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FLOOD IMPACT IN BURHI GANDAK RIVER BASIN IN MUZAFFARPUR DISTRICT

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ABSTRACT

The Burhi Gandak originates from Chautarwa Chaur near Bisambharpur in the district of West Champaran in Bihar. It initially flows through the East Champaran district. After flowing for a distance of about 56 kilometres (35 mi), the river takes a southerly turn where two rivers - the Dubhara and the Tour – join it. Thereafter, the river flows in a south-easterly direction through the Muzaffarpur district for about 32 kilometres (20 mi). In this portion, the river spills over its banks and a number of spill channels take off and rejoin it later. The Burhi Gandak runs a zig-zag course through the districts of Samastipur and Begusarai before covering a short distance in Khagaria district, running by the side of the town of Khagaria, and flows into the Ganges. It forms the western boundary of the Khagaria town and a protection embankment built along the eastern side of this river, protects Khagaria town from the floods of Burhi Gandak. The total length of the river is 320 kilometres (200 mi). The drainage area of the river is 10,150 square kilometres (3,920 sq mi)

Keywords: Burhi Gandak, Muzaffarpur, Flood, Rainfall

INTRODUCTION

The Burhi-Gandak river in its maiden journey from the Someshwar range of hills to its outfall into Ganga at Khagaria passes through three distinct phases with regard to its topography.In the initial reach it crosses through hilly region with thick forest and more or less inhabititated areas, hardly any flood problem is experienced in this reach. The river slope in this part is very steep and the meander is also very less.In the middle reach i.e. the reach upto Motihari town, this river debouches in the plains and it is still unembanked. Many tributaries which originate from the Himalayan foothills also join in this stretch. The river slope is moderate to flat and also the meander is pronounced specially in the end of this reach. The Masan meets this river at Basantpur (East Champaran) which is the first major tributary and contributes sizable discharge. Subsequently the Balor, the Pandai, the Sikta, the Tilawe and the Tiur meet the Burhi Gandak at Baghlochana, the Tularamghat, the Murgiltola, Agarwa and Gularia respectively in the districts of East and West Champaran. During the monsoon period due to heavy rainfall in the catchment the Sikrahana spills and causes inundation in the area. Flood in the mainstream may also occur due to flood in its tributaries. The Flood situation in the area further aggravates due to inadequate waterway provided in some of the bridges/culverts in the roads and railways.The areas generally affected by floods in West Champaran are the areas around Ramnagar, Narkatiaganj, Mainatand and Chanpatia etc. and in East champaran Sugauli, Motihari and Lalbegiaghat etc. Motihari town is frequently affected due to spill of Sikrahana river (Burhi Gandak is known as Sikrahana in its upper reaches).Burhi Gandak is almost fully embanked in the lower reach i.e. the stretch from Motihari to its outfall in Ganga, except few gaps in the left embankment near Muzaffarpur town when the Bagmati spills meet the Burhi Gandak river. In this reach the main flood problem is not due to inundation of the area but the erosive action on the banks of the river which causes breaches in the embankments even in

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medium floods almost every year at number of places. This leads to flood fighting works at the corresponding sites for protection of the embankment. Erosion is more severe from downstream of Muzaffarpur town till its outfall, which when not contained appropriately causes breach of embankments at the eroded sites frequently.The embankments on both banks of the river are very closely spaced i.e. the spacing between the embankments is even less than three Lacey's width. Land in the area is quite fertile and hence valuable.The fluctuation in the maximum and minimum river discharge is also high in case of this river system and hence the river is unstable.The course of the river is circuitous and meandering is more pronounced specially in this reach. The slope of the river is almost flat thereby causing sluggishness in the drainage of flood water. Over and above, as the Ganga remains high almost throughout the flood season and does not allow the Burhi Gandak flood water to drain down and therefore there is a back water effect in the main stream. This results in the rise in water level in the main channel of Burhi Gandak which bring allied problems like over topping of embankments, side erosion due to wave action, sloughing of the embankments.

