2	341.3	625.7	1512.4	980.6	235.2	103.3	451.0	1755.9	482.6	172.9	139.0	164.4	169.5	2312.8	1678.4	378.8	73.4	42.9	42.6	15688.0
State Average		356.0	2.6	8.2	10.8	15.1	45.7	15.4	3.4	7.0	11.3	8.1	4.3	2.2	11.4	20.9	50.4	32.7	7.8	3.4	15.0	58.5	16.1	5.8	4.6	5.5	5.7	77.1	55.9	12.6	2.4	1.4	1.4	522.9

Appendix-II
Extent of damage due to natural calamities
State-Odisha
Nature and period of natural calamity

S. No	Item	Total
1	Total number of districts in the state	30
2	Number of districts affected	27
3	Number of villages affected	10350
4	Population affected (in lakh)	38.90
5	Total land area affected (in lakh ha)	
6	Cropped are affected	
	(i) Total cropped area affected (In lakh Ha.)	3.14
	(ii) Estimated loss to crops (Rs. in lakh)	54229.94
	(iii) Area in ha. where crop damage was more than 33 % (In lakh Ha.)	2.36
7	Percentage of area held by SMF :	
	(i) In the State as a whole	
	(ii) In the affected Districts	
8	Houses damaged :-	
	(a) No. of house damaged :-	78137
	(i) Fully damaged pucca houses	3
	(ii) Fully damaged kutcha houses	685
	(iii) Severely damaged pucca houses	8
	(iv) Severely damaged kutcha house	2173
	(v) Partly damaged pucca houses	632
	Partly damaged kutcha houses	53499
	(vi) No. of huts damaged	3910
	(vii) No. of cowshed damaged	17227
	(b) Estimated value of damage to houses (Rs.in lakh)	10891.56
9	No. of human lives lost	38
10	No. of persons with grievous injuries	nil
11	No. of persons with minor injuries	nil
12	Animals lost:-	
	(a) No. of big animals lost	17
	(b) No. of small animals lost	9
	(c) No. poultry (birds) lost	33229
13	Damage to public proprieties:- (a) In physical terms (sector wise details should be given – e.g. length of State roads damaged, length of district roads damaged, length of village roads damaged, No. of bridges damaged, No. of culverts damaged, No. of school buildings damaged etc.)	Details given under Chapter- V
	(b) Estimated value of the damage to public properties. (Rs.in lakh)	85811.73
14	Estimated total damage to houses, crops and public properties.	150933.23

APPENDIX-III

Assistance for provision of temporary accommodation, food, clothing medical care etc. of the people affected/ evacuated due to "Flood & Heavy Rain" -2020 (Operation of Relief Camps)

