

# BIHAR FLOODS 2016

(वर्ष 2016 में बिहार में बाढ़)



आपदा नहीं हो भारी,  
यदि पूरी हो तैयारी।



## बिहार राज्य आपदा प्रबंधन प्राधिकरण

आपदा प्रबंधन विभाग, बिहार सरकार  
पटना



## पूर्व कथ्य

वर्ष 2016 में राज्य के लगभग सभी जिले विभिन्न आपदाओं से प्रभावित रहे हैं। ग्रीष्म काल में बड़े पैमाने पर आग लगने की घटनायें राज्य में हुईं तथा मॉनसून के आगमन के साथ ही बिजली गिरने से काफी लोगों की मौतें हुईं। यहां तक कि किसी एक दिन में बिजली गिरने से 56 लोगों की मौत हुई जो अप्रत्याशित है। मॉनसून आने के बाद जुलाई, अगस्त और सितम्बर महीने में राज्य के 31 जिले कमोवेश विभिन्न चरणों में बाढ़ से प्रभावित हुए। जहां 31 जिलों में बाढ़ आयी वहीं अगस्त माह में जब धान की रोपनी का समय था, अल्प वर्षापात के कारण कतिपय जिलों/प्रखंडों में सुखाड़ की भी स्थिति बनी।

परन्तु उपरोक्त सभी स्थितियों का मुकाबला राज्य प्रशासन की पूरी मशीनरी ने मिलकर किया। जहां तक बाढ़ आपदा प्रबंधन का सवाल है इसके लिए आपदा प्रबंधन विभाग ने मानक संचालन प्रक्रिया गठित किया है जिसके आलोक में लगभग सभी जिलों में बाढ़ की पूर्व तैयारियों को पूरा किया गया था। जल संसाधन विभाग ने भी मानक संचालन प्रक्रिया गठित किया है जिसके अनुसार तटबंधों के सुरक्षा का कार्य बाढ़ आने के पूर्व एवं बाढ़ के दौरान युद्ध स्तर पर किया गया। बाढ़ प्रभावित जिलों में बड़े पैमाने पर मानव एवं पशुओं के लिए राहत केन्द्रों तथा सामुदायिक किचन एवं लंगर की व्यवस्थाएं की गयीं। जिन जिलों में बाढ़ की स्थिति भयावह नहीं थी उन जिलों के जिला पदाधिकारियों ने उत्साहपूर्वक दूसरे बाढ़ प्रभावित जिलों की भरपूर मदद की।

इसी प्रकार आग लगने के दौरान भी जिलों ने मानक संचालन प्रक्रिया के अनुसार त्वरित राहत बांटने का काम किया। यहां तक कि कतिपय जिलों ने आग एवं आसमानी बिजली गिरने से बचाव के संबंध में आपदा प्रबंधन विभाग द्वारा जारी Advisory के आलोक में जन-जागरूकता लाने के अभिनव प्रयोग भी किये। कहना न होगा कि आपदा प्रबंधन के इन समस्त कार्यों में प्रमंडलीय आयुक्तों/जिला पदाधिकारियों की भूमिका

नेतृत्वकारी रही तथा सरकार के विभिन्न विभागों ने जिलों को भरपूर दिशा निर्देश जिलों को दिया। पूर्णिया प्रमंडल में तो विशेष आयुक्त के रूप में श्री सुधीर कुमार, प्रधान सचिव, कृषि विभाग को प्रतिनियुक्त किया गया, जिन्होंने अपने पूर्व अनुभव के आधार पर जिलों को उचित मार्गदर्शन प्रदान किया।

इस प्रकार सभी जिला पदाधिकारी/सभी प्रमंडलीय आयुक्त एवं जिलों के प्रभारी सचिव/प्रधान सचिव को वर्ष 2016 में अग्निकांड, आसमानी बिजली गिरने तथा बाढ़ आपदा से निपटने का पर्याप्त अनुभव प्राप्त हुए हैं। यदि इन अनुभवों को लेखबद्ध कर उसे एक दूसरे के साथ बांट कर हम सीख सकते हैं। हमारा सकारात्मक पक्ष क्या रहा तथा कौन सा पक्ष कमजोर रहा जिसमें सुधार कर हम भविष्य के आपदा प्रबंधन के कार्यों को बेहतर बना सकते हैं।

उल्लेखनीय है कि बिहार राज्य आपदा प्रबंधन प्राधिकरण ने इस बिन्दु पर विचार किया है तथा सभी प्रमंडलीय आयुक्तों, जिला पदाधिकारियों, जिलों के प्रभारी सचिव/प्रधान सचिव/जल संसाधन विभाग/कृषि विभाग/आपदा प्रबंधन विभाग/लोक स्वास्थ्य अभियंत्रण विभाग/पशुपालन एवं मत्स्य संसाधन विभाग/समाज कल्याण विभाग/स्वास्थ्य विभाग/शिक्षा विभाग तथा NDRF/ SDRF से अनुरोध किया है कि वे उपरांकित आपदाओं के प्रबंधन में अपने-अपने अनुभवों को लेखबद्ध कर बिहार राज्य आपदा प्रबंधन प्राधिकरण को भेजी जाय। जिसके तहत कई जिले के जिलाधिकारियों द्वारा विभिन्न आपदाओं के अनुभवों को लेखबद्ध कर प्राधिकरण को उपलब्ध कराया गया है जिसे इस रिपोर्ट में शामिल किया जा रहा है। साथ ही साथ तत्कालीन आपदा प्रबंधन के प्रधान सचिव तथा वर्तमान में प्राधिकरण के उपाध्यक्ष श्री व्यास जी द्वारा अपने अनुभवों को इस रिपोर्ट के माध्यम से साझा किया गया है।

**मोनीषा दूबे**

वरीय संपादक, बी.एस.डी.एम.ए.

# विषय सूची

पृ०सं०

## 1. A Report on Bihar Floods 2016

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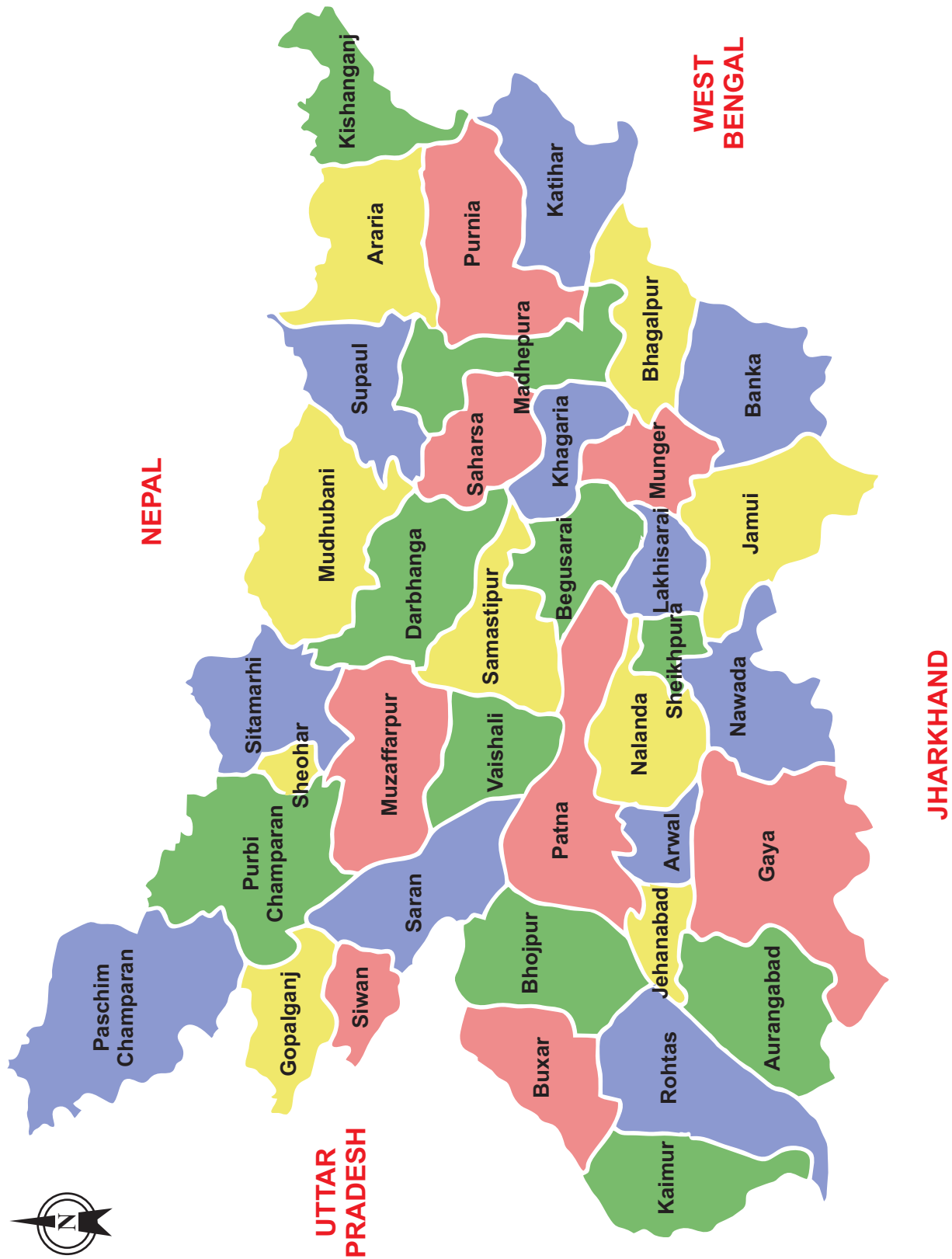
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# A Report on Bihar Floods 2016

— Vyas Ji, IAS (Retd.), Vice-Chairman, BSDMA

## PREFACE

**B**ihar is a multi-hazard prone State. The State has 38 districts. A total of 28 districts are flood prone, out of which 15 districts are considered extremely flood prone. A vast swathe of our land gets inundated every year not because of the excessive rainfall within our geographical boundaries but due to flooding in the rivers like Kosi, Kamala-Balan, Bagmati, Gandak, Adhwara group of rivers, Sone and Ganges which emanate beyond our territory, such as, Nepal, Chhatisgarh/Madhya Pradesh and Uttarakhand. The breach of Kosi embankment at Kusaha in 2008, preceded by unprecedented floods in 22 districts in the year 2007, brought havoc in Bihar and emasculated its economy substantially.

