

# **Floods in India**

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## **Flood: Introduction**

A flood is defined as water overflowing onto land that usually is dry. Flooding is often thought of as a result of heavy rainfall, but floods can arise in a number of ways that are not directly related to ongoing weather events. A flood is an overflow of an expanse of water that submerges land. The EU Floods directive defines, a flood as a temporary covering by water of land not normally covered by water in the sense of flowing water", the word may also be applied to the inflow of the tide. Floods produce damage through the immense power of moving water and through the deposition of dirt and debris when floodwaters finally recede. Flood is most prevalent and costliest natural disaster in the world which devastates both life and economy at a large extent.

## **Types of Flood**

- 1) **Flash Floods-** Flash floods are defined as those flood events where the rise in water is either during or within a few hours of the rainfall that produces the rise. Flash floods are often the result of heavy rains of short duration falling over a small area. Most flash floods associated with rainfall are produced by thunderstorms; that is, deep, moist convection. A single thunderstorm cell is unlikely to produce enough rainfall to cause a flash flood, so the typical flash flood is the result of several thunderstorms moving successively over the same area, known as 'training' thunderstorms. Orographic precipitation causes flash floods.
- 2) **River Floods-** River floods, in contrast to flash floods, typically occurs over days, or even months. A riverine flood occurs in the valley of a large river with many tributaries.
- 3) **Coastal Flood-** Floods in low-lying coastal areas, including estuaries and deltas, involve the inundation of land by brackish or saline water.

## **Flood in India**

Flood, an excess of water, can be caused by heavy rain fall followed by inadequate capacity of rivers to hold the water within their banks (NIDM, 2015). India receives major rainfall in only four months i.e. June to September. Distribution of rain in India is not similar at every place, some areas receive higher rainfall and some receives lower. The variation also varies time to time, the areas which are not traditionally prone to floods also experience severe inundation due to downpour and cloud bursting. Urban flood has become one of the major problem now a days, the recent floods in Delhi, Mumbai, Kolkata and other metropolises around the country definitely points towards the poor management of drainage system. NIDM has enlisted following causes for floods India:

### **The primary causes for Floods are:**

- Intense rainfall when the river is flowing full.
- Excessive rainfall in river catchments or concentration of runoff from the tributaries and river carrying flows in excess of their capacities.
- Cyclone and very intense rainfall when the EL Nino effect is on a decline.

- Synchronization of flood peaks in the main rivers or their tributaries.
- Landslides leading to obstruction of flow and change in the river course.
- Poor natural drainage system.
- Backing water in tributaries at their confluence with the main river.

