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IMPACT OF RIVER CONFLUENCE AND FLOOD LOSS IN BAMBULI AND ANAV VILLAGES OF SINDHUDURG DISTRICT, MAHARASHTRA

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ABSTRACT:

Two confluence sites of river Hatteri-Bhansal and *river Pithdhaval – Karli in Kudal tehsil of Sindhudurg were studied to determine the effects of river confluences on flooding areas of Bambuli and Anav villages. In Sindhudurg district of Maharashtra, riverine and estuarine floods are the most widespread hydro-meteorological disaster. Besides climatic and hydrological parameters i.e. rainfall and river discharges, River patterns and river morphology also one of the important parameters which influences on flood intensity. Therefore the present study attempts to understand the causes of flood and its severe impact on settlements and agricultural lands in the study area. The study reveals that confluence of river Hatteri-Bhansal and confluence of river Pithdhaval – Karli are one of the reasons for inundation of water during flood periods. The affected area is more prone to flooding every year due to locational characteristics of river junctions.*

INTRODUCTION:

Flood is a natural and repetitive occurrence of rivers and streams, which is responsible for erosion of river bed and bank, also led to deposition of sediment load in river bed and along the river banks. Confluences of rivers are probably the zones of floods and called to be the zones of flood hazards. Hazard is defined as a 'potentially damaging physical phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation' (Damayanti, 2011 and Daffi et.al 2014).

According to Miller (1958) and Best (1986) the rapid meeting of two channels each having independent flow and sediment discharge regimes creates unique erosional and depositional environments with consequent changes in channel morphology at confluences (Benda et.al 2004). Confluences of rivers are also responsible for piling up of river water in terms of slack water due to uneven

size of discharges from two different streams (Sapkale, 2007). Naturally, rivers are powerful agent of erosion, deposition and transportation processes which are most active when the river is in flood. This flooding occurs when the capacity of the channel to carry the discharge exceeded the channel or in bankfull stage. It has to be considered that floods are the most environmentally different and destructive of all natural hazards. Inundation of surface water in terms of flood becomes disaster when it damages the property and agricultural lands.

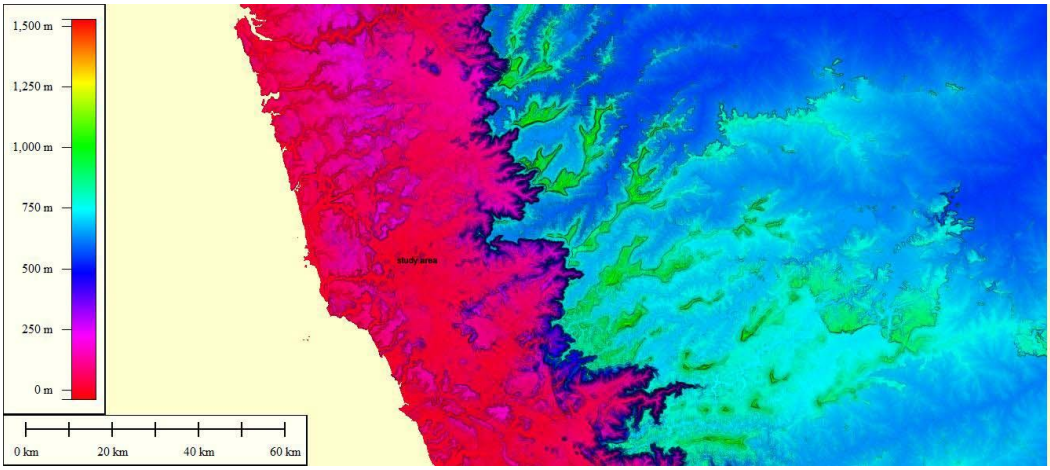

Figure 1 : Study Area – Based on SRTM data

THE STUDY REGION:

The study area forms the confluence sites of river Hatteri-Bhansal and river Pithdhaval – Karli in Kudal tehsil of Sindhudurg district, Maharashtra (fig. 1). The impact of these sites on villages Anav and Bambuli of Kudal tehsil have been studied. The region selected for study under consideration is a part of the South West corner of Maharashtra state. Kudal Tahsil of Sindhudurg District is among the tehsil which is mostly covered by hilly region. Amount of rainfall have shown yearly variations. Rainfall was observed 3187 mm in 2008 to 2009 where as it is increased by 4461 in 2010 to 2011 and again decreased to 3327.43 mm in the year 2012.