The vagaries of nature are such that the State faces the paradox of floods and drought at the same time and in same districts. Whereas some portions of a district may be affected by floods because of heavy rains in the catchment of river(s) crisscrossing that district, other portion may be reeling under drought due to irregular and/or scanty rains during South-West monsoons. To elucidate this point further, Bihar faced successive droughts in the year 2009 (26 districts), 2010 (all 38 districts), 2013 (33 districts and remaining 5 were placed in the watch list) and even succeeding two years were no better because of deficient rain fall. But together with drought, twenty (20) districts faced floods in the year 2013 and in the year 2014 Nalanda, Patna and Sheikhpura districts faced flash floods because of heavy rains in our neighboring State of Jharkhand. In the year 2016, the State had an overall rainfall deficit of 21% by the end of August with 166 blocks having rainfall deficit above 40%. However, thanks to the late monsoon rains during September and first/second week of October, the drought situation

could be averted. However, to encourage transplantation of paddy and save standing crops due to scanty rains during sowing season the State Government sanctioned a scheme of diesel subsidy to assist farmers for irrigation.

In addition to the disasters like chronic floods and successive droughts, all districts of Bihar are situated either in the seismic zone V, IV or III: nine (9) districts located near Nepal border come under most vulnerable seismic zone V. In 1934, Munger district suffered from massive earthquake which smothered hundreds of life and destroyed property worth billions bringing great miseries to the people. Though no earthquake of that magnitude has taken place in Bihar since then, low intensity tremors keep on occurring now and then causing loss of life and property. In the year 2015, Bihar suffered from the earthquake whose epicenter was Kathmandu, Nepal and more than 60 people lost their lives. Natural disasters, such as, heat and cold waves, cyclonic storms, hailstorms, lightening, drowning, boat capsizing and high speed winds and fire disaster occur almost every year causing substantial loss of life and property. If we add man-made disasters like road accidents, the number of disasters affecting the State would swell. In fact, the whole State is considered a multi-hazard prone State warranting multi-pronged contextual strategies to combat the disasters effectively.

This year Bihar has suffered from floods on account of heavy rain fall in the catchment areas of rivers emanating from out of this State and Nepal. Floods came and affected about 85 lakh population, flooding vast swathes in 31 districts in four phases. The mighty river Ganges got flooded because of unusual amount of water discharge in river Sone from Bansagar dam located in MP and Mohammedganj barrage located in Jharkhand. The water discharge to say the least was



unprecedented: it was 11.67 lakh cusec in the night of 19/20 August. Prior to that due to heavy discharge of water in the rivers such as Mahananda, Bakara, Kankai and some minor rivers, whose catchments lie in Nepal, vast area of north eastern districts, namely, Purnia, Araria, Kishanganj, Supaul got flooded. Because of Sone water, three districts, namely, Rohtas, Aurangabad and Arwal, which are traditionally not considered flood prone suffered from floods. Even Falgu, Dardha and some non-descript non-perennial southern rivers got flooded due to heavy rainfall in their catchments in Jharkhand plateau. At the fag end of the monsoon season, river Punpun got flooded causing damage to life and property in Patna district.

When the flood disasters struck, the entire state machinery swung into action immediately and massive rescue and relief operation was launched. At the beginning, dry food packets were distributed in the marooned areas through country boats and units of SDRF/NDRF. However, relief camps for humans and cattle as per need were set up for sheltering rescued people and livestock. The Disaster Management Department has developed a detailed Standard Operating Procedure (SOP) for flood disaster management. The rescue and relief operations started

in accordance with SOP. More than twenty teams of SDRF/NDRF were deployed for rescue and relief and all necessary arrangements in the relief camps were made which include arrangements for providing cooked food, water and sanitation, health care, fodder and cattle care, Anganwadis and school for children. Where people were reluctant to move out of their houses/villages community kitchens and langars were opened and cooked food was made available to the needy. In case of death caused by flood ex-gratia was provided expeditiously. The State has established a reputation of providing ex-gratia in death cases the same day.

After water receded Gratuitous Relief, House Damage Relief, Cattle Damage Relief and Agriculture Input Subsidy was distributed to the affected persons. However, the State faces huge challenge to restore damaged infrastructure, especially rural roads, which may require substantial financial resources.

The great part of the massive rescue and relief operation was that our dynamic Hon'ble Chief Minister Shri Nitish Kumar was leading the operations from the front. It was not only close monitoring from the State capital alone on real time basis, he was visiting the districts after districts and relief camps after relief

camps and was guiding the officers and men engaged in the rescue and relief operations at every stage when it was needed most. His bondage with the affected people was so natural and intense that his visit inspired confidence and hopes both in the administration and people. We were greatly benefitted from his experience, insights and problem solving abilities. Under his stewardship, the state has set up a benchmark in flood disaster management during Kosi disaster in 2008 which was appreciated by one and all. I was fortunate to accompany him in his visits and translate his instructions and decisions taken in the field into written orders of the Disaster Management Department for guidance to all districts, of course with valuable support of my able Joint Secretary and OSDs manning the department during my absence.

The reflections are based on the personal experiences I had in managing the floods at the state level in my capacity of the then Principal Secretary of Disaster Management Department, the post I held till 12 September, 2016 immediately before I was entrusted with my present assignment as the Vice-Chairperson of BSDMA. I wish to share with one and all that I

found almost all of our District Magistrates, Divisional Commissioners and other officers of district administration very hard working, innovative, sensitive and responsive to the problems faced by the affected population. The Senior Officers deputed to guide the district administration and concerned departmental secretaries worked very hard with utmost sincerity and commitment. The SDRF/NDRF teams and officers deserve wholesome praise and adulation for the kind of hard work, bravery and ingenuity shown by them at the call of duty. So much so, the brave NDRF men and officers facilitated child birth in the boats in which they were carrying pregnant ladies after rescue from the marooned/flooded remote areas.

However, there is a need to document the occurrence of flood, damages caused and response of the Government to mitigate the miseries facing the people. There are also certain lessons learnt and deficiencies observed in the response which need to be shared with all stakeholders so that we may have an improved response mechanism in the future. Keeping these purposes in view, I have penned these reflections.

## 2. OVERVIEW

Bihar lies in the eastern part of India surrounded by West Bengal, U.P. and Jharkhand in the east, west and south respectively, and Nepal in the north. The total geographical area of Bihar is 93595 sq. km. and net sown area is 53.96 lakh hectares. The average size of land holdings is 0.39 ha. Agriculture is the mainstay of the people which contributes about 18% of the state G.D.P. More than 80% of the workforce is engaged in the agriculture and allied activities in the State. The State falls under Agroclimatic Zones IV (Middle gangetic plain), further divided into 3 sub zones on the basis of homogeneity in soil, land use pattern, topography and climatic factors. The State is endowed with fertile alluvial soils, traditionally good rainfall, plenty of water resources and agroclimatic condition suitable for

growing three crops in a year and varieties of crops, fruits and vegetables. The State has immense potential, which is yet to be tapped fully, to raise the crop productivity and production levels of paddy, maize, wheat, pulses, fruits and vegetables.

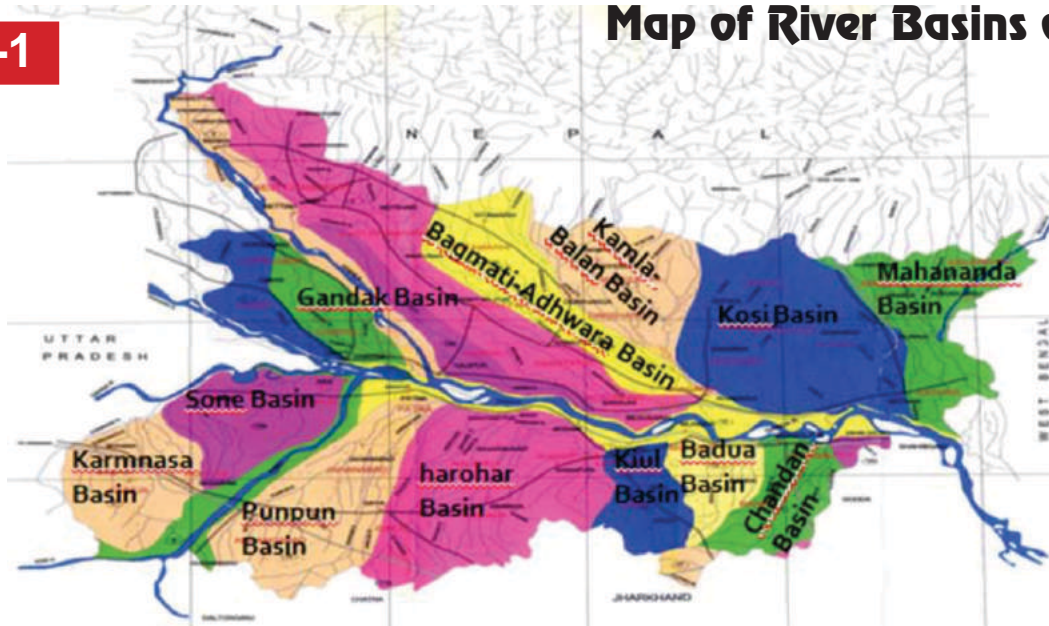
Bihar is crisscrossed by a web of rivers originating from Nepal, Uttarakhand, UP, Chhatisgarh/MP and Nepal. The prominent rivers originating from Nepal are: Mahanada, Kosi, Kamala Balan, Bagmati, Gandak, Budhi Gandak and rivers known as Adhwara group of rivers. River Ganga originating from Uttarakhand and travelling vast distance in UP enters Bihar in Buxar district and traverses a vast distance through its 12 districts before entering into the State of Jharkhand.

River Sone originates from amarkantak in Chhatisgarh with catchment area in the adjoining MP as well and rivers originating from Jharkhand are Uttar Koel, Nilanjana, Morhar, Punpun, Karmnasha etc. The rivers originating from Nepal flow down from north to south and rivers originating from Chhatisgarh/MP/Jharkhand flow down from south to north. All these rivers finally join river Ganga at different locations in Bihar which

flows from west to east dividing the State into two halves. The map below shows 12 river basins in Bihar: the river basins lying on the north of river Ganga are Mahananda basin, Kosi Basin, Kamala Balan Basin, Bagmati-Adhwara basin and Gandak Basin; the river basins lying on the south of river Ganga are Sone basin, Karmnasa basin, Punpun basin, Harohar basin, Kiul basin, Badua basin and Chandan basin.

