FLOODS

FUNDAMENTAL CONCEPT

Floods are always newsworthy whether it is a locality or a town isolated by swirling waters or a major disaster attracting attention of whole world.

Although man has been responding to flood since time unknown and is also leaving in the process much more is to be understood by the hydrologists, engineers, policy makers, farmers and town planners and above all by ***common people***. Therefore, it is necessary to understand the phenomenon of flood.

MEANING, DEFINITION & TYPES

The word *"flood"* comes from the Old English flod, a word common to Germanic languages. Deluge myths are mythical stories of a great flood sent by a deity or deities to destroy civilization as an act of divine retribution, and they are featured in the mythology of many cultures.

The *European Union (EU)* Floods Directive defines a flood as a covering by water of land not normally covered by water.

Thus, flood is a state of high water level along a river channel or on the coast that leads to inundation of land, which is not usually submerged. Floods may happen gradually and also may take hours or even happen suddenly without any warning due to breach in the embankment, spill over, heavy rains etc.

TYPES OF FLOODS

i. Areal Floods

The floods that happen on flat or low-lying areas when water is supplied by rainfall or snowmelt more rapidly than it can either infiltrate or run off. Areal flooding begins in flat areas like floodplains and in local depressions not

connected to a stream channel, because the velocity of overland flow depends on the *surface slope*.

Fig. Areal Floods

ii. Flash Floods

Fig. Flash Floods

The floods are generally the events of hill areas where *sudden heavy rain* over the limited area can cause a strong flow. Flash floods also occur when a temporary blockage in hilly areas impounds water which when released suddenly creates havoc.

iii. River Floods

The floods occur due to *heavy inflow* of water from heavy rainfall, snowmelt and short intense storms.

Fig. River Floods

iv. Coastal Floods

Fig.Coastal Floods

The floods are caused due to heavy rainfall from cyclones or due to tsunamis.

v. Urban Floods

Urban flooding is the inundation of land or property in a built environment, particularly in more densely populated areas, caused by rainfall overwhelming the capacity of *drainage systems*, such as storm sewers.

Fig.Urban Floods

vi. Catastrophic Floods

Catastrophic riverine flooding is usually associated with major *infrastructure failures* such as the collapse of a dam, but they may also be caused by drainage channel modification from a landslide, earthquake or volcanic eruption.

CAUSES OF FLOODS

There are several causes of floods and differ from region to region. The causes may vary from a rural area to an urban area. Some of the major causes are:

Heavy rainfall: It is the primary cause for floods in India. Especially, rainfall in a short span of time is of much concern as they are leading to flash floods. For instance, in July 2017, Mount Abu received the heaviest rainfall in over 300 years in a span of 24 hours. The hill station received an unprecedented 700 mm of rain in 24 hours. As per a study instituted by the United Nations, climate change phenomenon is believed to be behind flash floods across the globe.

Siltation of the Rivers: Heavy siltation of the river bed reduces the water carrying capacity of the rivers and streams leading to flooding. For instance, as a result of siltation, the Brahmaputra has been expanding – ranging from 2 km to 14 km – leading to frequent flooding in the North East region.

Blockage in the Drains: Blocked drains are the primary cause for the floods in urban areas, especially in metros. For instance, failure of the drainage system is believed to be one of the primary causes behind the Chennai floods in December 2015 that led to the death of more than 400 people.

Landslides: They are the major reason behind floods in hilly areas of the north and northeast. For instance, in June 2013, landslides caused a blockage of flow of streams and rivers in Uttarakhand and caused major floods, causing 5748 deaths.

Apart from the above reasons, natural hazards like cyclones and earthquakes and encroachments of river banks and water bodies cause flooding.

Impact of recurrent floods

The most important consequence of floods is the loss of life and property. Structures like houses, bridges and roads get damaged by the gushing water.

