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Flood Disaster Management for Prayag Chikhali: A Case Study

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Abstract - *Flood is one of the dangerous natural disasters, and India is highly prone to flood. There are many regions in the country that face this disaster. Flooding has many impacts. It damages property and endangers the lives of humans and other species. To prevent the detrimental effect of flood water, it is necessary to control flood. By using proper method, planning and management it can be possible.*

In recent years, intense rainfall with severe floods have experienced in many regions of Maharashtra. The districts viz; Sangli, Kolhapur, Satara, Pune, and Nashik in the western part of Maharashtra have been severely affected by flood. Considering Kolhapur region, particularly Karveer, Shiroli and Hathkangale tehsils were affected badly by flood. The focus of present study paper is to look into the most affected village Prayag Chikhali. The aim of this paper is to find out the causes of this drastic flood disaster, its impact on the area under study and suggest remedial solution to deal with this natural disaster in future. The paper also intends to compare the severity of floods occurred in the year of 2005 and 2019.

***Key Words*: Heavy Rainfall, Flood Impact, Flood Preparedness, Prayag Chikhali.**

1. INTRODUCTION

Flood impact is one of the most significant disasters in the world. Causes of floods are due to natural factors such as heavy rainfall, high floods and high tides etc., and human factors such as blocking of channels, improper land use, deforestation in headwater regions, etc. Floods result in losses of life and damage properties. Flood loss prevention and mitigation includes structural flood control measures such as construction of dams or river dikes and non-structural measures such as flood forecasting and warning, flood hazard and risk management, public participation and institutional arrangement, etc.

Therefore, the focus of this paper is to look into the worst affected village by flood, Prayag Chikhali. Floods are not new to the Prayag Chikhali. Water levels swell up every year. But this year the water levels rose at least seven feet higher than usual. And the impact of this flood water was stupendous. So, the aim of this study paper is to find out causes of flood disaster, its impact on the area under study, to compare the severity of floods occurred in 2005 and 2019 and suggest some remedial measures, which will help them while dealing with the flood in upcoming future years.

2. STUDY AREA

The present study is restricted to Prayag Chikhali village. It is located in northern part of Karveer tehsil and Karveer tehsil is situated in the northern part of Kolhapur district of Maharashtra. The study area is a part of Krishna basin which is a second largest river of south India and it is drained by Pnchaganga river. The north-east flowing Bhogavti, Tulsi, Kumbi rivers and eastward flowing Kasari river originated at elevation of about **900 m** MSL and flow down to **550 m** MSL till all these tributaries with Saraswati an underground drainage meet at Prayag **12 km** to the north of the Kolhapur city, from place it known as Panchaganga river. The Prayag Chikhali village is exactly located on flood plain of the Pnchaganga river and was severely affected by the flood. So, this village is undertaken for proper comprehension of flood damage in Karveer taluka. Therfore, the Prayag Chikhali village was selected for present investigation.

3. METHODOLOGY

The present study paper is based on primary and secondary source of data. Primary data was collected by conducting the intensive fieldwork. The secondary data is collected from Sinchan Bhavan Kolhapur, Collector office, Grampanchayat office, Department of Geology at Shivaji University, newspaper, social media and asking the questions from sarpanch and affected peoples. Tables and charts are constructed for better analysis. Flood affect has been assessed by computing the loss of household, loss of agriculture land, loss of human being and domestic animals here in this village. It also involves the observation of river channel, its width, edges of river and existing flood plain.

4. CAUSES OF FLOOD DISASSTER

4.1 Heavy Rainfall

Heavy and incessant rainfall was the major reason for flood occurred in the western part of Maharashtra. During 30th July to 10th Aug the rainfall intensity was concentrated and continuous from Western Ghats to the flood plain areas such as Kolhapur, Sangli, Satara, etc. In the year 2019, rainfall intensity is 3 times of 10 year average rainfall approximately. Following table shows the rainfall and discharge data of Panchganga Basin

Table -1: 30/07/2019 to 10/08/2019 Rainfall & Discharge data- Panchganga Basin

Dam	Total 10 yrs. avg. rainfall in mm (from 30 July to 10 Aug)	Total avg. rainfall in year 2019 in mm (from 30 July to 10 Aug)	Results
Radhanagari	56	213	3.82 times more
Tulsi	34	198	5.85 times more
Kumbhi	65	206	3.16 times more
Kasari	56	175	3.12 times more
Average	52.75	198	3.75 times more

*(**Note:** Data mentioned in table-1 is received from Simchan Bhavan Kolhapur, Maharashtra, India.)*