**Map-1**

**Map of River Basins of Bihar**



The rivers forming integral part of these basins make Bihar most vulnerable to floods even though there is rain deficit in Bihar but its neighboring states and Nepal have plenty of rains. Traditionally, there are 28 districts out of total 38 districts which are considered flood prone. Out of these 28 districts, 15 districts are considered extremely flood prone. The names of extremely flood prone and other flood prone districts are given below:

**Extremely flood prone districts:**

1. Muzaffarpur
2. Vaishali
3. East Champaran

4. Sitamarhi
5. Sheohar
6. Darbhanga
7. Madhubani
8. Samastipur
9. Saharsa
10. Supaul
11. Madhepura
12. Khagaria
13. Begu sarai
14. Bhagalpur
15. Katihar

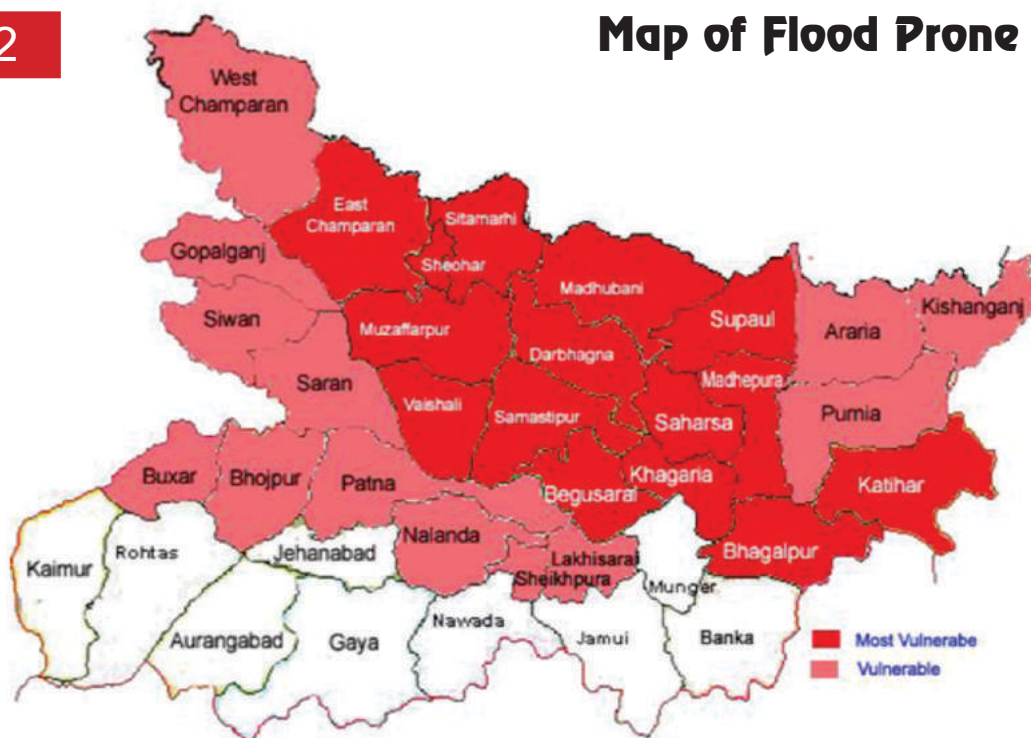


**Other flood prone districts:**

1. West Champaran
2. Saran
3. Siwan
4. Gopalganj
5. Patna
6. Nalanda
7. Bhojpur

8. Buxar
9. Lakhisarai
10. Sheikhpura
11. Purnia
12. Araria
13. Kishanganj

These districts have been show in the map of Bihar below.

**Map-2****Map of Flood Prone Districts**

Bihar's vulnerability to floods can be understood from the fact that floods have become an annual feature in Bihar: almost every year some or the other districts face flood situations. If we recount the occurrence of major floods in the last decade, Bihar faced major floods in 22 districts in the year 2007 followed by Kosi disaster in 2008 caused by breach of embankment in Kusaha in Nepal which was declared a national calamity by the central Government. We faced major floods in the year 2009 due to flooding in river Bagmati, in 2011 due to flooding in river Gandak, in the year 2012 due to flooding in Adhwara group of rivers and river Sone, in 2013 due to flooding in river

Ganga and rivers of Mahanada basin and in the year 2014 due to flooding in Punpun and some minor rivers originating from Jharkhand. It is noteworthy that of late some districts which are not considered flood prone have been experiencing flash floods because of heavy rains in the catchment area of the rivers passing through these districts and located in the neighboring states. These districts are Rohtas, Kaimur, Aurangabad, Arwal, Jehanabad and Gaya, all located in the south of river Ganga. Strange enough Munger district which though located on the banks of the river Ganga and was not a flood prone district is also experiencing floods now and then.

### 3. PREPAREDNESS FOR FLOODS

Since floods are a recurrent and annual phenomenon in Bihar, Disaster Management Department (DMD) has formulated a well articulated Standard Operating Procedure for Flood Disaster Management (SOP) duly approved by the State Government. The SOP prescribes detailed procedures for what is to be done and by whom before, during and after floods. The SOP also contains instructions and circulars governing evacuation, rescue and relief issued by DMD from time to time. DMD also updates the circulars and instructions from time to time and sends it to the districts for compliance. Based on the SOP, DMD issues instructions to the districts much in advance to make preparations for the likely floods and also allocates budget to each district for flood preparation. In addition, Water Resources Department (WRD) has also formulated a SOP for flood protection works prior to and during floods duly approved by the State Government. The WRD has a well laid out procedure to identify vulnerable points of the bunds and embankments much before the onset of monsoon every year and take measures to strengthen them before the start of flood season, say by 15 June. During floods, the flood protection work continues as per the SOP.

This year DMD issued instructions to the districts in the beginning of April, much before the 1st LRF of south-west monsoon 2016 was issued by IMD, for taking measures for flood preparedness in accordance with the SOP. When 1st LRF of monsoon 2016 was issued, IMD predicted good monsoon in the whole country. Good monsoon means floods in Bihar. So districts were already in preparation mode for combating floods. Meanwhile, IMD issued its 2nd LRF on 2 June in which it predicted more than 100% monsoon rains elsewhere but only 94% rainfall with an error of 8% in the North Eastern region of which Bihar is a part. The 2nd LRF was the indication that Bihar may face twin disasters of floods and drought in 2016: floods because of good monsoon in catchment areas of the rivers passing through its territory and drought because of less rainfall it may receive. In this background, Hon'ble Chief Minister twice reviewed the preparedness of all districts with SPs/ District Magistrates/Divisional Commissioners and Secretaries/ Principal Secretaries of concerned departments to combat the likely scenario of floods and drought: on 22 June and 12th July. It is noteworthy that DMD has also formulated a detailed SOP to combat drought duly approved by the State Government. During 12 July review meeting by Hon'ble Chief Minister, all districts and departments reported their



विकास का यही है नारा, आपका मुक्त हो बिहार हमारा



preparedness status to combat likely occurrences of floods and drought. However, the Secretaries/ Principal Secretaries in charge of various districts were deputed for on the spot review of the preparedness of the districts and report the status by 22nd July. Reports came from them that districts were fully prepared.

Bihar has raised a dedicated Battalion of State Disaster Response Force (SDRF). This force has shown exemplary courage and conviction in responding during floods and other disasters. The force was deputed in Srinagar during Kashmir floods in 2014 for assisting in rescue and relief operations there and the force was appreciated by all. The SDRF has its headquarters at Bihta in Patna. Besides Patna, SDRF teams have been positioned on semi-permanent basis in six flood and earthquake prone districts, namely, Sitamarhi, Madhubani, Madhepura, Purnia, Khagaria and Bhagalpur with cluster of adjoining districts attached to each team. In addition, 9th Battalion of NDRF has its headquarter also at Bihta in Patna with two teams positioned on permanent basis in Supaul district which is extremely prone to floods. With onset of monsoon, teams of NDRF were pre-positioned at flood prone districts of Darbhanga,

Muzaffarpur and Gopalganj with cluster of districts attached to each location. The SDRF and NDRF teams located/pre-positioned in the afore-said districts have also conducted community awareness programme to prepare community to combat floods and earthquakes. DMD has also trained thousands of community members in the flood prone panchayats for rescue and relief operations including people residing in the riverine (diyara) area. It has also trained youth in deep diving in all districts. This trained human resource is utilized for rescue and relief during floods and other disasters.

As a preparedness measure, all flood prone districts have been provided with sufficient number of inflatable boats, life jackets, GPS sets by the Government and have been authorized to procure sufficient number of country boats, polythene sheets, tents and other material resources as per requirement. For the last couple of years a constant effort has been made by DMD to equip the districts with country boats and District Magistrates have been authorized to procure boats @300 per extremely flood prone and 150 per flood prone districts. The districts were also authorized to fix rates and suppliers of essential commodities / materials required for flood relief so



that these could be procured as and when required. DDMA's were also asked to invoke the relevant provisions of Disaster Management Act whenever necessary to procure Materials as per requirement to meet the threatening disaster situations.

