

# A study of Haryana's vulnerability to flood and its coping strategies in the year 2017

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## ABSTRACT

*The state of Haryana is prone to various natural as well as man-made disasters. Flood is one of the major natural phenomena and an area of 23.50 lakh hectare is prone to floods in the state as per the assessment of National Flood Commission and as reported by states to the 11<sup>th</sup> plan working group. Floods occur in the state is due to heavy rains in the catchment area of river Yamuna and Ghaggar & heavy downpours in low lying pockets and due to poor drainage system in the state. This study highlights the Haryana's flood vulnerability and flood preparedness measures that have been taken by the government of Haryana in year 2017 to mitigate the risk of flood.*

*The objectives of the present study are:*

- *To understand the flood vulnerability of the state*
- *To understand the level of preparedness toward floods in the state of Haryana during 2017*

## Keywords:

## Introduction:

Haryana state is situated in north- western part of India (latitude 27°39' to 30°55' North and longitude 74°27' to 77°36'E). It is bounded by Shivalik range in the North- East and river Yamuna in the East, Aravali range in the South-West and river Ghaggar in the West. River Yamuna form part of the boundary between Haryana & Uttar Pradesh and River Ghaggar between Haryana & Punjab. As per the Census 2011, total population of the State is 25,351,462 and density of population is 573 per sq.km. At present, state has 22 districts and 6 Divisions.

**Flood Vulnerability:** Flood is a natural phenomenon and it occurs due to heavy rains in the catchment area of river & heavy downpours in low lying pockets and poor drainage system of the state. State has also faced severe water logging due to which rain water accumulate in some parts of the towns and fields of the state. History of devastating floods in Haryana can be seen in the years 1977, 1978, 1980, 1983, 1988, 1995, 1996, 2000, 2010, 2011. Floods in the state have been causing extensive damage to the standing crops but also of lives and cattle. Haryana is primarily an agrarian state and considered a grain bowl state. The total area of the state is 44.2 lac hectares out of which about 39.0 lac hectares is arable. According to the assessment of Rashtriya Barh Ayog (National Flood Commission) and as reported by states to the 11<sup>th</sup> plan working group, flood prone area in Haryana is 23.50 lakh hectares. In Flood Manual of Haryana, total 102 vulnerable points need special attention during monsoon season.

Topographically, from drainage angle the entire state is divided into two sub basins:-

- 1) **Yamuna Sub Basin:** Drainage area of Yamuna Sub Basin of Ganga Basin comprises the area of Yamuna Nagar (part), Karnal, Panipat, Sonapat, Rohtak, Jhajjar, Rewari, Gurgaon, Mewat, Mahendergarh, Jind (part), Faridabad and Palwal districts. It covers about 40% area of the state and it drains into river Yamuna.
- 2) **Ghaggar Sub Basin:** Remaining 60% area of the state drains into the Ghaggar Sub Basin of Indus Basin comprising Yamuna Nagar (part), Panchkula, Ambala, Kurukshetra, Kaithal, Jind, Bhiwani, Hisar, Fatehabad and Sirsa districts.

**Table 1:** Main drains, their capacity and out-fall source in the state of Haryana

Sr. No.	Name of Drain	Capacity Discharge in Cusec	Out-fall
<b>YAMUNA SUB BASIN</b>			
1	Main Drain No. 2	6325	River Yamuna
2	NaiNallah	2241	Drain No. 8
3	Diversion Drain NO. 8	7320	River Yamuna
4	West Jua Drain	500	Mangeshpur Drain
5	Drain No. 8	1537	Bhindawas lake/Drain

Sr. No.	Name of Drain	Capacity Discharge in Cusec	Out-fall
6	Out-fall Drain No. 8	4000	Dhansa out-fall Drain
7	KCB Drain	692	Mangeshpur Drain
8	Chandeni Drain	425	NuhDrain
9	Nuh Drain	1362	UjinaDrain
10	UjinaDrain	2200	Ujina Diversion Drain
11	Ujina Diversion Drain	2200	Gaunchi Main Drain
12	Gaunchi Main Drain	6655	River Yamuna
<b>GHAGGAR SUB BASIN</b>			
1	Saraswati Drain	16660	A tributary of River Ghaggar
2	Kaithal Drain	213	River Ghaggar
3	Rangoi Diversion Drain	4088	River Ghaggar
4	HisarGhaggar multipurpose channel	500	River Ghaggar
5	MirpurChoe Drain	830	River Ghaggar
6	Amin Drain	2250	River Ghaggar
7	HisarGhaggar Drain	750	River Ghaggar
8	Baretta Drain	1380	River Ghaggar
9	SirhindChoe Drain	2454	River Ghaggar
10	RangoiNallah	7000	River Ghaggar

**Source:** Irrigation & Water Resource Department, Haryana

In the year 2017, low floods were experienced in the state with the highest flood discharge of about 1.47 lac cusecs in river Yamuna in the month of September and no loss of life and livestock was reported.