PAST HISTORY OF FLOODS IN BURHI GANDAK RIVER

The plains of Bihar, adjoining Nepal, are drained by a number of rivers and its tributaries that have their catchments in the steep and geologically nascent Himalayas. Gandak, Burhi Gandak, Bagmati, Kamla Balan, Adhwara group of rivers, Kosi and Mahananda originates in Nepal, carry high discharge and very high sediment load and drops it down in the plains of Bihar. About 65% of catchment areas of these rivers fall in Nepal/ Tibet and only 35% of catchment areas lie in Bihar. In the year 1978,1987,1998,2004 and 2007 Bihar witnessed high magnitudes of flood. The total area affected by floods has also increased during these years. Flood of 2004 demonstrates the severity of flood problem when a vast area of 23,490 sqkm was badly affected by the floods of Bagmati, Kamla Balan & Adhwara groups of rivers causing loss of about 800 human lives, even when Ganga, the master drain was flowing low.At present, almost entire length of Burhi Gandak river is embanked on both sides below Motihari town in north Bihar. However, before the flood embankments were constructed, the Burhi Gandak used to spill more or less throughout its length. The great earthquake of 1934 had some effect on its regime. Construction of embankments were started during 1954. In between 1934 and 1954 the river had high floods in the years 1936, 1946, 1952, 1953 and 1954. These caused great damage to the area. The three floods of 1952, 1953 & 1954 coming in a row precipitated the proposal to build continuous embankments along both banks of the river. These embankments were practically completed in all the reaches by the end of 1957.During the construction period of embankments and thereafter high flood are reported to have occurred in 1955, 1956, 1964, 1966, 1971, 1974, 1975, 1978, 1979, 1981, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1995, 1998, 2001 & 2004.In some of the years, the embankments breached at many places and caused heavy damages to private as well as public properties. The causes of these breaches were different though failure through piping action is reported to have dominated as the most general cause of failure of embankments.

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CAUSES OF FLOODS IN THE BURHI GANDAK RIVER SYSTEM

Main causes of floods in the Burhi Gandak river system are enumerated below :

(i) Inundation due to overtopping of banks of the river in middle reaches.

(ii) Inundation in lower reaches where gaps are left in the embankment and also where spills/channel from the Bagmati meets the Burhi Gandak.

(iii) Bank erosion problem in the reach below Muzaffarpur (Sikandarpur).

(iv) Drainage congestion in the area due to inadequate waterways provided in the railway and road bridges especially in East Champaran district (upper reaches).

OVERALL DAMAGE OF FLOOD

Flood damage occurs in lower reaches of Burhi Gandak basin. MUZAFFARPUR district are prone to recurring floods. Flood moderation in Burhi Gandak by diversion through the proposed link canal would reduce the inundated area by about 50% as is evident from the simulation study of the worst flood of 2004 (226 sq km without proposed canal and 114 sq km with proposed canal) carried out for hydrological studies) respectively. The total damages to houses, crops and public utilities will be reduced to a great extent due to reduction of inundation. The damage to the extent indicated in of 2004 amounting to Rs. 81,242 lakh can be reduced to a great extent. If the flood magnitude is less than the worst flood of 2004, the losses can be minimal. Therefore, in totality, the reduction of damage in terms of reduction of inundation, damages to house, crop and public utilities would be much beyond 50%. Since the reduction of flood damages is directly proportional to annual flood peaks occured in Burhi Gandak river, the reduction in damages will vary from 50 to 90% on year to year basis. Hence, an average reduction in damages to the tune of 70% of the overall average annual damages in the districts of Samastipur, Begusarai and Khagaria has been considered to arrive at the benefits from flood control. The overall average annual damage of the three districts work out as Rs. 20472.53 lakh. Accordingly, 70% of the overall average annual damages i.e. Rs. 14330.73 lakh has been considered as annual benefit from the project.

FLOODS IN BURHI GANDAK RIVER SYSTEM

The river Burhi-Gandak originates from Someshwar range of hills. After traversing through three districts of Bihar, it falls in the river Ganga at Khagaria.As per in the initial reach it crosses through the hilly region with thick forest and more or less inhabited areas, hardly any flood problem is experienced in this reach. The river slope in this part is very steep and the meander is also very less. In the middle reach i.e. the reach upto Motihari town, this river debouches in the plains and it is still un-embanked. Many tributaries which originate from the Himalayan foot hills also join in this stretch. The river slope is moderate to flat and also the meander is pronounced specially at the end of this reach. The Masan stream meets this river at Basantpur (East Champaran) which is the first major tributary and contributes sizable discharge. Subsequently the Balor, the Pandai, the Sikta, the Tilawe and the Tiur meet the Burhi Gandak at Baghlochana, the Tularamghat the Murgitola, Agrwa and Gularia respectively in the district of East and West Champaran During the monsoon period due to heavy rainfall in the catchment the Sikrahana spills and causes inundation in the area. Flood in the mainstream may also occur due to floods in its tributaries. The flood situation in the area further aggravates due to inadequate waterway provided in some of the bridges/culverts in the roads and railways. Flood water is

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therefore withheld before the canal banks for long period which results in breaches and over topping.