#### 4. FLOOD SITUATION DURING MONSOON 2016

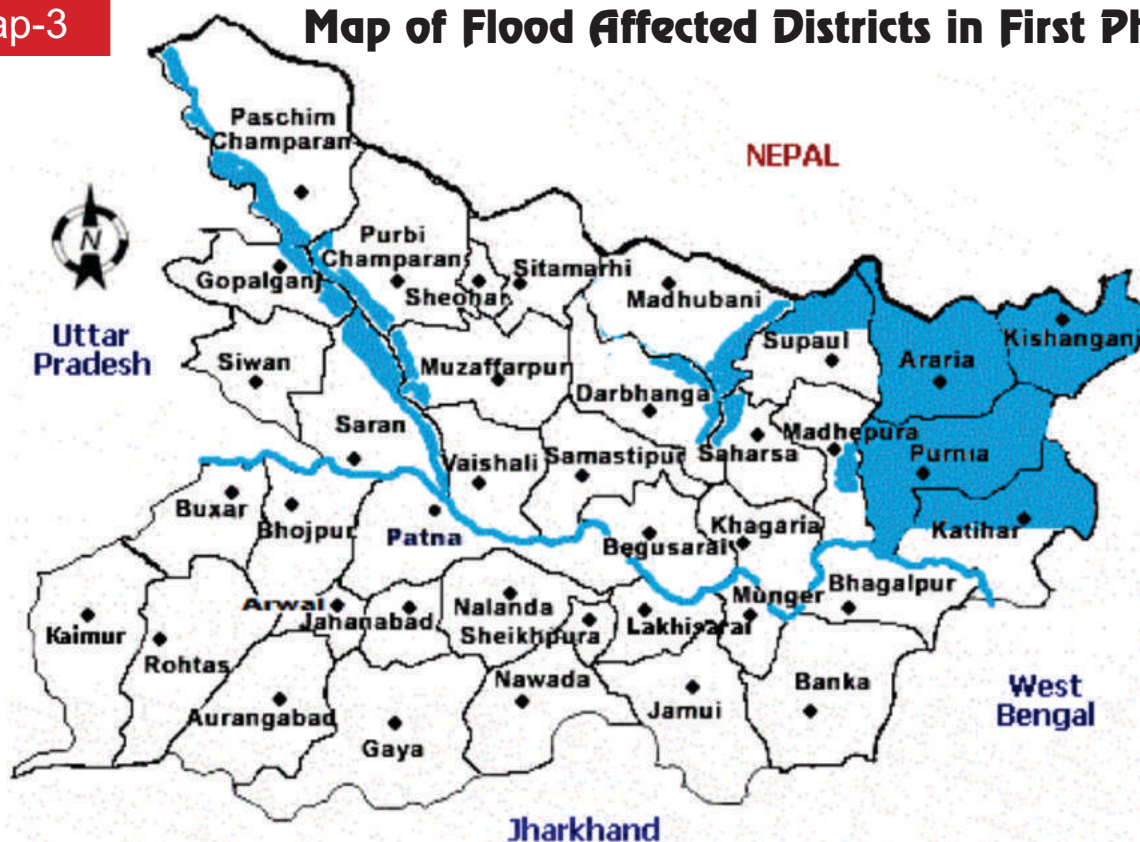
The rainfall statistics would show that the monsoon 2016 got delayed in Bihar by over 10 days and remained weak till August. An internal review revealed that by 24th August the rainfall deficit in 166 blocks was more than 40%. Strangely, some of these

through Bihar located in the neighboring Indian States and Nepal.

**4.1 First phase floods (23/07/16 to 03/08/16):** There was heavy rainfall in the catchment area of Mahananda and Kosi basins located in Nepal causing flooding of rivers Mahananda, Kosi, Kankai, Budhi Kankai, Bakra, Parman in the beginning of third week of July. At the same time heavy rain fall occurred in the catchment area of Kamala-Balan, Gandak and Baghmata basin located in Nepal causing flooding in the rivers Kamal-Balan, Bhootahi Balan and Baghmata. Ghaghra river originating from UP was also in spate. The flooding in the aforesaid rivers in turn flooded vast swathes of Purnia, Kishanganj,

Map-3

Map of Flood Affected Districts in First Phase



blocks were from the flood prone districts. However, the monsoon got revived in September and Bihar received good rainfall. But in spite of weak monsoon, Bihar faced floods in phases during July, August and September which were caused due to heavy rains in the catchment areas of rivers flowing

Araria, Katihar, Supaul and Madhepura districts and partially affected some villages in the districts of Saharsa, Madhubani, Darbhanga, Gopalganj, Saran, West Champaran, East Champaran and Muzaffarpur causing substantial loss of lives and property. The above map 3 shows the flood affected districts:

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#### 4.2 Second phase floods (11/08/16 to 16/08/16):

The floods in the second phase were caused due to heavy rainfall in the catchment area of Sone, Karmna- sha and Punpun basins located in Jharkhand/ Chhatisgarh/MP. On 13/08/16 the Indrapuri Barage on the Sone river located in Bihar received combined water discharge of 7.96 lakh cusec released from Mohamedganj Barage located on North Koel river in Jharkhand and Bansagar dam located in MP. As a consequence thereof, peak water

exists to gauge the water discharge in these hilly rivers, it is not known what the amount of water discharge was. These two rivers merge to form Falgu river at Bodhgaya which is quintessentially considered a river without water by the locals. But the amount of water passing through this river was unprecedented and some old people say that such amount of water had passed in the year 1977. Flooding in Falgu had adverse impact in Gaya and Jehanabad districts which are not considered flood

Map-4

### Map of Flood Affected Districts in Second Phase



discharge in the Sone river was in tune of 7.96 lakh cusec causing floods in some areas of Rohtas, Aurangabad and Arwal districts which are not considered flood prone and water level rose in the river Ganges. During this phase there was sudden huge discharge of water in Nilanjana and Morhar rivers due to heavy rains in the catchment of these rivers located in Jharkhand and since no mechanism

exists to gauge the water discharge in these hilly rivers, it is not known what the amount of water discharge was. These two rivers merge to form Falgu river at Bodhgaya which is quintessentially considered a river without water by the locals. But the amount of water passing through this river was unprecedented and some old people say that such amount of water had passed in the year 1977. Flooding in Falgu had adverse impact in Gaya and Jehanabad districts which are not considered flood

**4.3 Third phase floods (19/08/16 to September first week):** During night of 19/20 August the water discharge in the Sone river rose significantly from 3.48 cusec on 18 August at 3 pm to 11.67 cusec at 3 am on 20 August. The water discharged in river Sone ultimately descended down to river Ganga near Maner in Patna district raising the water level significantly which caused severe flooding in the riverine area. Though water level in river Ganga was rising steadily in August and on 12th August it had already crossed the danger mark at Gandhi Ghat (AL 48.79 meters against DL 48.60 meters) but due to

discharge of Sone water in Ganga in the night of 19/20 August, the water level at Gandhi Ghat peaked to 50.52 meters on 21 August surpassing the HFL of 50.27 meters recorded in the year 1994. The below table 1 will show the water level of Ganga at different sites in Bihar and dates during this phase (figures in red indicate AL above DL):

Further, on the northern bank of river Ganges, additional water came from river Ghaghra which was in spate due to heavy rainfall in its catchment area located in UP. Ghaghra merges into Ganges at a place

**Table 1 : Water Level of Ganges at Different Sites in Bihar's History**

S.No	Name of Site	HFL/YEAR	DL	MAX in Aug	12 Aug	14 Aug	19 Aug	20 Aug	21 Aug	22 Aug	25 Aug
1	Buxar	62.09/1948	60.32	58.42	59.93	60.04	60.52	60.76	60.93	61.11	61.26
2	Dighaghat	52.52/1975	50.45	49.29	50.04	50.92	50.76	51.18	52.12	51.80	51.78
3	Gandhighat	50.27/1994	48.60	48.15	48.79	49.46	49.48	49.85	50.52	50.28	50.15
4	Hathidah	43.15/1971	41.76	41.04	41.71	42.11	42.42	42.53	42.97	43.17	43.11
5	Munger	40.99/1976	39.33	37.53	37.98	38.39	38.94	39.17	39.55	39.89	40.06
6	Bhagalpur	34.50/2013	33.68	32.89	32.96	33.40	33.98	34.05	34.18	34.50	34.67
7	Kahalgaon	32.87/2003	31.09	31.08	31.12	31.51	32.10	32.14	32.22	32.38	32.74

called Doriganj in Saran district. Ghaghra at Gangpur Siswan crossed danger level on 18/08/2016 (AL: 57.31, DL: 57.04) and on 22/08/2016 water level went upto 57.39 meter.

As a result of rising water of Sone, Ganges and Ghaghra, vast swathes of districts located in the Sone/karmnasha basin, namely, Rohtas, Aurangabad,

Arwal and Kaimur, and, 12 districts located on the banks of river Ganges and Ghaghra, namely, Buxar, Bhojpur, Saran, Patna, Vaishali, Samastipur, Begusarai, Bhagalpur and Katihar got flooded. Out of these 12 districts, Katihar got flooded twice this year. The riverine area of these districts bore the brunt of unprecedented floods. The below map 5 shows the affected districts:

Map-5

### Map of Flood Affected Districts in Third Phase



However, by 30th August water receded below DL (AL: 59.97) at Buxar, receded below DL on 31st August at Digha Ghat (AL: 50.28) and Munger (AL: 39.33), receded below DL on 01 September at Gandhighat (AL: 48.56), and on 02 September it was still flowing over DL at Bhagalpur and Kahalgaon with AL at Hathidah (AL: 38.57) below DL.

**4.4 Fourth Phase floods (September First/second week):** Due to heavy rains in the Central Bihar,

districts of Gaya, Jehanabad and Arwal, some local rivers, such as, Falgu, Dardha, Jamune, Bakane etc got flooded which caused flood like situations in some low lying areas of Gaya town and rural areas of Jehanabad and Arwal. We dispatched SDRF teams for rescue and relief purposes. Dry food packets were distributed and in some cases community kitchen was opened to serve cooked food to the affected population. Gaya received unprecedented rainfall of



244 mm in a single day on 7th September which caused urban flooding in Gaya town and rockslide on the adjoining brahmyoni hillock causing great apprehension to the life and property of people residing in the foothills.

**4.5 Fifth Phase floods (September 2nd week):** Due to heavy rain fall in mid-September Punpun river got flooded affecting certain areas of Patna district. This was unexpected flood with no history of floods in Punpun during September. The flood caused damage to crops and houses and rural people faced great inconvenience.

## 5. RESPONSE: RESCUE AND RELIEF OPERATIONS

The State Government launched a massive response in all phases of floods. The first task was deployment of boats and NDRF/SDRF teams for rescue and relief, to distribute food packets to the marooned villagers and open relief camps for providing temporary shelter and cooked food to the rescued people. So accordingly, large number of country boats was pressed into service for transport, rescue and relief, and, SDRF/NDRF teams got engaged in rescue and relief operations. In the third phase of floods 10 additional teams of NDRF were requisitioned from the Central Government which reached the State quickly and deployed in the flood affected districts for rescue and relief operations.