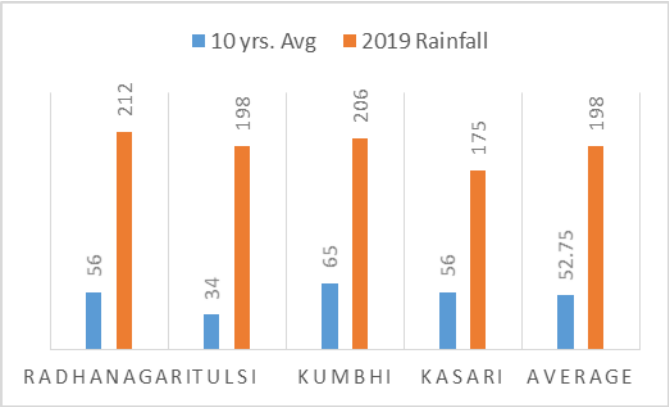

Chart-1: Panchaganga Basin 10 yrs Avg Rainfall vs 2019 Rainfall

4.2 Discharge from dams

There is no doubt that heavy and erratic rainfall is one of the reasons for floods in Western Maharashtra. But that is often coinciding with dams being full due to poor management, resulting in dam induced floods. An assessment of the Krishna river basin by South Asia Network on Dams, Rivers, and People shows how mismanagement on releasing the water from various dams worsened the flood in Kolhapur, Sangli and Satara districts of Maharashtra.

Three of the big dams in the region Koyana, Radhanagari and Warana were almost 100 per cent full by August 5, when the current floods started. The Radhanagari dam was close to 80 per cent full by 25 and Koyana and Warana dams were around 50 per cent full, according to the Central Water Commission live storage data. But no water released from these till then. As per the information that if these dams had started releasing water from July 25, they would have had sufficient space during the first week of August when the districts received heavy rainfall and that would have helped reduce the floods. The dams, that were supposed to help moderate the flood situation, instead ended up exacerbating it.

Table-2: Rivers and Dams in Kolhapur District and their discharge

Basin	River	Dams	Capacity (TMC)
Panchganga	Bhogavati	Radhanagari	8.362
	Tulsi	Tulsi	3.471
	Kumbhi	Kumbhi	2.713
	Kasari	Kasari	2.770
Warana	Warana	Warana	34.399
	Kadavi	Kadavi	2.515
Dudhganga	Dudhganga	Dudhganga	25.400
	Vedganga	Pathgoan	3.716
	Chikotra	Chikotra	1.522
Ghatprabha	Hiranvakeshi	Chitri	1.882
	Tamraparni	Jangamhatti	1.208
	Ghatprabha	Ghatprabha	1.545
	Tamrparni	Jambre	0.820

*(**Note:** Data mentioned in table-2 is received from Simchan Bhavan Kolhapur, Maharashtra, India.)*

4.3 Irresponsible behaviour of villagers

Even after getting high alerts from disaster management department, people were not ready to leave their houses thinking of water level rises up every year. But this year water level rose up at least seven feet higher than usual. And it became difficult to shift the peoples and domestic animals from village. Due to this irresponsible behaviour, about 450-500 domestic animals died. Fortunately no loss of human being occurred but it was risky to shift them from flood water. If people would have shifted just after the high alert given, the damage intensity could have reduced by a great amount.

5. IMPACT ANALYSIS

Table-3: Impact of flood disaster on Prayag Chikhali in the year 2005 and 2019.

Impact of flood on	Year 2005 (approximately)	Year 2019 (approximately)
Duration of Flood	8-10 days	12 days
Height of flood	47 feet	55.5 feet
Agriculture land	95%	100%
Partly collapsed house	40%	42%
Totally collapsed house	15%	28%
Loss of human being	NA	NA

Loss of domestic animals	350-400	600

*(**Note:** Data mentioned in table-3 for year 2005 is collected from reference paper no. 2)*

6. SUGGESTIONS

Ideally, the best approach to flood risk mitigation is to simply not build in a flood zone or occupy an existing structure in flood-prone area. Since the local and neighborhood people at the flood prone area totally dependent on farming and other local businesses at the same area for their survival from centuries it is least probable to move to another place. Some suitable solutions are suggested as follows:

1. Shifting to a people at higher elevation from flood prone zone in monsoon period.

2. Elevating the site by building up land levels or structure by adding extra floors.

3. Construct temporary sheds for domestic animals in flood duration time.

4. Make availability of at least 2-3 boats, which will help to fast the rescue operations.

7. CONCLUSIONS

In summation, Prayag Chikhali experiences frequent flooding. This is due to the regions physical geography. Densely clustered rivers along with unimaginable rainfall during the monsoon season, makes Prayag Chikhali a disaster zone waiting to happen.

The only option left is rehabilitation. Government has provided them with 96 acres of land divided into plots for building houses at Sontali, four km from Prayag Chikhali. However, the rehabilitation remained on paper, as most villagers preferred to stay back in Prayag Chikhali. Villagers are saying, "What were we going to do in Sontali? Our fields are here, our ancestral houses are here. The villagers did not want to travel 4 km every day to reach their fields. So we decided to live here."

Therefore the better planning and management during and after flood is essential to solve this problem. For this we have suggested some remedial measures above.

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