The areas generally affected by floods in West Champaran are the areas around Ramnagar, Narkatiaganj, Mainatand and Chanpatia etc. and in the East Chanmparna, Sugauli, Narkatia, Motihari and Lalbighiya ghat etc. Motihari town is frequently affected due to the spill of Sikrahana river.In the lower reach i.e. the stretch from Motihari to its outfall in Ganga it is almost fully embanked except few gaps in the left embankment near Muzaffarpur town where the Bagmati spills meet the Burhi Gandak river. In this reach the main flood problem is not due to inundation of the area but the erosive action on the banks of the river which causes breaches in the embankments even in medium floods almost every year at number of places. This leads to flood fighting works at the corresponding sites for protection of the embankment. Erosion is more severe from downstream of Muzaffarpur town till its outfall which when not contained appropriately forces retiring of the embankment at the eroded sites.frequently.The embankments on both banks of the river are very closely spaced i.e. the spacing between the embankments is even less than three Lacy's width (Standard Regime width of channel no scouring no silting) and also the distance of the embankments are generally less than one Lacey's width from the main stream. Reason being that the land is quite fertile and hence valuable. The density of population is also quite high in this area. This naturally might have compelled to align these embankments contrary to the prescribed normal design norms. The fluctuation in the maximum and minimum river discharges is also high in case of this river system and hence the river is unstable. The course of the river is circuitous and meandering is more pronounced specially in this reach.The slope of the river is almost flat thereby causing sluggishness in the drainage of flood water. Over and above, as the Ganga remains high almost throughout the flood season and does not allow the Burhi Gandak flood water to drain down and therefore there is a back water effect in the main stream. This results heightening up of water level in the main channel which bring allied problems like overtopping of embankments, side erosion due to wave action, sloughing of the embankment and maintenance of continuous vigil in the affected reach till the situation eases etc.

FLOOD WATER ENTERS MORE MUZAFFARPUR AREAS

The flood situation has further worsened in the muzaffarpur district with the turbulent burhi gandak engulfing many new areas from motipur to moraul. about 500 landless families living between the riverbed and its embankments, off the balughat and akharaghat localities of the town, have been displaced by the river and they have taken shelter along the main road and the embankments. whereas bagmati has caused floods four times during the current season so far, this is for the first time this year that the burhi gandak river has started putting pressure on its embankments. reports reaching here said that the southern embankment of burhi gandak is about to give way near the salaha village under the mushahari block after persistent erosion of the embankment. villagers have themselves plugged a crack in the bund once but it is not known how long would it work. the level of the water was only two feet below the top of the bund and it was steadily rising. this has made the villagers panicky. in case, the river breaches its embankment there, the flood water may spread over entire mushahari block areas and may touch the eastern part of the muzaffarpur town as well, it is feared. the burhi gandak is constantly threatening the embankments along the bochaha and moraul villages, reports said. any preventive measure was yet to be taken by the government, the reports added. a number of localities of the town, including aghoria bazar-amgola road, hospital road, thanagumti, purani

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dharmashala, tilak maidan, lower parts of akharaghat and balughat were also witnessing a flood-like situation following heavy rain. the old and small drain of aghoria bazar- ramdayalunagar was not able to contain the water flowing into it from kalambag road and amgola. besides, the fields, off the ramdayalu overbridge, were already filled with water and, therefore, there was no scope of drain water flowing into them. as a result, the rain water has accumulated all around and scores of houses in the affected areas continued to be inundated on wednesday. meanwhile, samata party leader harendra kumar claimed on wednesday the flood waters of burhi gandak and bagmati have spread over more than half of the minapur block areas. he attributed the floods to the administration's failure to strengthen embankments. he also alleged irregularities in relief distribution.

A VILLAGE IN BIHAR'S MUZAFFARPUR DECLARES: NO BRIDGE, NO VOTE

Mohammed Taushiq Raza, 36, of Dumri village, said they have decided to boycott the Lok Sabha elections. "We will not vote this year at all. We have been electing our representatives for the betterment of the area but we have got only false promises from politicians "Pul nahin, toh vote nahin (No bridge, no vote)." Read banners put up at Dumri village in Katra region of Bihar's Muzaffarpur district that has a population of nearly 5,000. In the absence of a concrete bridge over Lakhandai river, the villagers make do with a bridge made of bamboo, locally known as

chachri pul, which they have erected themselves and with their own money. In fact, the chachri pul gets washed away almost every year in floods and has been rebuilt a number of times in the past two decades. Villagers said building a chachri pul costs them around Rs 1.5 lakh.The story is the same in the entire region that has several chachri puls, many of them in a dangerously precarious condition, for the 2.5 lakh population spread over 22 panchayats.About two years ago, the villagers said, an 18-year-old boy fell off the bridge, his body was recovered after four days. A boy with a fractured hand and another with an injured head in Dumri stand testimonies to the accidents that recently took place at the pul.Relating how tough it gets when there is a medical emergency, especially during the night, Sadique Ali, another villager, said, "Kisi lady ko delivery ke liye raat birat peeda hoti hai toh bahaut pareshani hojati hai idhar se lejane mein. Muzaffarpur leke jaate hain jisme dedh se do ghante lagte hain. kayi mahilaayein mar chuki hain. (It gets difficult to take a woman in labour pain to hospitals in Muzaffarpur, where in many cases women have lost their lives)."