It was also decided to open community kitchens on



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the uplands available in some of the marooned villages. There is an elaborate process delineated in SOP to run the relief camps, so arrangements were made accordingly in the relief camps: all inmates were registered, breakfast and cooked lunch and dinner was served, medical camps established, temporary toilets erected and hand pumps installed, and even schools and Anganwadi centres were opened. It was also decided to provide clothing, utensils, soaps, hair oil to all inmates and sanitary napkins to women inmates of relief camps from Chief Minister's Relief Fund. Since livestock is an important source of livelihood of people in the villages, animals were brought from the marooned area to the cattle relief camps where arrangements of fodder, water, cattle shed and medical facilities was made. During course of inspection of relief camps and flood affected areas, Hon'ble Chief Minister realized that there was need of opening 'langars' where flood affected people can come on their own or if need be can be brought through country boats and

take food. Accordingly 'langars' were opened where cooked lunch and dinner was provided to those flood victims who were neither staying in relief camps nor were beneficiaries of community kitchens. The 'langars' largely provided succor to the people in distress due to flood. He also instructed that packets of rice, pulses, potato, salt and turmeric powder should be sent to the families affected who were not willing to come out of their villages.

Bihar has established a benchmark of reaching ex-gratia to the families of the persons deceased due to disasters within 24 hours. Accordingly, barring few exceptions this benchmark was followed and ex-gratia was reached instantly to the affected families.

It was decided to provide GR, HDR, and Agriculture Input Subsidy in case of crop damage and cattle damage relief once water recedes from the flooded area. A snap shot of boats deployed, SDRF/NDRF teams engaged, dry ration packets distributed and relief camps opened is given below:

**Table-2**  
**Snapshot of rescue and relief Operations during flood**

Sl. No.	District	Boats	SDRF/ NDRF teams	Relief Camps/No. of persons	Cattle Camps/No. of cattle	Dry ration packets distributed
1	Araria	124	4	156/179803	23/3305	70100
2	Supaul	23	2	8/24283	1/522	4816
3	Darbhangha	482	2	0/0	15/5794	0
4	Purnea	234	4	141/28451	15/5794	244326

5	Kishanganj	117	5	108/204168	0/0	44666
6	Katihar	13	4	187/357500	9/2555	210050
7	Madhepura	82	1	2/702	8/8000	26460
8	Bhagalpur	265	3	118/84060	27/22988	121803
9	Saharsa	228	0	2/825	0/0	0
10	Gopalganj	51	4	10/26640	0/0	15589
11	E.Champaran	61	1	13/9419	0/0	7255
12	W.Champaran	105	1	0/0	0/0	11062
13	Muzaffarpur	96	1	6/2400	0/0	16100
14	Saran	436	2	34/358943	13/16000	145800
15	Nalanda	13	0	3/686	0/0	2888
16	Munger	159	2	78/78357	8/11700	21040
17	Vaishali	286	4	13/12196	7/3200	22899
18	Buxar	131	1	3/8240	8/1900	43700
19	Samastipur	227	8	50/52892	18/47000	45840
20	Khagaria	153	11	54/20288	13/17674	42153
21	Bhojpur	409	4	310/138460	28/5537	55383
22	Begusarai	260	6	102/377000	56/2345	95422
23	Patna	360	12	50/26518	24/23517	95955
24	Lakhisarai	118	3	33/13064	6/4950	1000
25	Arwal	3	1	4/203	0/0	0
26	Aurangabad	11	2	0/0	0/0	0
27	Kaimur	9	0	1/140	1/152	0

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28	Rohtas	9	3	2/230	0/0	0
*29	Gaya	0	1	0/0	0/0	0
*30	Jehanabad	0	1	0/0	0/0	0
31	Madhubani	63	1	0/0	0/0	0
	<b>Total</b>	<b>4528</b>	<b>94</b>	<b>1488/2003468</b>	<b>266/177139</b>	<b>1344307</b>

\*Full details not available

## 6. DAMAGE CAUSED BY FLOODS

**6.1** The floods in Bihar affected 8612802 people, 177 Blocks/Anchals, 1380 Panchayatats, 4862 Villages situated in 31 districts causing huge loss of lives and property.

### 6.2 Loss of Human lives

A total of 243 human deaths were caused during three phases of floods. The deaths were caused chiefly due to drowning except in Gaya where 3(three) persons were swept away in the gushing

water in river Nilanjana.

### 6.3 Loss of Cattle

A total of 5383 cattle deaths were caused during floods. In cases when humans left their villages for safer places leaving behind their cattle, the report from various sources has revealed that cattle were swept away in the gushing water of swollen river Ganges.



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#### 6.4 Houses Damaged

A total of 75928 huts, 51177 kaccha and 2817 pucca houses were partially/fully damaged.

#### 6.5 Crop Loss

The floods caused loss of 363452.30 hectares of agriculture/horticulture crops and 8969.86 hectares of perennial crops in various districts.

#### 6.6 Damage/Loss of Boats/Fishing Nets

The floods caused damage to 418 boats and 614 fishing nets in Patna, Bhojpur, Buxar, Begusarai, Khagaria, Bhagalpur, Kishanganj and Araria districts taken together.

#### 6.7 Damages to Infrastructure

##### (a) Roads and Bridges

The floods caused extensive damage to National Highways, Major District Roads and Village Roads including bridges.

##### (b) Embankments and Irrigation Systems

The floods caused extensive damage to Zamindari Bunds and embankments and one Barrage on river Gandak.

##### (c) Electric Poles and Installations

The floods caused extensive damage to electric poles and installations.

##### (d) Water Installations

The floods also damaged water installations at certain places.

##### (e) Damage to School Infrastructure

The floods caused extensive damage to over 2200 elementary and secondary schools.

##### (f) Damage to Health Facilities

The floods caused extensive damage to about 100 Health Sub-Centres, Additional Primary Health Centres and Primary Health Centres.

##### (g) Damage to Government Buildings

The floods caused damage to some school buildings as well.

## 7. LESSONS LEARNT

Every disaster teaches us certain lessons. These lessons should be studied carefully not only for 'build back better' purpose but also for the purposes of improving the preparedness and response to future flood disasters. As observed from the state level, following pertinent lessons have clearly emerged:

### (A) Deficiencies which need to be addressed

- a) We do not have a robust system of monitoring rainfall in the catchment areas of rivers emanating from Nepal. As a consequence thereof we were taken by surprise when Mahanada, Kankai, Bakra, Parman and other rivers/rivulets got flooded in the last week of July.
- b) Likewise, we do not have any robust system of monitoring rainfall in the catchment areas of rivers which enter into Bihar from Jharkhand. So when Nilanjana, Mohane, Falgu and other minor rivers/rivulets got flash floods we and the community populating the basins of these rivers were completely taken by surprise and off guard. The Falgu river was last flooded in the year 1977 and it flooded in 2016, after 39 years.
- c) In Gaya the rainfall in one day, on 5th September, was 244 mm surpassing all previous records. But there was no specific forecast of the rainfall of such magnitude by IMD. This rainfall in one day caused urban flooding and rockslide which are unprecedented events from south Bihar standards.
- d) The State has developed a well



documented Standard Operating Procedure for managing flood disasters called SOP in common parlance. The SOP was approved by Hon'ble Chief Minister in 2010 and ever since it is in vogue. The SOP was printed in booklet form and widely circulated. The copies of SOP in sufficient number are available in the districts and it has been uploaded on the website of DMD. In addition, DMD issues circulars to the districts and concerned departments in March/April every year to make pre-flood preparations in accordance with the SOP and since 2010 Hon'ble Chief Minister makes reviews of the pre-flood preparations in June/July every year. This year he made reviews twice and senior officers were dispatched to the districts to make on the spot reviews based on the SOP. However, it was

revealed that most of the cutting edge level district officials put on flood duty were not well aware of the contents of the SOP: perhaps the contents of SOP were neither explained to them suitably by the district administration nor they had cared to apprise themselves of these.

- e) The State Disaster Response Fund (SDRF) norms have also been printed in a booklet form and widely circulated in the districts. In addition, it has been uploaded on the website of the DMD. But it was revealed that most of the district officials responsible for relief distribution were ignorant of the most of the provisions of SDRF norms.
- f) It was revealed that in spite of DMD issuing circulars to the districts and concerned departments in March/April this year to make pre-flood preparations in accordance with the SOP and Hon'ble



CM making reviews of the preparedness twice, some of the districts and departments had not made suitable preparations and to say the least, they seemed to be ill prepared. The deficiency in the pre-flood preparation caused problems in proper response when the floods knocked on the doors and affected vast swathes of districts.

- g) For the past couple of years the capacity of the state and districts in terms of human and material resources are being constantly built and strengthened. One of the standing instructions of the DMD has been that the 15 extremely flood prone districts should procure country boats @ 300 and the 13 remaining flood prone districts procure country boats @150 each. But it was revealed that except few exceptions most of the

concerned districts do not have sufficient number of country boats.

- h) It was observed that in some of the districts the rates and sources of supply of fodder and cattle feed were not fixed as part of the preparedness. As a consequence, fodder could not be made available to the cattle in the relief camps in time. However, the problem caused by such lethargy in some of the flood affected districts was solved by some efficient District Magistrates of some of the non-flood affected districts who at short notice made arrangements of fodder from their own districts because they had done effective pre-flood preparations.
- i) It was observed that some of the districts had fewer inventories of polythene



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sheets which are most essential item of relief during disasters. This created lot of problems during flood and request for arranging polythene sheets started pouring in the DMD from such districts. Though it was a matter of great satisfaction that some of the demands were met from the inventories maintained in some better prepared districts.

- j) Mismanagement in organizing relief camps for humans and cattle was observed in districts which were not fully prepared yet during review meetings had exuded confidence. The insensitivity diluted the response efforts of the State Government though it was remedied at the later stage.
- k) The State has established a benchmark of reaching ex-gratia to the family of deceased persons within 24 hours in all kinds of disaster which is well known to the media and stakeholders by and large. But in a particular district the Government faced flake from the media because the local administration delayed the payments for couple of days.

#### (B) Best Practices

However, there were shining examples of some good practices and exemplary responses in most of the districts where District Magistrates were leading from the front. Some of the examples are given below:

- District Magistrates of number of non-flood affected districts promptly came forward to provide material assistance to the flood affected districts at a very short notice. They provided food packets,

polythene sheets, country boats, inflatable boats, rushed SDRF teams and fodder at short notice. Such districts are the shining example of the high sense of sensitivity towards disaster affected people of this state which our officers have nurtured and the State should be proud of this fact.