Table 2: The maximum discharge observed in the main rivers during the year 2017

Sr. No.	River	Discharge Site at	Maximum Discharge Recorded in Cusec	Date on which maximum Discharge recorded
1	River Yamuna	HathniKund Barrage	147212	02.09.2017
2	River Ghaggar	Panchkula Site 4A	18323	19.08.2017
		GulhaCheeka	26132	23.08.2017
		Khanauri	7100	04.09.2017
		Chandpur including RangoiNallah and JoyaNallah	4150	06.09.2017
		Downstream Ottu	3060	17.09.2017
3	River Markanda	Jhansa	8206	04.09.2017
4	River Tangri	Jansui	10317	26.08.2017

**Source:** Irrigation & Water Resource Department, Haryana

Haryana has received-28% deficit rainfall during the monsoon 2017. The Panchkula and Fatehabad districts received 50-60% less rainfall than normal whereas 07 districts received 30-50% less than the normal rainfall. Some parts of the districts namely Hisar and Jind were water logged due to accumulation of rain water mainly in the fields due to concentrated rainfall in the local catchment. Although dewatering through pumps was done efficiently and the problem of water logging was effectively taken by the Irrigation & Water Resource department, Haryana. In 2017, the State was fortunate to have no untoward incident due to proper flood preparedness and effective vigilance by the state and district administration.

State has reduced the losses from floods by adopting various structural & non-structural measures. Better planning resulted in government being well prepared for floods in advance and the same is reflected in the compensation figures. As per the data of flood compensation for past three years, compensation amount paid in the state for past three years has decreased manifold.

Table3: Detail of compensation provided for flood in the state of Haryana

Year	2015-16	2016-17	2017-18
<b>Flood</b>	220,955,329	2,757,667	1,107,541

Source: Revenue & Disaster Management Department, Haryana

In 2017, the state has carried various flood preparedness activities such as protection embankments, ring bunds, other bunds, drains, link drains, road network were inspected and strengthened and repaired before the monsoon onset. A meeting of Haryana State Drought Relief & Flood Control Board and Haryana State Technical Advisory Committee on Drought Relief & Floods have been taken by the Additional Chief Secretary & Financial Commissioner, Revenue & Disaster Management Department Haryana and by the Hon'ble Chief Minister of Haryana, respectively to review flood preparedness in the state. Annually Flood Control Rooms are established at State Headquarters as well as at all District Headquarters to access the rainfall and flood situation in the state. Each district has prepared Flood Control Order (Flood Plan) to cope up with the flood situation in a timely manner. State Flood training camps have been organized every year at Brahmavar, district Kurukshetra, Talyar lake, district Rohtak and Hathnikund Barrage, district Yamunanagar in the months of April, May and June respectively. Familiarization Exercise on floods has been organized by NDRF and SDRF. Wireless Stations have also been installed by the Police Department in collaboration with Irrigation and Water Resources Department along with the Flood Control Rooms at every district headquarters to record the river/drain discharges.

WhatsApp groups for "Flood Management" have been used for providing warnings and to establish inter and intra State coordination among authorities on a real time basis through social media groups to monitor rainfall and river flows in the State during 2017. Special attention was focused on Yamuna and Ghaggar Rivers and their tributaries in the State. These groups includes all the stakeholders i.e. Chief Minister, Ministers of Government of Haryana, Chief Secretary, Administrative Secretaries and Head of Departments of Government of Haryana, Divisional Commissioners, Deputy Commissioners, field level functionaries, NGO's, Central Government institutions like CWC, IMD and NDMA, IMD officials of surrounding states like Himachal Pradesh and Utrakhand. The purpose of these groups was to ensure heavy rainfall warnings, flood warning dissemination and timely response to floods and to resolve issues in a real time. It ensure timely communication amongst various stakeholders i.e. the weather monitoring institutions, the river flow monitoring departments, the Revenue and Disaster Management authorities and also coordinate interstate matters like alarming Government of Delhi regarding impending surge in Yamuna flows as and when excess water inflows appear at Tajewala/Hathnikund barrages. This has helped in providing timely warnings of rain and inflow of water in Yamuna and Som Rivers and accordingly steps have been taken in the districts to protect the precious human lives and properties in the flood prone villages. State has also availed the services of IMD and CWC for timely quantitative precipitation forecasts and resultant expected water flow in Yamuna & Ghaggar by using latest modelling techniques. Because of active flood management measures, administration would be able to manage cloud burst like situation when around 365 mm rainfall occurred in short span of five hours in Yamunanagar district by releasing advance warnings and evacuation in 2016. The strength of the monitoring system lies in capturing data in advance and data at source- especially the rainfall predictions, the river flow data, the ability to issue warnings in advance to downstream habitations and calibrating the response. River Gauge data generation points at Yamuna and Ghaggar river are providing the information on hourly basis which in turn ensures adequate time for evacuation of people.

### Conclusion:

The state has adopted a proactive approach towards flood Management. Integrated planning and effective response capacity has saved many lives in 2017. Using mobile application "WhatsApp" in an effective manner can help the other states in imparting real time information and warnings about heavy rainfall & river flow so that the state can timely respond to floods and resolve the issue in a real time. It can ensure timely communication amongst various departments & officials. Flood risk can be reduced by adopting various structural measures such as construction of dams, embankments, drainage channel etc. and non-structural flood management techniques such as flood planning, research, information resources, public awareness, training programmes etc. The present study reveals that no untoward incident has happened in the state due to proper flood preparedness and effective vigilance by the state and district administration.

### References:

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