DATABASE AND METHODOLOGY:

The present study was based on the field visits and primary data collection. Questionnaires survey has carried out in two villages of Kudal tehsil i.e. Anav and Bambuli. Confluence sites of river Hatteri-Bhansal and river Pithdhaval – Karli were surveyed and detailed observations have carried out by conducting various field visits. Secondary data was collected from the revenue departments of Sindhudurg district. The topographical maps and images from

Google earth have also used. Cross sections of rivers under consideration were also prepared by using SRTM data and global mapper software.

RESULTS AND DISCUSSIONS:

Present study reveals that overall damage and financial losses towards settlements and other infrastructure due to flood and torrential rain in Kudal Tehsil has accounted for Rs. 4.88 crores during the year 2011 (Report-disaster plan 2014). The present study also reveals that confluence of river Pithdhaval – Karli and confluence of river Hatteri-Bhansal are one of the reasons for inundation of water during monsoon season (fig. 2). Therefore the present study attempts to understand the causes of flood and its severe impact on settlements and agricultural lands in the study area.

Figure 3 and 4 shows the cross section at the mouth of the river confluences. The water depth/thalweg of Hatteri is more or less 6 metres from mean sea level at its confluence. The river bed thalweg of Pithdhaval is 4-5 metres from msl.

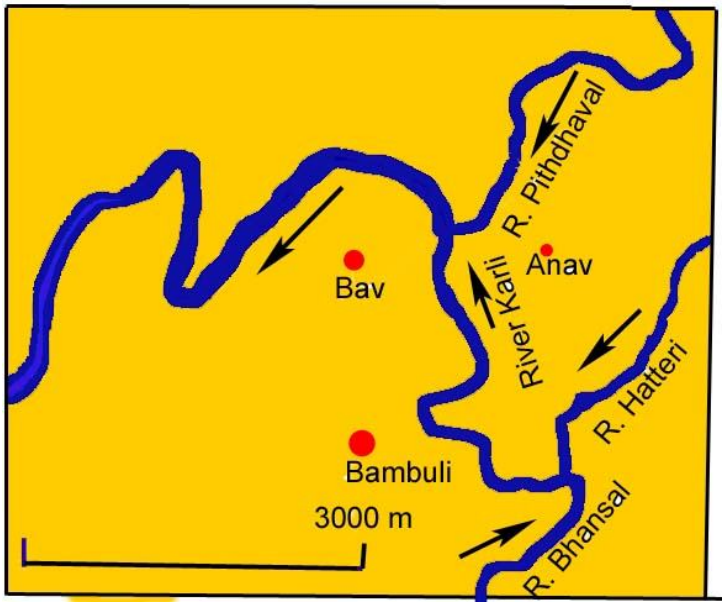

Figure 2 : River Confluences and Angle of Junction

Most of the years, study area receives heavy rains and led extensive flood. During the flood in village Anav and Bambuli some houses were evacuated. River water flooded in agricultural fields along the river banks. During heavy rainfall and heavy discharges, flood water reached upto a height of 2-3 metres in the agricultural fields of village Anav .