- The NDRF and SDRF teams deployed in the flood affected districts played stellar role in the discharge of rescue and relief functions with many examples of personal valor and acts which they performed going beyond the call of normal duty. One such example is the delivery of children conducted successfully in the NDRF/SDRF boats during rescue operation.
- The additional requirement of NDRF teams was promptly met by NDRF Hq/NDMA/MHA.
- The relief camps in some districts were better organized with good arrangements for stay, sanitation, food, medical assistance and other amenities. In some camps anganwadi centres were in operation. Our District Magistrates and other senior officers personally monitored the operation of relief camps and provided guidance and leadership successfully.
- The Health Department officials of state and district levels played very pro-active role in providing medical assistance to the affected population. The relief camps were provided with adequate medicines and medical teams. The department also made arrangements for boat ambulances and ensured no epidemics spread after flood water receded. In



Purnia district, Panchayat representatives, anganwadi workers and JEEVIKA workers were innovatively involved in epidemic preventing activities.

- The community kitchens and langars proved very effective in quenching hunger of the affected people and no person remained without food.
- Another innovative idea to reach dry food to those who were not willing to take shelters in the relief camps proved very

effective to ameliorate the sufferings to a great extent.

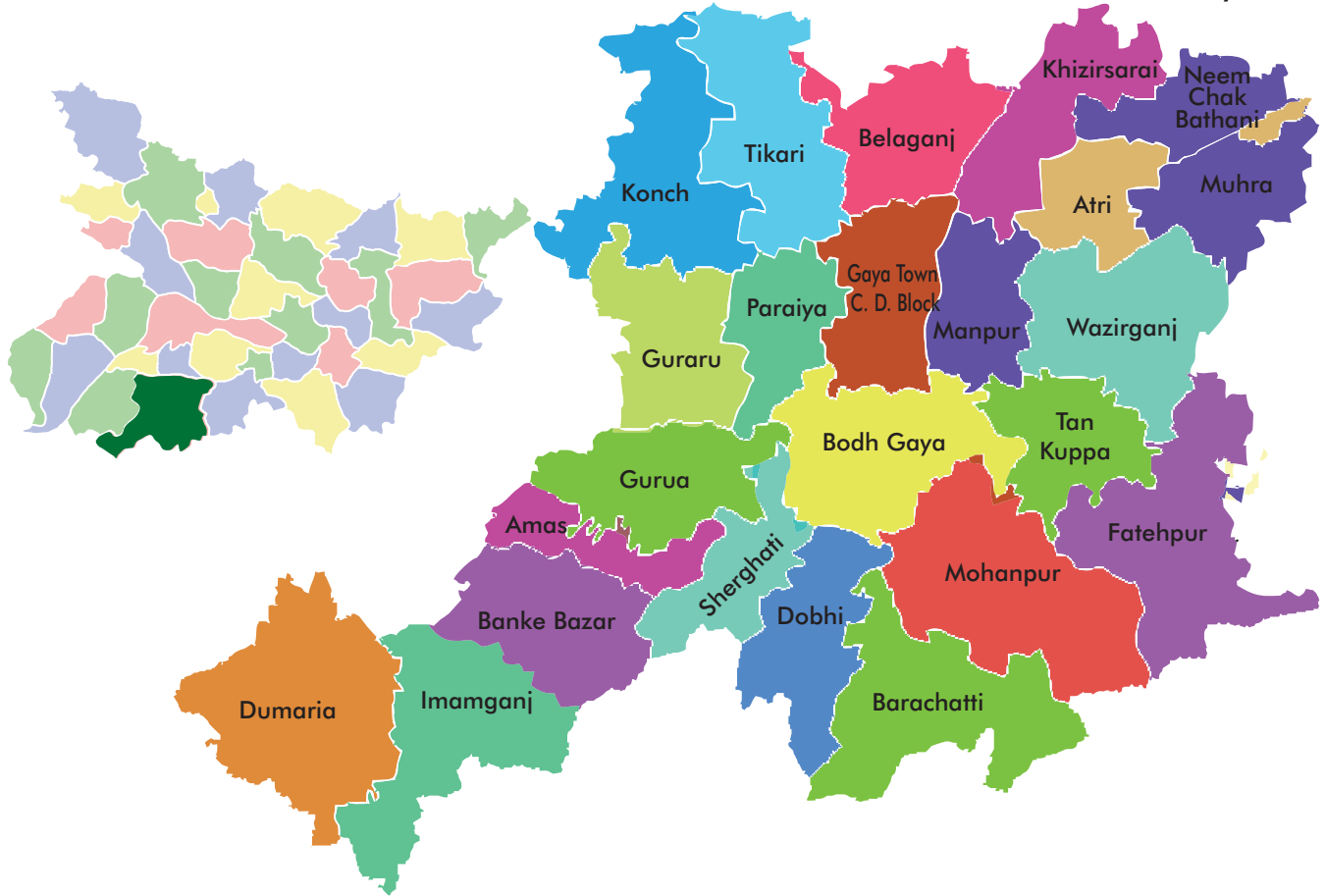
- In most cases ex gratia payments to the families of deceased persons was made the same day or the next day.

And lastly, the whatsapp group of DMD proved very effective in sharing of information and improving response on real time basis. The use of this social media platform is a novel experiment which has been appreciated by one and all.



# गया शहर में बाढ़

कुमार रवि, भा०प्र०से०  
जिला पदाधिकारी, गया



**किसी** भी देश या प्रदेश के लिए प्राकृतिक आपदाओं से निपटना बहुत ही मुश्किल काम होता है। इस विषम परिस्थिति में जन-जीवन काफी प्रभावित होता है और ऐसा लगता है कि जीवन यहाँ-वहाँ रुक सी गयी है। इससे प्रभावित लोग छोटी से छोटी मदद के लिए तरस जाते हैं।

वर्तमान वर्ष 2016 दिनांक-05.06.2016 एवं 06.09.2016 को हुई मूसलाधार वर्षा के कारण बिहार के कई जिले गंभीर रूप से बाढ़ से प्रभावित

हुए। गया जिला भी उनमें से एक है। मूसलाधार वर्षा ने गया जिले को दो तरह से प्रभावित किया :-

1. गया शहर के घुघड़ी टांड के क्षेत्र निचले क्षेत्रों में बाढ़ की स्थिति।
2. शहर के गेवाल बिगहा क्षेत्र में स्थित ब्रह्मयोणी पहाड़ के एक बड़े चट्टान का खिसकना।

## 1. गया शहर के घुघड़ी टांड क्षेत्र के निचले क्षेत्रों में बाढ़ की स्थिति

गया शहर का एक बहुत आबादी वाला क्षेत्र—घुघड़ीटांड अंतर्गत अशोक बिहार, मधुसुदन कॉलोनी, पन्त नगर, विष्णु बिहार कॉलोनियाँ बुरी तरह से बाढ़ की चपेट में आया था।

उपरोक्त सभी कॉलोनियों में 06 से 10 फीट तक पानी का जमाव हो गया था। इसका मुख्य कारण दुबहल गाँव (नैली पंचायत) में आहर बांध का टूटना तथा जल निकासी के रास्ते का अवरुद्ध होना भी था। यहाँ जल जमाव लगातार बढ़ते रहने के कारण लोगों के घर से निकलना मुश्किल हो गया और जन जीवन अस्त-व्यस्त हो चुका था। स्थिति इतनी बिगड़ चुकी थी कि महामारी भी फैल सकती थी, जिससे निपटना और भी मुश्किल हो जाता। लोगों के शौचालय टंकी में पानी भर जाने के कारण मल शौचालय के माध्यम से घर में आ चुका था। घरों में पानी घुसने के कारण साँप कीड़े—मकोड़े आदि का भी आश्रय स्थल हो चुका था। मुसलाधार वर्षा एवं घर के अंदर जल—जमाव से एक तटला वाला मकान वाले लोगों की मुश्किलें काफी बढ़ने लगी। वे सभी पड़ोसी या रिश्तेदार के घर में शरण लेने के लिए मजबूर हो गए।

जिला पदाधिकारी, गया के निर्देशानुसार आपदा की उक्त स्थिति से निपटने के लिए तत्काल कार्रवाई प्रारम्भ की

गई। इसके अन्तर्गत आपदा से निपटने के लिए दो प्रकार की रणनीति बनाई गई :—

- I. तत्कालिक कार्रवाई जिसके अन्तर्गत आपदा से प्रभावित लोगों को उनके जरूरत के अनुसार तत्काल राहत एवं बचाव प्रदान किया गया।
- II. दीर्घकालिक उपाय जिसके अन्तर्गत जल निकासी वाले नालों को अतिक्रमण से मुक्त करने पर कार्य किया गया।

## 1. गया शहर के घुघरी टांड क्षेत्र के निचले क्षेत्रों में बाढ़ की स्थिति से निपटने के लिए की गई कार्रवाई।

### I. तत्कालिक उपाय :—

दिनांक 05.08.2016 को मूसलाधार वर्षा का खबर मिलते ही जिला पदाधिकारी ने उपलब्ध संसाधन का आकलन किया। आपदा विभाग से सम्पर्क स्थापित कर बचाव एवं राहत कार्य के लिए एस0 डी0 आर0 एफ0/एन0 डी0 आर0 एफ0 के टीम की प्रतिनियुक्त की गयी। प्रभावित क्षेत्रों में आवश्यक राहत सामग्री वितरण करने हेतु सरकारी तौर पर की गयी व्यवस्था के अतिरिक्त विभिन्न स्वयंसेवी संस्थाओं, सामाजिक कार्यकर्ताओं एवं प्रबुद्ध नागरिकों का भी सहयोग लिया गया।

a) **बचाव कार्य** :— बाढ़ से प्रभावित क्षेत्रों में 06 से 10 फीट तक पानी का जमाव था। ऐसी स्थिति में समान्य तौर पर आवागमन संभव नहीं था। फलस्वरूप सबसे पहले एस0 डी0 आर0 एफ0/एन0 डी0 आर0 एफ0 के चार नावों की मदद से बाढ़ में फसे वैसे लोगों को बाहर निकाला गया, जिनके घरों में पानी घुस गया था। तत्पश्चात् प्रभावित परिवार के जो लोग जो आवश्यक सामग्रियों को लेकर अपने घरों से आना-जाना करना चाह रहे थे,