Some of the negative impacts of recurrent floods are given below –

Impact on Agriculture: Recurrent floods impact the agriculture sector adversely. Due to recurrent floods, fields get submerged and lead to the loss of harvest increasing the vulnerability of farmers to indebtedness. The loss is not only for the farming community but also the common man is hit hardly due to persistent inflation. Besides, the threat to life of milch animals impact the farming community adversely.

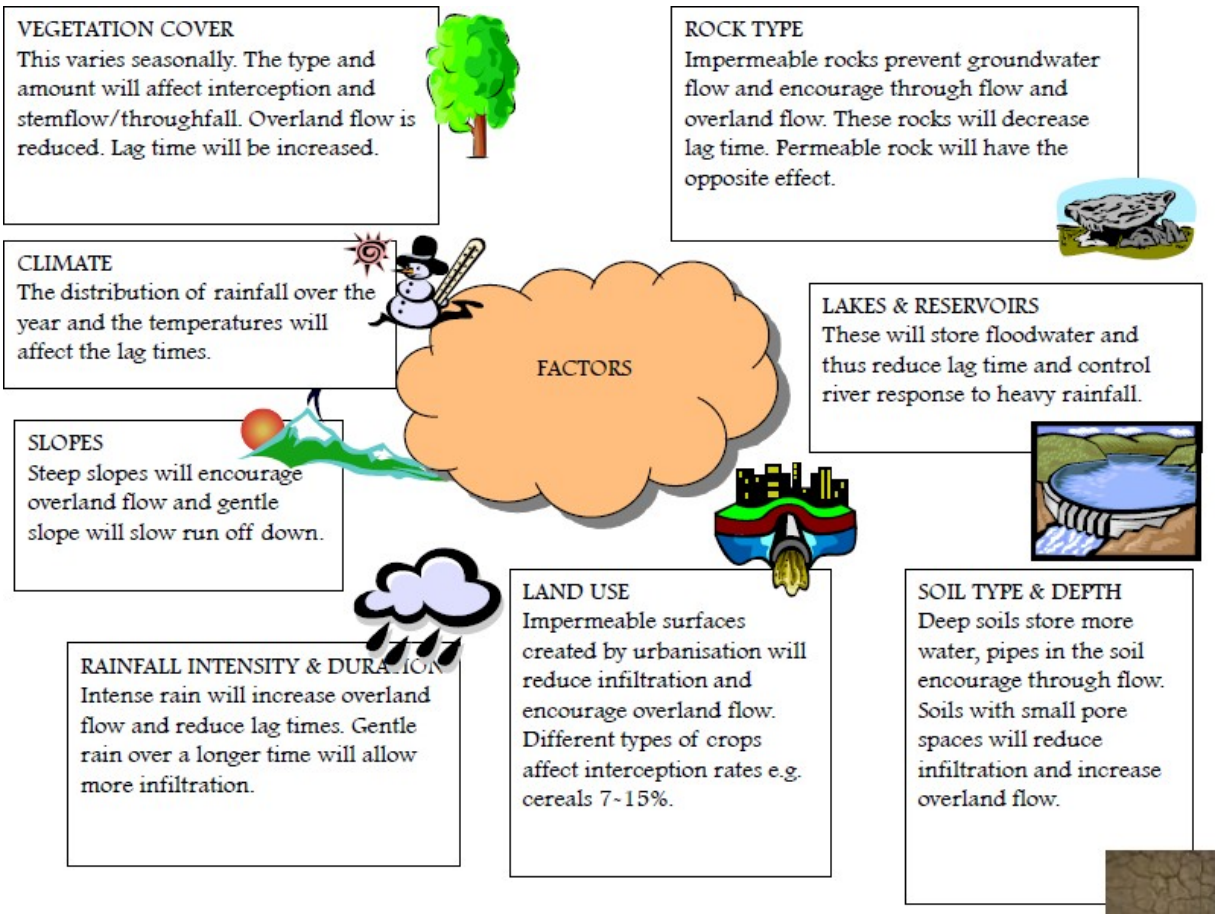
Moreover, floods may also affect the soil characteristics. The land may be rendered infertile due to erosion of top-layer.