Sl. No	Name of the district	Total no. of relief camps opened	Total no. of people accomodated in relief camps (cumulative)	Average no. (in a day) of relief camps	Average duration of operation of relief camps	Average no. of People accommodated per day in the relief camps	Expenditure incurred on (Rs. In Lakhs)					
							Temporary accommodation	Food	Clothing	Medical care	Other essential items (to be specified)	Total
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Angul	3	330	3	1	330	0	0	0	0	0	0.000
2	Balasore	53	4405	16	4	2882	0	6.79595	0	0	5.104	11.900
3	Bargarh	5	1611	5	8	362	0	3.5855	0	0	0.65	4.236
4	Bhadrak	121	22404	11	5	2729	0	18.306	0.8	0.2	3.18	22.486
5	Bolangir	5	161	3	1	161	0	0.07	0	0	0	0.07
6	Boudh	13	4276	7	2	1425	0.128	1.5319	0	0	0.1408	1.801
7	Cuttack	20	18934	20	7	642	0	4.2	0	0	0	4.200
8	Dhenkanal	6	415	2	4	119	0	0.295	0	0	0	0.295
9	Jagatsinghpur	19	1948	19	7	1948	0	4.6256	0	0	0.59398	5.220
10	Jajpur	328	269301	182	11	90820	8.2455	189.07405	0	0	2.938	200.258
11	Jharsuguda	11	4289	11	3	679	0	3.21	0	0	3.04	6.250
12	Kalahandi	1	24	1	2	24	0	0.0024	0	0	0	0.0024
13	Kandhamal	4	63	4	4	63	0	0.048	0	0	0	0.048
14	Kendrapara	225	100443	88	7	56326	0	84.946	0	0	10.54	95.486
15	Keonjhar	44	17162	18	3	4803	0	24.01	0	0.025	2.1	26.135
16	Khordha	5	1831	5	1	1831	0	0	0	0	0	0.000
17	Malkangiri	19	646	9	4	162	0	0.956	0	0	0.3258	1.2818
18	Mayurbhanj	37	8667	35	5	7617	0.095	2.27598	0	0	0.7749	3.146
19	Puri	36	24568	34	14	10767	0	12.368	0	0	0.000	12.368
20	Sambalpur	21	2400	18	4	2300	0	6.0972	0	0	0	6.097
21	Subarnapur	3	391	3	2	366	0	0.6817	0	0	0.14235	0.824
22	Sunadargarh	1	66	1	1	66	0	0.0348	0	0	0	0.0348
Total		980	484315	495	4	186422	8.4685	363.11448	0.8	0.225	29.52983	402.13781

APPENDIX-IV

Agriculture crop loss and fund required for input subsidy (SMF)

Agriculture/ Horticulture crop loss and fund required for input subsidy due to "Flood & Heavy Rain" - 2020;											
Sl. No.	Name of the district	Total agriculture/ horticulture crop area affected (in Ha.)	Total agriculture/ horticulture crop area where crop loss is >33% (in Ha.)	Total area under crop loss of 33% & above (area in Ha.)				Agriculture input subsidy required in Rs.			
				Rainfed	Irrigated	Perennial	Total	Rainfed @ 6800/- per Hect.	Irrigated @13500/- per Hect.	Perennial @ 18000/- Per hect.	Total fund required in Rs.
1	2	3	4	5	6	7	8	9	10	11	12
1	Angul	1970	1669	1259.084	143.292	0	1402.376	8561771.2	1934442	0	10496213.2
2	Balasore	11385	3888.3	3881	7.3	0	3888.3	26390800	98550	0	26489350
3	Bargarh	1724.07	320.92	289.07	17.85	0	306.92	1965676	240975	0	2206651
4	Bhadrak	42755	29956.4	25784.4	4131	0	29915.4	175333920	55768500	0	231102420
5	Bolangir	660	660	660	0	0	660	4488000.00	0.00	0.00	4488000.00
6	Boudh	1154	1154	630	524	0	1154	4284000	7074000	0	11358000
7	Cuttack	35574.3	32156.3	24671	7485.3	0	32156.3	167762800	101051550	0	268814350
8	Dhenkanal	6442.6	4260.5	3827.3	433.2	0	4260.5	26025640	5848200	0	31873840
9	Jagatsinghpur	19125	12100	6806	5294	0	12100	46280800	71469000	0	117749800
10	Jajpur	73514	63253	49825.7	13351	76.3	63253	338814760	180238500	1373400	520426660
11	Jharsuguda	955.05	880.65	845.28	35	0	880.28	5747904	472500	0	6220404
12	Kalahandi	0.23	0.23	0	0.23	0	0.23	0.00	3105.00	0.00	3105.00
13	Kendrapara	56590	44941	36922	5621	2398	44941	251069600	75883500	43164000	370117100
14	Keonjhar	3805	2819.07	2551.07	113	0	2664.07	17347276	1525500	0	18872776
15	Khordha	7903.35	7903.35	4940.56	2129.308	0	7069.868	33595808	28745658	0	62341466
16	Koraput	1.2	1.2	1.2	0	0	1.2	8160.00	0.00	0.00	8160.00
17	Malkangiri	1040.08	765.45	552.341	214.894	0	767.235	3755918.80	2901069.00	0.00	6656987.80
18	Mayurbhanj	8102	883.78	883.78	0	0	883.78	6009704	0	0	6009704
19	Nayagarh	2802	2662.27	2662.27	0	0	2662.27	18103436	0	0	18103436
20	Puri	35312	23223.24	14596.738	8608.57	17.933	23223.241	99257818.4	116215695	322794	215796307.4
21	Sambalpur	550.73	519.73	163.73	356	0	519.73	1113364	4806000	0	5919364
22	Subarnapur	2285.103	1907.103	471.103	1436	0	1907.103	3203500.4	19386000	0	22589500.4
Total		313650.713	235925.493	182223.626	49900.944	2492.233	234616.803	1239120657	673662744	44860194	1957643595