उन्हें नाव की मदद से परिवहन व्यवस्था उपलब्ध कराई गई।

b) **राहत कार्य** :— एस0 डी0 आर0 एफ0/एन0 डी0 आर0 एफ0 के नाव एवं प्रशिक्षित कर्मी, स्थानीय जनप्रतिनिधियों, स्वयं सेवी संस्थाओं एवं सरकारी कर्मियों की टीम बनाकर, बाढ़ में फसे लोगों तक आवश्यक सामग्रियों को पहुँचाया गया। उन्हें उपलब्ध करायी गई सामग्रियों में दूध, बिस्कुट, ब्रेड, चुड़ा, बोतल बंद पानी, माचिस एवं मोमबत्ती इत्यादि थे।

### राहत कार्य में वितरित सामग्रियों की विवरणी

क्रम सं०	वितरित राहत सामग्री	मात्रा/संख्या
1.	दूध	275 लीटर
2.	दूध पाउडर	100 पैकेट
3.	पानी (बोतल)	3340
4.	स्लाईस्ड ब्रेड	800 पैकेट
5.	बिस्कुट	8500 पैकेट
6.	चुड़ा	150 कि० ग्रा०
7.	गुड़	60 कि० ग्रा०
8.	मोमबत्ती	700 पैकेट
9.	माचिस	760 पैकेट

### राहत कार्य से लाभान्वित परिवारों की विवरणी

क्रम सं०	प्रभावित कॉलोनी	लाभान्वित परिवारों की संख्या
1.	अशोक बिहार	148
2.	पन्त नगर	232
3.	मयूर बिहार	50
4.	मधुसूदन कॉलोनी	166

a) **चिकित्सा सुविधाएँ** :- बाढ़ से प्रभावित घरों तक नाव के माध्यम से चिकित्सकों की टीम भेजकर बीमार लोगों को चिकित्सा सुविधा एवं दवायें उपलब्ध करायी गयी। बाढ़ का पानी निष्क्रमित होने के बाद महामारी फैलने से बचाव हेतु ब्लीचिंग पाउडर का छिड़काव भी किया गया।

b) **कम्यूनिटी किचेन** :- बाढ़ से प्रभावित लोगों को समय पर भोजन उपलब्ध कराने के लिए प्रभावित क्षेत्रों में कम्यूनिटी किचेन की व्यवस्था की गयी, जो दिनांक-08.09.2016 से 10.09.2016 तक संचालित हुआ। इस कम्यूनिटी किचेन में सुबह का नास्ता, दोपहर एवं रात्रि के भोजन उपलब्ध कराने की व्यवस्था की गयी, साथ ही जरूरतमंद लोगों को दूध भी उपलब्ध कराया गया।

### कम्यूनिटी किचेन से लाभान्वित होने वाले की विवरणी

क्रम सं०	संचालन की अवधि	लाभान्वितों की संख्या	व्यय राशि
1.	08.09.2016 से 10.09.2016 तक	8905	8.67



राहत और बचाव कार्य का जायजा लेने हेतु माननीय मुख्यमंत्री, बिहार एवं महानिदेशक (गृहरक्षक) द्वारा दिनांक-08.09.2016 को प्रभावित क्षेत्रों का भ्रमण किया गया और राहत और बचाव कार्य को देखकर हर्ष व्यक्त किया गया। साथ ही आपदा से निपटने के लिए सभी आवश्यक उपाय करने का निर्देश दिया गया।

**I. आपदा से निपटने के लिए किये गये दीर्घकालिक उपाय :-** इसके अंतर्गत निम्न प्रकार से कार्य किये गये :-

- a) बाढ़ से प्रभावित क्षेत्रों से तेजी से जल निकासी को सुनिश्चित करना आवश्यक था, ताकि पानी का निकास हो सकें। इसके लिए जल निकासी के सभी रास्तों को साफ किया गया। परन्तु बड़े पैमाने पर अतिक्रमण किये जाने की वजह से जल निकासी नहीं हो पा रहा था।
- b) माननीय मुख्यमंत्री, बिहार के निदेशानुसार जिला पदाधिकारी, गया द्वारा उप विकास आयुक्त, सहायक समाहर्ता, नगर आयुक्त, अनुमंडल पदाधिकारी (सदर), एस0 डी0 आर0 एफ0/एन0 डी0 आर0 एफ0 के प्रतिनिधियों एवं अन्य जिला स्तरीय पदाधिकारियों के साथ बैठक की गई तथा आवश्यक दिशा निर्देश दिए गए।
- c) तदुपरान्त उप विकास आयुक्त, गया की अध्यक्षता में सहायक समाहर्ता, भूमि उप समाहर्ता, सदर गया, अंचल अधिकारी,

नगर एवं सहायक अभियंता, नगर निगम, गया के साथ बैठक आहूत की गई। बैठक में घुघड़ीटाड़ बाईपास मोड़ स्थित अतिक्रमण हटाने हेतु स्थल चिह्नित किया गया। वहां के स्थानीय लोगों से सम्पर्क स्थापित कर पदाधिकारियों के साथ उक्त स्थल को अतिक्रमण हटाने हेतु अन्तिम रूप से निर्णय लिया गया तथा आवश्यक संसाधनों तथा जे0 सी0 बी0 मशीन, ट्रैक्टर, मजदूर एवं पर्याप्त संख्या में पुलिस बल सहित राहत एवं बचाव कार्य को बड़े पैमाने पर संचालित करने की सभी तैयारियाँ उसी रात को ही पूरी कर ली गई।

- d) उप विकास आयुक्त, गया के नेतृत्व में स्थानीय जनप्रतिनिधियों, पुलिस बल एवं नगर निगम के अन्य संसाधनों की मदद से व्यापक रूप अतिक्रमण हटाकर नालों को साफ किया गया। दिन भर चले अभियान के बाद नालों से पानी का तेजी से निकास प्रारंभ हुआ, जिससे दिनांक-09.09.2016 से पानी तेजी से घटने लगा जिसके फलस्वरूप अगले 24 घंटे में स्थित सामान्य हो गयी।

समय-समय पर माननीय प्रभारी मंत्री महोदय, महानिदेशक (गृहरक्षा), बिहार, पटना, आयुक्त, मगध प्रमण्डल, गया, जिला पदाधिकारी, गया, वरीय पुलिस

अधीक्षक, गया एवं अन्य वरीय पदाधिकारियों द्वारा राहत-बचाव एवं अतिक्रमण मुक्त कार्य का पर्यवेक्षण किया गया।

दिनांक-10.09.2016 को बाढ़ एवं जल निकासी की समीक्षा के उपरान्त स्थानीय जनप्रतिनिधियों, राहत एवं बचाव में जुड़े संबंधित पदाधिकारियों, स्वयं सेवी संस्थाओं एवं स्थानीय लोगों के साथ विचारोपरान्त सर्वसम्मति से दिनांक-11.09.2016 से राहत कार्य बन्द किया गया। दीर्घकालिक उपायों के अन्तर्गत नालों की नियमित सफाई एवं अतिक्रमण हटाने के कार्यों को बाद में भी समय-समय पर जारी रखा गया, ताकि भविष्य में ऐसी स्थिति पुनः उत्पन्न न हो।

## 2. गया शहर के गोवाल विगहा क्षेत्र में स्थित ब्रह्मयोनी पहाड़ के एक बड़े चट्टान का खिसकना।

लगातार मूसलाधार वर्षा होने के कारण, शहर के दूसरे भाग के ब्रह्मयोनी पहाड़ पर अवस्थित एक बड़ा चट्टान, जिसकी उँचाई 4 मीटर, आधार परिधि 16.20 मीटर, वजन 200 टन है, फिसलने लगा, जिससे पहाड़ के आस-पास बसे आबादी पर जान-माल का खतरा उत्पन्न हो गया था।

दिनांक-08.09.2016 को गया के बाढ़ प्रभावित क्षेत्रों के भ्रमण एवं निरीक्षण के दौरान माननीय मुख्यमंत्री, बिहार के द्वारा इससे निपटने के

लिए जिला पदाधिकारी, गया को आवश्यक कार्रवाई करने का निर्देश दिया गया।

जिला पदाधिकारी, गया द्वारा त्वरित कार्रवाई करते हुए :-

1. पहाड़ के आस-पास बसे आबादी को गया कॉलेज, गया में स्थानान्तरित कराया गया, जिसमें उनके लिए रहने, खाने, बच्चों की पढ़ाई इत्यादि की पूरी व्यवस्था की गई। प्रभावित कुछ अन्य लोग अपने मित्रों एवं रिश्तेदारों के घरों में स्थानान्तरित हुए।
2. इस समस्या के स्थायी सामाधान के लिए जिला पदाधिकारी, गया के द्वारा पहल करते हुए विशेषज्ञ टीमों को बुलाया गया। ये विशेषज्ञ टीम निम्न थी :-

1. Army Team 104 Engineering Regiment, Ranchi.
2. Rock Excavation Engineering Division, CSIR-CIMFR, Dhanbad,

1. Army Team 104 Engineering Regiment, Ranchi का भ्रमण एवं दिये गये सुझाव-इस दल के द्वारा दिनांक-09.09.2016 को ब्रह्मयोनी पहाड़ का निरीक्षण किया गया एवं तत्काल एवं स्थायी सामाधान के लिए आवश्यक सुझाव दिया गया।

### a. Immediate Measures

1. Channelizing of rain water
2. Concreting of Base



3- Anchorage of Boulder

4- Placement of I-Section Iron Rails

#### **b Permanent Measures**

i. Construction of Retaining wall

ii. Use of Silent Explosives

2. Rock Excavation Engineering Division  
CSIR-CIMFR, Dhanbad के टीम के द्वारा  
ब्रह्मयोनी पहाड़ का निरीक्षण किया गया एवं  
निम्नलिखित सुझाव दिया –

i इस टीम के द्वारा मुख्यतः विस्फोटों के द्वारा  
नियंत्रित विस्फोट के माध्यम से चट्टान को  
तोड़कर हटाने का सुझाव दिया गया। यह भी  
कहा गया कि विस्फोट की पूरी प्रक्रिया  
CSIR-CIMFR, Dhanbad के तकनीकी

विशेषज्ञों के द्वारा हो ताकि किसी दुर्घटना की  
सम्भावना नहीं रहें।

**विशेषज्ञ दलों के सुझाव के आधार पर किये  
गये कार्य :—**

1. चट्टान के स्लोप से पानी निकालने के  
लिए नाली का निर्माण किया गया।
2. चट्टान के आधार को कंक्रीट किया गया।
3. चट्टान को हटाने के लिए आर्कियोलॉजी  
विभाग, बिहार से आनापत्ति प्रमाण-पत्र  
प्राप्त किया गया।
4. विशेषज्ञ दलों के सुझाव के आधार पर  
भविष्य में किये जानेवाले कार्य :—