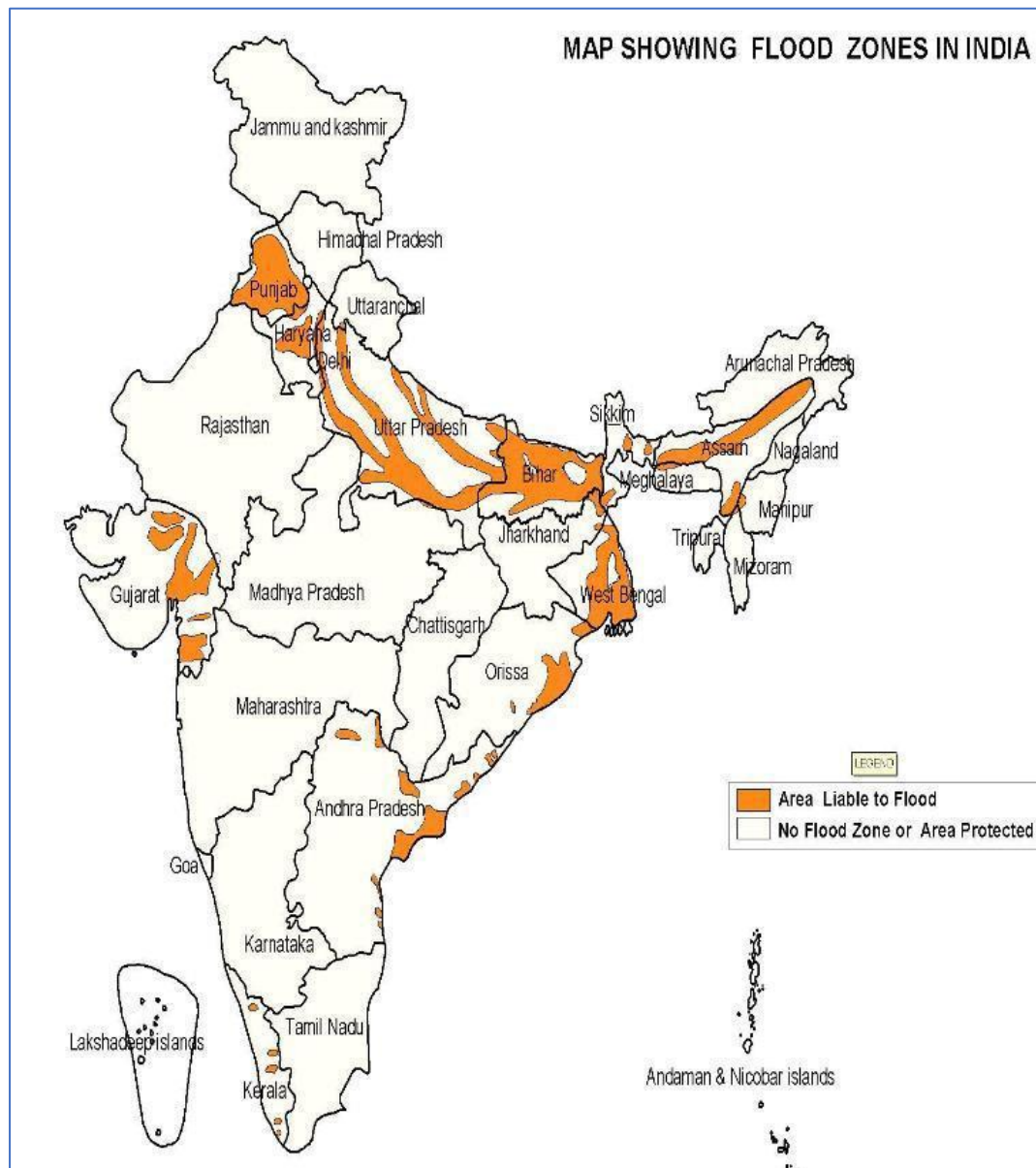
**Flood Prone Areas in India:** Indian subcontinent has specific geographical structure which makes various part of the nation prone to the flood. The snow-clad Himalaya in the North encompasses one of the largest glaciers of the world which are source of various perennial rivers. These rivers constitute a large plain which is habituated by millions of the Indians. These gigantic plains are very prone to the flood brings by the rivers which swell due to heavy rainfall in Monsoon. According to NIDM, the average rainfall in India is 1150 mm with significant variation across the country. The annual rainfall along the western coast and Western Ghats, Khasi hills and over most of the Brahmaputra valley amounts to more than 2500 mm. Most of the river floods occur during the monsoon period and are usually associated with tropical storms or depressions, active monsoon conditions and break monsoon situations. Besides the river flood, heavy rainfall, cloud bursting, out-burst of glacial lakes and tsunami is other causes of the flood. If we look at the Vulnerability atlas of flood zone in India, issued by Central Water Commission we find that the flood prone areas in India are mainly the Indo-Ganga-Brahmaputra plain and the coastal areas in the Eastern and Western coastal regions. River flood is result of gathering of water from various tributaries of the river which brings huge silts and sands with them and deposits it on the bed of the river. The deposited silts reduce the pace of the flow of river and it starts expanding horizontally and submerging the nearby habitats. In most flood prone states, land depression, low pressure areas are the two most important synoptic systems responsible for floods. NIDM mentioned in its document that in Bihar 100% and in U.P. 82% flood is caused due to land depression and well-marked low pressure. In W. Bengal main reason for flood is cyclonic circulation. Whereas in Punjab, Gujarat, Rajasthan & Jammu & Kashmir the main reason of frequent flooding is low pressure areas. Flood in Orissa and Andhra Pradesh is due to monsoon depression. Now days metropolitan cities are facing repeating episodes of the flood. This flood is caused by mismanaged drainage and sewer system which get choked due to careless dumping of the wastes in the drains and poor maintenance by the responsible agencies. The coastal flood is mainly because of the cyclones and tsunami. Rashtriya Barh Aayog (1980), mentioned that India's 12 % land comes under the flooded areas which were comprised nearly 40 million hectare of land. This has exceeded upto 49.815 mha as per the database maintained by CWC based on the flood damage data reported by States for the period from 1953-2010 (**Report of Working Group on Flood Management and Region Specific Issues for XII Plan (2011)**). Annual average area and population affected due to flood: 7.2 M ha and 3.19 million respectively.

### **Occurrence of Flood in India**

India has faced 649 disasters from 1915 to 2015. Out of these 649 events 302 disaster were caused by flood with on an average of 3 flood per year. This accounted approximately 47% of total disasters took place in India in the last 100 years. These floods can be further divided into Riverine Flood, Flash flood, coastal flood and other type of flood.

Decadal change of flood in India distinguishes an alarming picture. If we look at the flood trend based on CRED (Centre for Research on the Epidemiology of Disasters) data we find that in the last five decades India has witness continuous rise in flood disasters. The occurrence of flood disasters reached approximately 100 in the last decade. The lives claimed by these floods have gone from an average of 1000 per year in the 1965-75 decade to 1700 per year in 2005-15 decade. The cumulative economic loss in the last decade i.e.2005-2015 was nearly 2% of

current GDP of India. Compare to previous decadal loss last decade shows a steep rise on economic burden caused by flood. The decadal economic burden burgeoned from USD 11.6 billion in 1995-2005 to USD 34.5 billion in 2005-2015. This because the most affected five floods took place in last five years only. Uttarakhand flood (2013), Leh-Ladakh flood (2010), Assam flood (2012), Jammu Kashmir flood (2014) and recently Manipur Flood (2015) are some example of the biggest floods in India.



### **Selected References:**

- Tripathi, Prakash (2015), “Flood Disaster in India: An Analysis of Trends and Preparedness”, *Interdisciplinary Journal of Contemporary Research*, Vol.2, No.4
- <https://shodhganga.inflibnet.ac.in/bitstream/10603/212604/8/6%20chapter1.pdf> accessed on 4/4/2020
- [http://curry.eas.gatech.edu/Courses/6140/ency/Chapter8/Ency\\_Atmos/Flooding.pdf](http://curry.eas.gatech.edu/Courses/6140/ency/Chapter8/Ency_Atmos/Flooding.pdf) accessed on 4/4/2020