APPENDIX-V

Agriculture crop loss and fund required for input subsidy (other than SMF)

Agriculture/ horticulture crop loss and fund required for input subsidy due to "Flood & Heavy " - 2020 (Other than SMF)															
Sl. No.	Name of the district	Total agriculture/ horticulture crop area affected (in Ha.)	Total agriculture/ horticulture crop area where crop loss is >33% (in Ha.)	Out of (4) area belong to farmers other than SMF (in Ha.)				No. of farmers other than SMF affected by the instant calamity				Assistance required in Rs.			
				Rainfed	Irrigated	Perennial	Total	Rainfed	Irrigated	Perennial	Total	Rainfed @ 6800/- per Hect.	Irrigated @13500/- per Hect.	Perennial @ 18000/- Per hect.	Total fund required in Rs.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Angul	1970	1669	0	0	0	0	0	0	0	0	0	0	0	0
2	Balasore	11385	3888.3	0	0	0	0	0	0	0	0	0	0	0	0
3	Bargarh	1724.07	320.92	0	0	0	0	0	0	0	0	0	0	0	0
4	Bhadrak	42755	29956.4	1765	246	0	2011	866	451	0	1317	12002000	3321000	0	15323000
5	Bolangir	660	660	0	0	0	0	0	0	0	0	0	0	0	0
6	Boudh	1154	1154	0	0	0	0	0	0	0	0	0	0	0	0
7	Cuttack	35574.3	32156.3	0	0	0	0	0	0	0	0	0	0	0	0
8	Dhenkanal	6442.6	4260.5	0	0	0	0	0	0	0	0	0	0	0	0
9	Jagatsinghpur	19125	12100	0	95	0	95	0	38	0	38	0	1282500	0	1282500
10	Jajpur	73514	63253	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharsuguda	955.05	880.65	0	0	0	0	0	0	0	0	0	0	0	0
12	Kalahandi	0.23	0.23	0	0	0	0	0	0	0	0	0	0	0	0
13	Kendrapara	56590	44941	0	0	0	0	0	0	0	0	0	0	0	0
14	Keonjhar	3805	2819.07	155	0	0	155	69	0	0	69	1054000	0	0	1054000
15	Khordha	7903.35	7903.35	0	0	0	0	0	0	0	0	0	0	0	0
16	Koraput	1.2	1.2	0	0	0	0	0	0	0	0	0	0	0	0
17	Malkangiri	1040.08	765.45	0	0	0	0	0	0	0	0	0	0	0	0
18	Mayurbhanj	8102	883.78	0	0	0	0	0	0	0	0	0	0	0	0
19	Nayagarh	2802	2662.27	0	0	0	0	0	0	0	0	0	0	0	0
20	Puri	35312	23223.24	0	0	0	0	0	0	0	0	0	0	0	0
21	Sambalpur	550.73	519.73	0	4.4	0	4.4	0	7	0	7	0	59400	0	59400
22	Subarnapur	2285.103	1907.103	0	0	0	0	0	0	0	0	0	0	0	0
Total		313650.713	235925.493	1920	345.4	0	2265.4	935	496	0	1431	13056000	4662900	0	17718900