○ चट्टान के नियंत्रित विस्फोट के पूर्व



anchoring & wire meshing का कार्य किया जाना है।

- Anchoring & wire meshing कार्य के लिए Maccaferri Environmental Solution Private Ltd. को बुलाया गया है।
- Maccaferri Environmental Solution Private Ltd. के द्वारा इस कार्य के लिए 29.00 लाख रुपये का प्राक्कलन दिया गया है।
- चट्टान के नियंत्रित विस्फोट के लिए हीरालाल एजेंसी, प्राइवेट लिमिटेड, राँची के द्वारा निरीक्षण कर 4.5 लाख रुपये का प्राक्कलन दिया गया है।
- हीरा लाल एजेंसी, प्राइवेट लिमिटेड, राँची के द्वारा 5 कनवेयरबेल्ट की आवश्यकता बतायी गई है। प्रत्येक कनवेयर बेल्ट का मूल्य 3.0 लाख रुपये बताया गया है।
- भवन निर्माण विभाग, गया के द्वारा किये गये जानेवाले कार्यों में 13.81 लाख रुपये का प्राक्कलन दिया गया है।
- CSIR-CIMFR के द्वारा कन्सल्टेंसी एवं तकनीकी सहयोग के रूप में 7.00 लाख रुपये की मांग की गई।
- कार्यपालक अभियंता, भवन निर्माण विभाग, गया एवं सहायक निदेशक खान एवं भूतत्व, गया द्वारा विभागीय स्तर पर कार्य कराने एवं 47.31 लाख रुपये आवंटित करने हेतु प्रधान सचिव, आपदा प्रबंधन विभाग, बिहार से अनुरोध किया गया है।
- Double wire-mesh fencing कार्य तथा CSIR-CIMFR के कन्सल्टेंसी एवं तकनीकी सहयोग के रूप में 32.00 लाख रुपये के अतिरिक्त राशि की भी आवश्यकता होगी।
- ब्रह्मयोणी पहाड़ के उपर चट्टान को खिसकने से रोकने के लिए Maccaferri Machine का उपयोग किया गया था।

# सुपौल में बाढ़ आपदा प्रबंधन

बैजनाथ यादव, भा०प्र०से०  
जिला पदाधिकारी, सुपौल

**कोशी** की गोद में अवस्थित सुपौल जिला अन्तर्गत कुल 04 अनुमंडल एवं 11 अंचल है, जिनमें से 06 अंचल सुपौल, किशनपुर, सरायगढ़-भप0, निर्मली, मरौना एवं बसंतपुर है, जो प्रत्येक वर्ष बाढ़ से प्रभावित होता है। आपदा कई रूपों में सामने आती है, यथा बाढ़, अग्निकांड, ओलावृष्टि, सड़क दुर्घटना, आँधी-तूफान, भूकम्प, वज्रपात इत्यादि।

यह जिला भूकम्प प्रवण जोन V में आता है। यह जिला आपदा के मामलों में अत्यंत ही संवेदनशील है और यहाँ के लोग बाढ़, सुखाड़, अग्निकांड, तेज आँधी चक्रवात एवं भूकम्प जैसी विभिन्न आपदाओं से प्रभावित होते रहते हैं।

पूर्व वर्ष के अनुभव के आधार पर मैं यह कह सकता हूँ कि मानक संचालन प्रक्रिया (Standard operation procedure) के अनुसार सभी आवश्यक तैयारियों को सन्निहित करते हुए प्रत्येक स्तर पर कार्य का आवंटन तथा जिम्मेदारी का निर्धारण करने का प्रयास किया गया। फलस्वरूप आपदा की स्थिति में द्रुत एवं निर्वाह गति से समन्वय के साथ राहत कार्य सम्पादित किया जा सका।

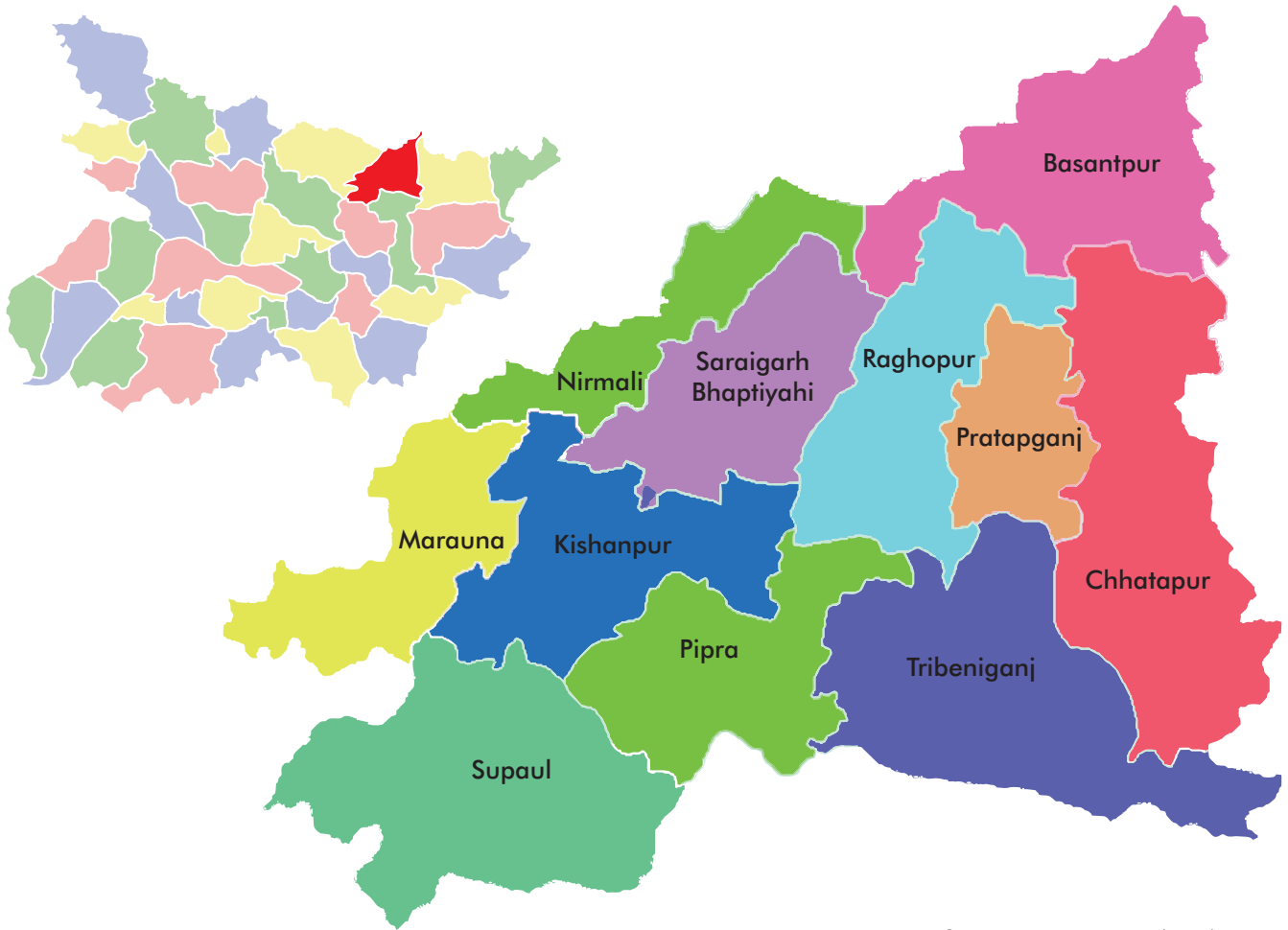
कोशी नदी के पूर्वी एवं पश्चिमी तटबंध की सुरक्षा हेतु कुल 92 स्थानों पर गृह रक्षकों को कनीय एवं सहायक अभियंताओं के साथ प्रतिनियुक्त किया गया ताकि किसी असामाजिक तत्व द्वारा तटबंधों को क्षति नहीं पहुँचाया जा सके।

बाढ़ प्रभावित क्षेत्र में जनसंख्या निष्क्रमण हेतु पंचायत वार ऊँचें स्थल/शरण स्थली का चयन कर पर्यवेक्षक एवं अन्य कर्मियों की प्रतिनियुक्ति सूची तैयार की गयी।

संचार योजना, गोताखोरों की सूची हेलीपैड हेतु ऊँचें स्थल की सूची, चिकित्सक एवं पारामेडिकल कर्मी की प्रतिनियुक्ति सहित, मानव चिकित्सालयों की सूची, पशु चिकित्सकों की अंचलवार शिविर प्रतिनियुक्ति सूची तैयारी की गयी।

जिला नियंत्रण कक्ष/जिला स्तरीय टास्कफोर्स का गठन सहित जिला के वरीय पदाधिकारी सहित अन्य पदाधिकारियों का अद्यतन दूरभाषा/मोबाईल/ई-मेल/फैक्स नम्बर का संकलन तैयार किया गया।

इस जिला में एन0डी0आर0एफ0 की एक/कम्पनी की स्थायी रूप से रखने हेतु तत्काल



मानव आश्रय स्थल –सह– सामुदायिक भवन गणपतगंज (राघोपुर अंचल) में व्यवस्था की गयी। है। निदेशानुसार समीप के जिलों यथा

दरभंगा, अररिया, पूर्णिया, आदि जिलों में भी घटनाये घटित होने पर इस जिले में ही एन0डी0आर0एफ0 टीम को भेजा गया।



# बाढ़ राहत की कुछ झलकियाँ





# अलग-अलग चरणों में बाढ़ से प्रभावित क्षेत्रों का मानचित्र



Map of Bihar



Map of Flood Affected Districts in First Phase



Map of Flood Affected Districts in Third Phase



Map of Flood Affected Districts in Second Phase



Map of Flood Prone Districts



Map of River Basins of Bihar



**बिहार राज्य आपदा प्रबंधन प्राधिकरण**

आपदा प्रबंधन विभाग, बिहार सरकार

द्वितीय तल, पंत भवन, पटना-1



प्रति : 3000, जनवरी 2018