Damage to infrastructure: Recurrent floods cause severe damage to economic infrastructure like transportation networks, electricity generation and distribution equipment, etc.

Outbreak of diseases: Lack of proper drinking water facilities, contamination of water (well, ground water, piped water supply) leads to out break of epidemics like diarrhoea, viral infection, malaria and many other infectious diseases. The probability of outbreak of diseases in highly densed areas of India is high.

Besides the above, strain on the administration, cost of rescue and rehabilitation of the flood affected population are other causes of concern.

FACTORS RESPONSIBLE FOR FLOODS



1.2 IMPACTS OF FLOODS

- Human Loss
- Property Loss
- Affects the Major Roads
- Disruption of Air / Train / Bus services
- Spread of Water-borne Communicable Diseases
- Communication Breakdown
- Electricity Supply Cut off

- Economic and Social Disruption
- Increase in Air / Water Pollution

FLOODS IN INDIA

FLOODS PRONE AREA IN INDIA

Fig. Major flood prone areas in India

- Floods cause damage to houses, industries, public utilities and property resulting in huge economic losses, apart from loss of lives.
- Though it is not possible to control the flood disaster totally, by adopting suitable structural and non-structural measures the flood damages can be minimised.

VULNERABILITY TREND

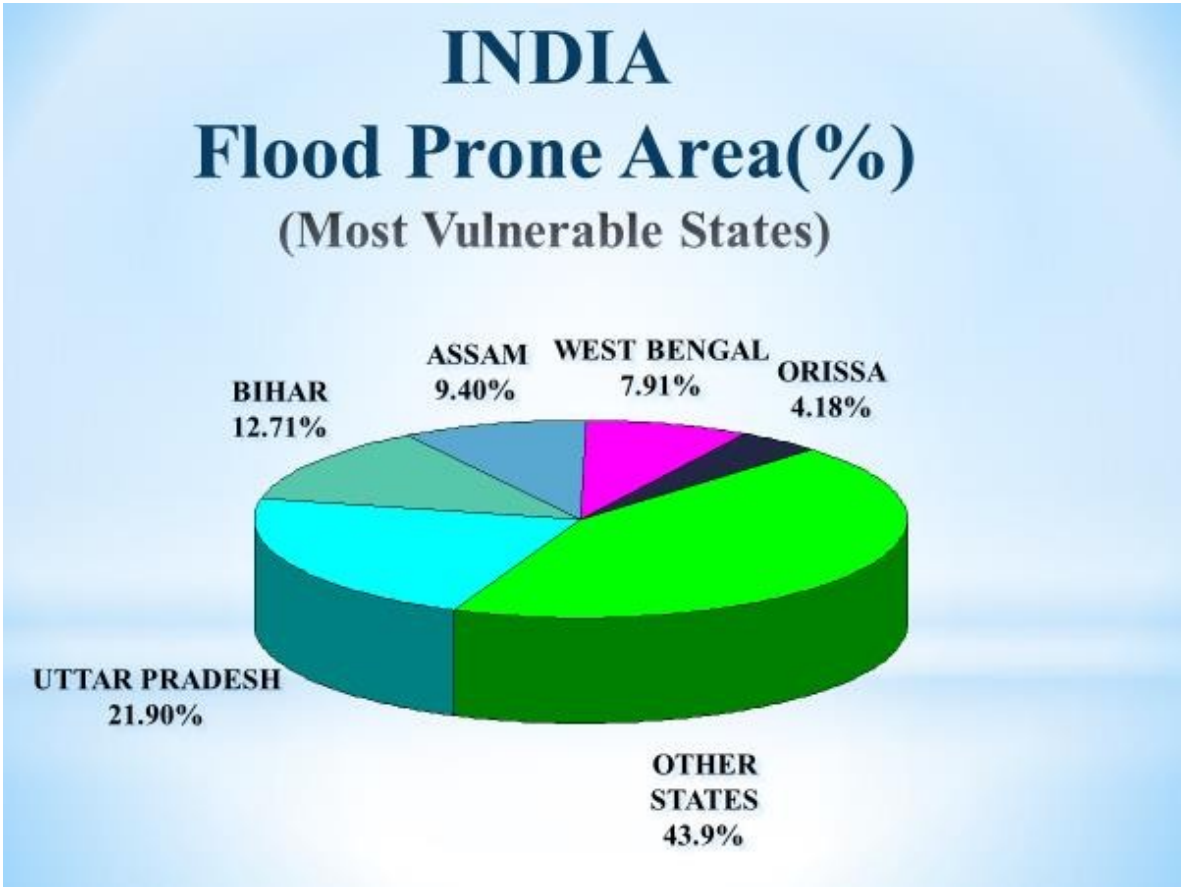


Fig.State wise vulnerability trend in India

MAJOR FLOODS IN INDIA

1. Bihar floods, 1987

- Bihar floods in 1987 remain one of the deadliest to have been seen in India since independence.
- In one of the worst floods in Bihar, 1,399 people and 5,302 animals lost their lives, and nearly 29 million people were affected in 30 districts, 382 blocks, 6,112 panchayats, and 24,518 villages.
- The damage to crops was calculated to be 68 billion Indian rupees and damage to public property was at 68 million rupees.

2. Gujarat floods, 2005

- Gujarat flood accounted for a loss of more than 8,000 crore rupees.
- The floods also caused a great financial and economic loss to the nation.
- More than 123 deaths were recorded and a total of 2,50,000 people were evacuated.
- The day is referred to as a 'BLACK DAY' in Indian History.

3. Maharashtra floods, 2005

- In the Maharashtra floods, approximately 1,094 people died.
- It occurred just one month after the June 2005 Gujarat floods.

- 52 local trains, 37,000 autos, 4,000 taxis, 900 'BEST' buses and 10,000 trucks were either damaged or spoiled.