Appendix-VI

Animal Husbandry (Replacement of Animals)

Sl. No.	Name of the District	No of Livestock/Birds Lost					No.of animals qualifying for relief grant (i.e. subject to ceiling of 3 large milch animal or 30 small Milch animals or 3 large Draught animals or 6 small draught animals per House hold				Expenditure incurred (Milch Animal @30,000/- for Large Animal and @3,000/- for Small Animal) Draught Animal @25,000/- for Large Animal and @16,000/- for Small Animal				Poultry @ 50/- per bird subject to a ceiling of assistance of Rs.5000/- per beneficiary per house hold	Total Amount (11+12+13+14+15)
		Milch Animal		Draught Animal		Poultry Birds	Milch Animal		Draught Animal		Milch Animal		Draught Animal		Poultry Birds	
		Buffalo /Cow	Sheeps /Goat	Bullock	Calf		Buffalo/ Cow	Sheeps/ Goat	Bullock	Calf	Buffalo/ Cow	Sheeps/ Goat	Bullock	Calf		
1		2	3	4	5	7	8	10	12	14	17	18	19	20	21	22
1	Angul	0	6	0	0	0	0	6	0	0	0	18000	0	0	0	18000
2	Bhadrak	4	0	0	0	2000	4	0	0	0	120000	0	0	0	5000	125000
3	Cuttack	0	0	0	0	500	0	0	0	0	0	0	0	0	5000	5000
4	Dhenkanal	1	0	0	2	0	1	0	0	2	30000	0	0	32000	0	62000
5	Jajpur	0	0	1	2	22909	0	0	1	2	0	0	25000	32000	65000	122000
6	Kendrapara	4	3	0	1	600	4	3	0	1	120000	9000	0	16000	10000	155000
7	Khordha	1	0	0	0	100	1	0	0	0	30000	0	0	0	5000	35000
8	Puri	1	0	0	0	7120	1	0	0	0	30000	0	0	0	35250	65250
Total		11	9	1	5	33229	11	9	1	5	330000	27000	25000	80000	125250	587250

Appendix-VII

Assistance required towards repair / restoration of damaged houses (in Rs.)

Sl. No	Name of the district	Fully damaged		Severely damaged		Total fully/ Severely damaged pucca/ kutcha house		Partially damaged				Hut damaged		Total		Cow shed damaged		Grand total
		Pucca house	Kutcha house	Pucca house	Kutcha house	No. of house damaged	Fund required @ Rs.95100/- or Rs.101900/- per house	Pucca house	Funds required @ Rs.5200/- per house	Kutcha house	Funds required @ Rs.3200/- per house	No. of hut	Funds required @ Rs.4100/- per hut	No. of house damaged (7+9+11+13)	Funds required (8+10+12+14)	No. of cow shed	Cow Shed Damaged @ Rs.2100/- per cowshed	Funds required (16+18)
		No.	No.	No.	No.	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No	Amount	No.	Amount	Amount
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Angul	0	11	2	42	55	5230500	54	280800	2116	6771200	14	57400	2239	12339900	11	23100	12363000
2	Balasore	0	4	0	0	4	380400	3	15600	442	1414400	18	73800	467	1884200	7	14700	1898900
3	Bargarh	0	11	0	0	11	1046100	4	20800	2758	8825600	40	164000	2813	10056500	55	115500	10172000
4	Bhadrak	0	5	0	10	15	1426500	0	0	2701	8643200	4	16400	2720	10086100	142	298200	10384300
5	Bolangir	0	6	0	81	87	8865300	2	10400	2456	7859200	10	41000	2555	16775900	112	235200	17011100
6	Boudh	0	0	0	2	2	190200	0	0	1763	5641600	0	0	1765	5831800	0	0	5831800
7	Cuttack	0	1	0	0	1	95100	0	0	118	377600	1	4100	120	476800	19	39900	516700
8	Deogarh	0	2	2	2	6	611400	38	197600	385	1232000	1	4100	430	2045100	16	33600	2078700
9	Dhenkanal	0	1	0	0	1	95100	0	0	407	1302400	5	20500	413	1418000	1	2100	1420100
10	Jagatsinghpur	0	0	0	0	0	0	0	0	136	435200	0	0	136	435200	237	497700	932900
11	Jajpur	2	457	2	1708	2169	206271900	319	1658800	21116	67571200	3441	14108100	27045	289610000	14890	31269000	320879000
12	Jharsuguda	0	6	0	48	54	5135400	1	5200	1033	3305600	0	0	1088	8446200	40	84000	8530200
13	Kalahandi	0	2	0	0	2	190200	3	15600	83	265600	1	4100	89	475500	0	0	475500
14	Kandhamal	0	1	0	0	1	101900	3	15600	203	649600	3	12300	210	779400	5	10500	789900
15	Kendrapara	0	14	0	2	16	1521600	3	15600	3490	11168000	173	709300	3682	13414500	1225	2572500	15987000
16	Keonjhar	0	48	0	49	97	9224700	13	67600	4274	13676800	1	4100	4385	22973200	214	449400	23422600