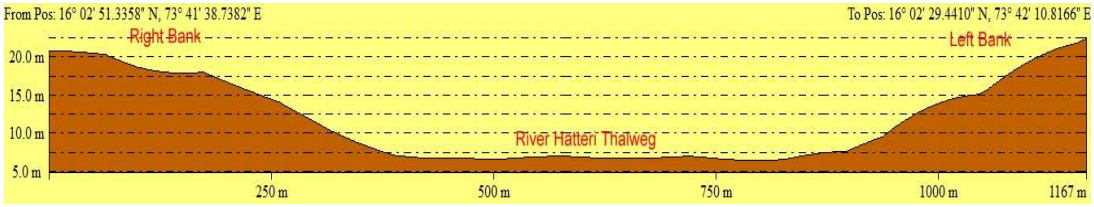

Figure 3 : Cross section at confluence –mouth of River Hatteri

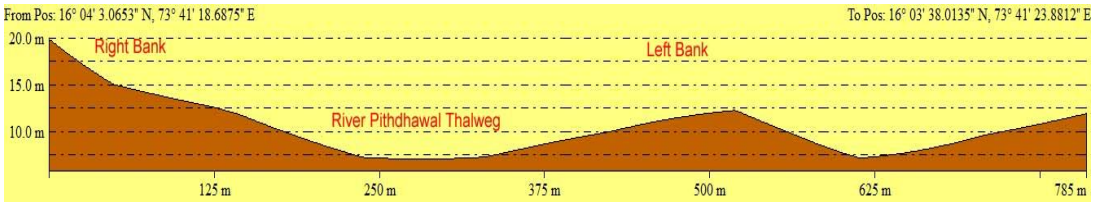

Figure 4 : Cross section at confluence –mouth of River Pithdhaval

As per perceptions of villagers, flooding in the study area particularly in the agricultural fields occurs when there is a continuous rain for number of days. This also increases the river water volume and discharges; poured out from both banks of the river channel. The infiltration of surface water reduced at some extent and tends to increase the surface water and inundation. At the confluence sites the river flow interrupted due to uneven volume of water and influenced on the river velocities also. River water inundated in the lower leveled sites for longer period of times and damage maximum standing crops.

Villages in Kudal tehsil are affected by flooding of Karli River in rainy season. Villagers are affected by such catastrophic event therefore attempt has been made to understand these damages by means of questionnaire. Perceptions of villagers are negative towards the facilities provided during the floods of 2005 and 2009. More than 90% villagers are agreed that the main causes of flood in the study area are torrential rain during monsoon period, and the river confluences. On the other hand sudden release of water from dam also causes for damage during flood.

Houses which are 500 metres away from river were inundated with 1 to1.5 metres. Wetness remains for 7 to 8 days. Houses, those made up of stones, bricks, timber were severely damaged. In Bambuli during flood in 2010, water got saturated around houses for 7 to 8 days. During spring tide the water of river becomes salty; it becomes saline, not used for drinking and agriculture purpose. (Madiwal, 2012).

Gram panchayat helps villagers to migrate to safe places/other villages, sometimes they were also migrated in schools of the village. Numbers of partly

damaged houses were more in 2009 to 2010. Government has given more compensation of Rs. 28, 87,895/-. It was less in 2008 to 2009 and little bit more in 2010 to 2011. Government compensation is given only when rainfall is above 65 mm. Number of totally and partially damaged houses in 2008 and 2009 were 5 and 327 respectively. In 2009 and 2010 it was 57 and 527 (Report Kudal tehsil and Madiwal, 2012).

River Bhansal & Hatteri strikes face to face at the confluence .The flood water with heavy discharge of both rivers entered in the agricultural lands of Bav and Bambuli that extends for a distance of 500-600 m. at left bank. Hatteri River is quite straight and narrow than Bhansal at the junction point; there it strikes with high velocity, at confluence zone. Downstream to these both rivers, the river is known as Karli river of Sindhudurg District.

At Anav village, River Pithdhaval meets River Karli, making an angle of 90° to the convex side of Karli River and leads to spread the flood water in the agricultural area of the Anav village. At this location Pithdhaval river tries to push the heavy discharge toward its left side and Karli flood water encroached towards the right side in the agriculture fields for a distance of 700 to 800 metres with a height of 10 to 11 metres. Left bank of Karli River is protected due to the presence of elevated portion of hill.

CONCLUSION:

A locational characteristic leads to flood in the study area. River Bhansal & Hatteri strikes face to face at the confluence. Generally, when two rivers meets at any place then the discharge of river also increased due to clubbing of two different river discharges. Angle of junctions also considered to be an important factor. River confluences are one of the major causes of flood in the study area. Approximately 123.48 hectares area is affected by flood. Temporary accommodation should be provided during flood period to vulnerable people.

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