

Q: What are floods? What causes floods? Also explain the effects of floods and how to mitigate floods? Can floods be predicted?

# FLOODS

**WHO:** Floods are the most frequent type of natural disaster and occur when an overflow of water submerges land that is usually dry.

## Causes of flooding

### Meteorological (weather) cause

- Prolonged & intense rainfall
- Cyclones
- Typhoons
- Tsunami

### Hydrological Cause

It causes by the process -

- Rapid ice & snow melt
- Land erosion
- Saturated land
- Impervious surface
- Poor infiltration rates

### Anthropogenic cause

- Man made

- Population growth
- Deforestation
- Urbanization
- Climate change
- Global warming
- Poor land use
- Planning

## Types of Floods

### Flash Floods

FF are caused by rapid & excessive rainfall that raises water heights in quick time and rivers, streams, channels or roads may be overtaken.

### River floods

RF are caused when consistent rain or snow melt forces a river to exceed capacity.

### Coastal Floods

CF are caused by storm surges associated with tropical cyclones & tsunamis.

## EFFECTS OF FLOODS

### Primary Effects

- i- **Property Damage**: Floodwaters inundate (large amount of water) and damage homes, buildings, infrastructure & vehicles.
- ii- **Loss of Life**: Floods can result in fatalities due to drowning, accidents, and other water-related incidents.
- iii- **Displacement**: Floods force people to evacuate their homes, leading to temporary or permanent displacement.
- iv- **Crop damage**: Farmlands & crops can be destroyed or severely damaged by floodwaters, impacting agricultural production which affects economy and GDP.

## Secondary Effects

- i- **Waterborne diseases:** Contaminated floodwaters can lead to outbreaks of waterborne diseases such as Cholera, typhoid fever and gastroenteritis, affecting public health.
- ii- **Food shortage:** Crop damage and disruption to transportation and distribution networks can result in food scarcity and higher prices, impacting food security.
- iii- **Disruption of services:** Floods can damage utilities such as water supply, sewage systems, electricity, and communication networks, leading to service interruptions & delays in recovery efforts.
- iv- **Economic loss:** Businesses may suffer financial losses due to damage to infrastructure, interruption of operations, and loss of revenue, affecting regional and local economies.
- v- **Environmental degradation:** Floods can cause pollution, habitat destruction, and loss of biodiversity, leading to long-term environmental damage and ecosystem degradation.
- vi- **Mental health impacts:** Floods can cause stress, anxiety, depression and other mental health issues among affected individuals and communities.

## Tertiary (Long term) Effects

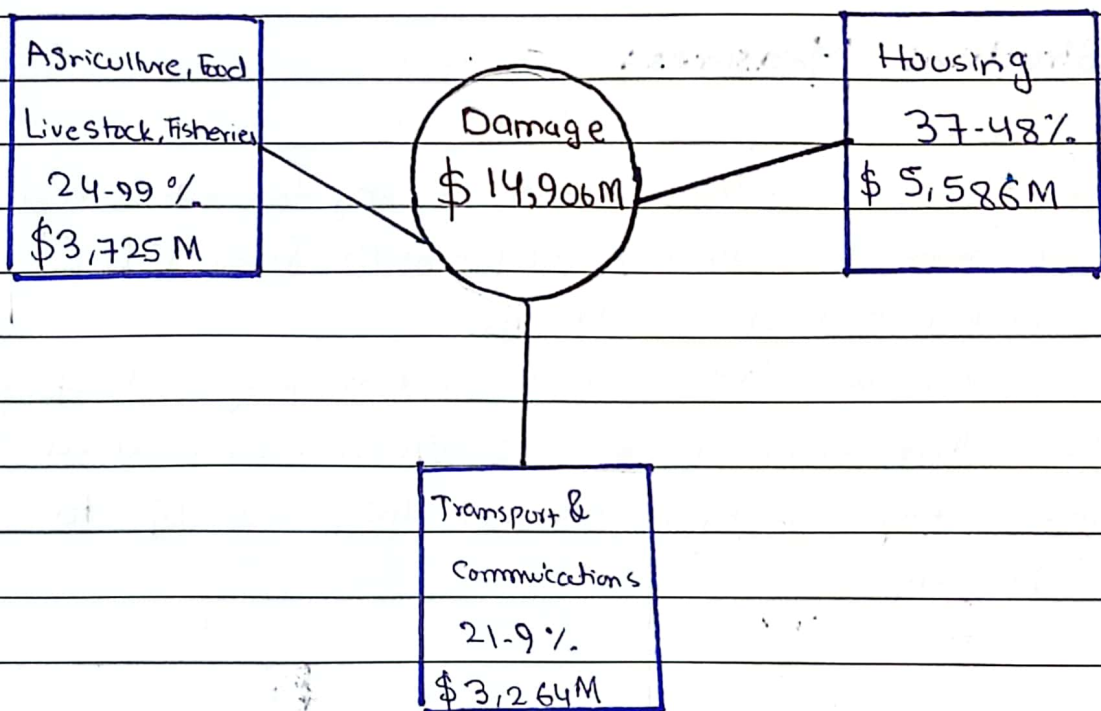
Long term effects of flooding include economic hardship, rebuilding costs, food shortages, poverty, loss of production, loss of

Economic growth and delay in development programmes - It usually takes years for affected communities to come back to normalcy.

## Effects of Floods in Pakistan

The floods in Pakistan from June to October, 2022 hit the country severely. According to World Bank (WB)

The floods affected 33 million people and more than 1730 lost their lives. More than 8 million displaced people faced a health crisis. The total damages caused by floods exceed USD 14.9 billion, and total economic losses to reach about USD 15.2 billion.



# Management of Floods

## Structural Measures:

- i. **Dam<sup>s</sup> Construction:** Construction of Dams and Reservoirs helps to mitigate floods by regulating water flow and storing excess water.
- ii. **Levees and Flood Walls:** Levees and flood walls acts as barriers. There can be installed along rivers and coastlines to protect communities.
- iii. **Channelization:** Modification of natural waterways by straightening or deepening channels can help to improve flow and reduce flooding.
- iv. **Retention Ponds:** There are artificial ponds or basins to hold water temporarily during heavy rainfall thus preventing flooding.

## Non-Structural Measures:

- i. **Floodplain Management:** Implementing zoning regulations and land-use planning to restrict development in flood-prone areas and preserve natural floodplains.
- ii. **Building Codes and Retrofitting:** Implementing and enforcing building codes that account for flood resilience, as well as retrofitting existing structures, enhances their ability to withstand flooding.

iii. Early warning Systems: These systems use various monitoring technologies to detect and forecast floods, allowing authorities to take necessary steps.

iv. Public awareness and education Campaigns: Educating the public about flood risks, preparedness, and response strategies when flood occurs.

v. Sustainable Urban Drainage Systems (SUDS):

It includes techniques such as permeable pavements, green roofs, and rain gardens, which manage storm water on-site and reduce runoff, thus decreasing the flood risk.

## Prediction of Floods

Floods can be predicted by following ways:

i. Hydrological Modelling: Hydrologists use mathematical models to simulate the behavior of rivers, streams, and other water bodies, incorporating data such as rainfall, soil moisture and topography to forecast river levels and potential flooding.

ii. Meteorological forecasting: Meteorologists analyze weather patterns and use radar, satellite imagery and computer models to heavy rainfall events that can lead to flooding.

iii. Historical Data and Statistical Analysis: By studying past flood events and analyzing historical records, scientists can identify patterns and trends in flood occurrence.