- The financial cost was calculated to be 550 core rupees.

4. Assam floods, 2012

- The worst floods since the year 1998, Assam floods took the lives of more than 120 people.
- The flood also affected 1,744 villages across nine districts and 70,000 hectares of cropland.
- It was reported that more than five million people were evacuated.
- Flooding significantly affected Kaziranga National Park, where about 540 animals died.

4. Uttarakhand floods, 2013

- In the Uttarakhand floods, the destruction of bridges and roads left about 1,00,000 pilgrims and tourists trapped.
- The Indian Air Force, the Indian Army, and paramilitary troops evacuated more than 1,10,000 people from the flood-hit areas.
- More than 5,000 people were presumed dead.

6. Jammu & Kashmir floods, 2014

- Caused by torrential rainfall, in September 2014, the Kashmir region suffered disastrous floods across many of its districts.

- According to the Home Ministry of India, 2,600 villages were reported to be affected in Jammu and Kashmir -- out of which 390 villages in Kashmir were completely submerged.

Droughts:

Everything needs water. Even when we don't need water, humans tend to use much more water than is necessary on a daily basis. This is why a water shortage is so difficult for us.

Obviously, the drought will impact the agriculture industry. In order to save his crops, the farmer may have to spend money on new irrigation plans. Since he's now paying more money to provide the crops, he will have to charge more for the produce to make a profit. As a result, the public will have to pay more for food. Some foods will also become "scarce"— meaning the cost of goods will rise.

There will also need to be water outages in order to preserve water. Sometimes, public places like schools, offices and restaurants will have to close when they don't have water, which can affect the country's productivity.

During droughts, there may also be an increase in the number of forest fires or bush fires because of the dry conditions.

There are some other issues which result from droughts:

- Affects education since schools have to be closed if there's no water
- Reduces fire fighting capability and also, there's now a risk to public safety from fires or any other accident that requires large volumes of water immediately.
- High food -cost foods cause dietary deficiencies

Potential for conflicts (Water user conflicts, Political conflicts, Management conflicts)