17	Koraput	0	0	0	1	1	101900	1	5200	340	1088000	0	0	342	1195100	8	16800	1211900
18	Malkangiri	1	22	1	48	72	7336800	52	270400	1234	3948800	3	12300	1361	11568300	2	4200	11572500
19	Mayurbhanj	0	29	1	38	68	6466800	9	46800	1376	4403200	88	360800	1541	11277600	130	273000	11550600
20	Nabarangpur	0	3	0	7	10	1019000	0	0	361	1155200	0	0	371	2174200	1	2100	2176300
21	Nayagarh	0	1	0	2	3	285300	0	0	9	28800	1	4100	13	318200	0	0	318200
22	Nuapada	0	0	0	0	0	0	0	0	33	105600	0	0	33	105600	0	0	105600
23	Puri	0	0	0	1	1	95100	28	145600	367	1174400	0	0	396	1415100	17	35700	1450800
24	Sambalpur	0	10	0	3	13	1236300	8	41600	2052	6566400	22	90200	2095	7934500	13	27300	7961800
25	Subarnapur	0	0	0	6	6	570600	73	379600	2448	7833600	45	184500	2572	8968300	6	12600	8980900
26	Sunadargarh	0	51	0	123	174	16547400	18	93600	1798	5753600	39	159900	2029	22554500	76	159600	22714100
Total		3	685	8	2173	2869	274045500	632	3286400	53499	171196800	3910	16031000	60910	464559700	17227	36176700	500736400

Appendix-VIII

Requirement of funds under the head of repair of damaged infrastructure of immediate nature (Rs. in Lakh)								
Sl. No.	Sector	Items	Damage in physical terms (Kms/ Nos. etc.)	Actual damage accessed (Total damage in Lakh Rs.)	Requirement of funds for repair of immediate nature	Out of (7), amount available from annual maintenance budget	Out of (7), amount available from related schemes/ programs/ other sources	Out of (7), amount proposed to be met from SDRF/NDRF
1	Road & Breaches	GP/ PS Road damaged	8316.51 kms.	12265.56	12265.56	0.00	0.00	12265.56
		PWD Road damaged	1714.72 kms.	9688.95	4256.05	0.00	0.00	4256.05
		Rural Road including breaches damaged	1735.69 kms.	15423.69	3309.84	0.00	0.00	3309.84
		Urban Road damaged	151.32 kms.	2447.99	268.25	0.00	0.00	268.25
		NH (mantained by state) damaged	10.09 kms.	163.90	31.55	0.00	0.00	31.55
		Breaches in PWD Roads	42 Nos.	398.75	114.70	0.00	0.00	114.70
		Breaches in NH mantained by State	11 Nos.	34.00	12.00	0.00	0.00	12.00
		Total			40422.84	20257.95	0.00	0.00
2	CD/ Bridges damaged	CD/ Bridges damaged/ washed away in PWD roads	192 Nos.	1630.53	397.75	0.00	0.00	397.75
		CD/ Bridges damaged/ washed away in rural roads	473 Nos.	3423.96	1223.23	0.00	0.00	1223.23
		CD/ Bridges damaged/ washed away in NH	14 Nos.	122.00	24.00	0.00	0.00	24.00
		Culvert damaged in urban roads	7 Nos.	47.00	47.00	0.00	0.00	47.00
		Total			5223.49	1691.98	0.00	0.00
3	Drain damaged	Drain damaged of PWD Dept.	300 Kms.	50.00	50.00	0.00	0.00	50.00
		Drain damaged of H & UD Dept.	44.28 Kms.	537.02	78.84	0.00	0.00	78.84
		Total			587.02	128.84	0.00	0.00
4	Water Supply System damaged	Rural Water Supply System damaged	543 Nos.	320.29	320.29	0.00	0.00	320.29
		Urban Piped Water Supply System damaged	92 Nos.	161.50	138.00	0.00	0.00	138.00