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About two years ago, the residents of Dumri village said, an 18-year-old boy fell off the bridge, his body was recovered after four days. Schoolgoing children also use this bridge – a source of constant worry for the parents. "We are so scared to send our children to schools outside our villages. This is hampering their education," added Sadique.There are around 18-20 chachri puls in Katra for connecting villages like Dumri, Sunderkhauli, Sanhauli, Basghatta, Basua and Aurai.

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MUZAFFARPUR GEARS UP TO TACKLE FLOODS

Muzaffarpur : District authorities have launched a preparedness drive to tackle ensuring flood threats in the district.

National Disaster Response Force (NDRF) and State Disaster Response Force (SDRF) teams have been deployed al-ong the Baghmati, Lakhandai and Gandak rivers in Minapur, Gaighat, Katra, Aurai and Bochahan blocks of the district.

District magistrate (DM) Mohammad Sohail reviewed the flood situation and discussed required measures to lessen its threat with disaster

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management and other officials.He told The Telegraph that 89 medical teams and 16 mobile teams had been formed to come to the aid of flood affected people in the district.NDRF and SDRF personnel had been deputed along the river side and are imparting rescue skills to residents living along the river banks.Even homeguard jawans are being imparted necessary training to be vigilant during the flood seasons. Residents in particular are being coached to use make-shift banana plantation raft and rubber tubes to move through flooded villages, the district magistrate said.Six motorboats are available with the NDRF and it has requested the state government to arrange for 10 more motorboats to meet any eventuality, the DM said.Necessary polythene sheets, fodder, foodgrain and medicines required during floods are being supplied to the flood-hit locations.The block development officers and circle officers have been directed to engage countryside boats to ferry out marooned people ahead of the flood fury. Patrolling is on along the embankments of the Bagmati, Lakhandai, Gandak and Budhi Gandak rivers passing through the districts are.

Junior Engineers of water resources departments have been entrusted the task of maintaining vigilance of embankments.Some long embankments on the Lakhandai river look worrisome but steps are being taken to strengthen and fortify it to save it from erosion and destruction owing to huge surge of water, the district magistrate said.All sulice gates, numbering 114 on both flanks of rivers in the district, are being fortified and renovated on a war footing to control the flow of river water.Plugging of the embankment near Rajwara village where a large portion of it got washed away last year owing to water currents, thereby inundation the eastern part of the town, are being completed. A parallel embankment is also being built there to protect the villagers of Mushahri block as well as colonies situated in eastern part of the town from the fury of the flood, the district magistrate said.

CONCLUSION

In Patna, several neighbourhoods, settled north of the 25km long flood protection wall, face the immediate risk of flooding due to rise in the water level of the Ganga. Riverine areas, including Bind Toli near Digha, are already surrounded with floodwaters for the past 48 hours.Incessant rain in catchment areas, besides the Ganga and the Burhi Gandak surging beyond the danger mark during the last few days, are posing inundation threat to a number of villages in the riverine areas across Khagaria district.According to official sources, floodwaters of the rising Ganga and the Burhi Gandak have entered a number of houses in villages of Khagaria and Gogri blocks.“People of these marooned villages are accustomed to living this way. The government and the district administration think flood is a normal phenomenon as it occurs every year,” said Pappu Paswan, a resident of Nanhku Mandal Tola in Rahimpur panchayat.Meanwhile, Gogri circle officer (CO) Kumar Ravindra Nath and his Khagaria counterpart Dhirbalak Rai, who visited their respective floodaffected areas, said the situation was under control. Flood threat looms large over Bihar as a number of rivers, including the Ganga, Bagmati, Burhi Gandak, Ghaghara and Kosi, are flowing above their respective danger levels from Patna to Khagaria over the past 48 hours.The Ganga, for instance, was flowing 41cm above the corresponding danger level at the Gandhi Ghat and 18cm above the danger level at Hathidah in Patna district on Wednesday morning. The Punpun was also flowing 85cm above the danger level at Shripalpur in Patna district.

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