		Tube Weel/ Plat form damaged in urban area	85 Nos.	30.50	30.50	0.00	0.00	30.50
		Total		512.29	488.79	0.00	0.00	488.79
5	River/ Saline Embankments	Breaches in river/ saline emnankment	38 Nos.	3506.00	1300.00	0.00	0.00	1300.00
		Damage to river/ saline emnankment	996.90 Kms.	21281.39	1889.17	0.00	0.00	1889.17
		Total		24787.39	3189.17	0.00	0.00	3189.17
6	Drainage System	Damage to drainage channels	863.63 kms.	1648.37	1648.37	0.00	0.00	1648.37
		Damage to canals	457.58 kms.	3587.32	805.45	0.00	0.00	805.45
		Total		5235.69	2453.82	0.00	0.00	2453.82
7	Minor Irrigation/ Lift Irrigation projects	Minor Irrigation Projects damaged	93 Nos.	223.07	139.50	0.00	0.00	139.50
		Lift Irrigation Projects damaged	3856 Nos.	2614.81	2614.81	0.00	0.00	2614.81
		Total		2837.88	2754.31	0.00	0.00	2754.31
8	School Buildings	Pry. School buildings damaged	540 Nos.	959.37	959.37	0.00	0.00	959.37
		Secy. School buildings damaged	10 Nos.	48.25	20.00	0.00	0.00	20.00
		Total		1007.62	979.37	0.00	0.00	979.37
9	Community Health Center	CHCs damaged	3 Nos.	12.00	6.00	0.00	0.00	6.00
		Total		12.00	6.00	0.00	0.00	6.00
10	Community Buildings/ Assets/ AWC damaged	GP/PS Building & community hall damaged	101 Nos.	182.21	182.21	0.00	0.00	182.21
		Anganwadicentres damaged	282 Nos.	440.60	440.60	0.00	0.00	440.60
		Total		622.81	622.81	0.00	0.00	622.81
11	Power Sector damaged	11 KV Transformer damaged	45 Nos.	39.11	39.11	0.00	0.00	39.11
		11 KV Poles damaged	982 Nos.	41.66	39.28	0.00	0.00	39.28
		11 KV conductor damaged	331.64 kms.	167.69	165.82	0.00	0.00	165.82
		Distribution Transformer damaged	571 Nos.	563.53	563.53	0.00	0.00	563.53
		LT line poles damaged	1172 Nos.	47.08	46.88	0.00	0.00	46.88
		LT line conductor damaged	219.17 kms.	118.27	109.59	0.00	0.00	109.59
		Total		977.34	964.21	0.00	0.00	964.21
Grand Total				82226.37	33537.25	0.00	0.00	33537.25

Chapter-XI

Visual Accounts



badkhaligoan to mundapada road





