



# FLOODS

## FLOODS IN PAKISTAN:

A flood is a large amount of water overflowing land that is usually dry. In Pakistan, this often happens due to:

### Heavy Monsoon Rains (June-Sept):

These intense downpours can overwhelm rivers and drainage systems.

### Melting of Snow and Glaciers:

As temperatures rise, glaciers melt, adding significant water to already swollen rivers.



## TYPES OF FLOOD



### RIVERINE FLOODING

They occur when rivers overflow their banks, inundating surrounding areas.



### FLASH FLOODING

Fast, dangerous floods that rise quickly (in hours) after heavy rain.



### URBAN FLOODING

When heavy rain overwhelms a city's drainage system due to heavy rainfall.



### COASTAL FLOODING

When seawater inundates low-lying coastal areas. It is caused by storm surges or rising sea levels.

# FLASH FLOODS

## FLASH FLOODS IN PAKISTAN:

Pakistan experiences frequent flash floods, particularly during the monsoon season (July-September) as well as in winter season due to heavy rainfall in the mountains and foothills. These rapid inundations cause losses of in life property and infrastructure, especially in Punjab, Khyber Pakhtunkhwa, AJ&K, Gilgit Baltistan and Balochistan provinces

## CAUSES OF FLASH FLOOD



### HEAVY RAINS

Heavy monsoon rains overwhelm drainage systems, causing flash floods in Pakistan.



### GLACIAL MELT

Rising temperatures melt northern glaciers, increasing river flow and causing floods.



### DEFORESTATION

Deforestation reduces vegetation cover, causing runoff and floods.



### URBANIZATION

Unplanned mapping and concrete surfaces prevent absorption, causing flash floods through rapid runoff



### TOPOGRAPHY

Mountainous terrain and steep slopes accelerate water flow, increasing flash flood risk



### CLIMATE CHANGE

More extreme and unpredictable rainfall events directly raise flash flood potential



### RIVER ENCROACHMENT

Narrowing river channels obstruct natural flow, leading to flash flooding



### POOR WATER MANAGEMENT

Inadequate water regulation systems & flood control infrastructure contribute to flooding



### SEDIMENTATION

Silt buildup reduces water reservoirs capacity contribute to flash flood



### INFRASTRUCTURE FAILURES

Breaches of dams, levees or drains unleash flash floods suddenly



# BE PREPARED FOR FLASH FLOODING



## ACTIONS BY ORGANIZATIONS

### PRE



#### EARLY WARNING SYSTEMS

Develop and implement community level early warning systems to alert communities of potential flash floods.



#### COMMUNITY AWARENESS

Educate residents on flood risks, evacuation routes, and emergency plans.



#### INFRASTRUCTURE DEVELOPMENT

Build and maintain dams, levees, gabion wall and retention ponds to control floods.



#### VEGETATION AND SOIL MANAGEMENT

Promote afforestation and soil conservation to enhance water absorption and reduce runoff.



#### LAND USE PLANNING

Enforce zoning to prevent construction in flood zones and preserve drainage.

### DURING



#### ADVISORIES & ALERTS

Activate early warning systems to alert communities and provide real-time information on flood progression.



#### EVACUATION PLANS

Execute evacuation plans to move residents to safety



#### RESCUE OPERATIONS

Deploy swift-water rescue teams equipped to assist stranded individuals and animals.



#### ROAD CLOSURE AND TRAFFIC MANAGEMENT

Close roads and manage traffic to prevent accidents and facilitate emergency response efforts.



#### PROVIDE REAL-TIME UPDATES

Communicate flood updates and safety instructions through multiple channels to keep residents informed.

### POST



#### DAMAGE ASSESSMENT

Conduct rapid assessments of infrastructure damage and affected areas to prioritize recovery efforts.



#### RELIEF ASSISTANCE

Provide immediate relief and assistance to affected individuals.



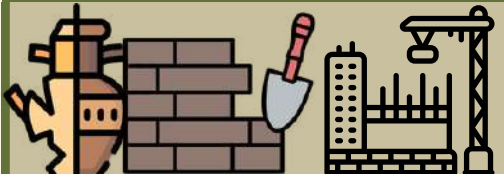
#### HEALTH AND SANITATION

Provide medical aid, clean water, and sanitation to prevent disease after floods.



#### FLOOD RISK REDUCTION

Long-term measures such as improved drainage systems, land use planning revisions.



#### REHABILITATION & RECONSTRUCTION

Restore infrastructure and rebuild homes promptly.

# BE PREPARED FOR FLASH FLOODING



## ACTIONS BY COMMUNITY AND INDIVIDUALS

### PRE



#### STAY INFORMED

Stay informed about weather forecasts and flood alerts.



#### PREPARE AN EMERGENCY KIT

Prepare an emergency kit with essentials like food, water, medications and documents.



#### KNOW EVACUATION ROUTES

Know the evacuation routes and evacuation plan



#### EARLY WARNING SYSTEMS

Establish and maintain early warning systems to alert residents of potential floods.



#### CONDUCT DRILLS

Conduct drills and exercises to practice evacuation procedures.

### DURING



#### EVACUATE TO HIGHER GROUND

Evacuate to higher ground immediately if advised by authorities.



#### AVOID FLOOD WATERS

Avoid walking or driving through floodwaters; they may be deeper or faster-flowing than they appear.



#### FOLLOW INSTRUCTIONS

Follow instructions from emergency services and local authorities



#### ENGAGE VOLUNTEERS

Engage volunteers for emergency response and build shelters for displaced residents.



#### COORD WITH OTHER COMMUNITIES

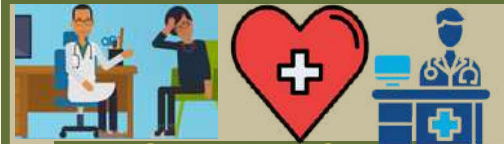
Coordinate with neighbouring communities and authorities for flood condition, mutual aid and support

### POST



#### ASSESS DAMAGE TO PROPERTY

Assess damage to property and prioritize safety during cleanup efforts.



#### SEEK MEDICAL ATTENTION

Seek medical attention for injuries or illnesses related to the flood.



#### ORGANIZE COMMUNITY CLEANUP

Organize community cleanup efforts to remove debris and restore infrastructure.



#### PROVIDE SUPPORT SERVICES

Provide support services such as counselling and relief assistance to affected individuals and families.



#### FLOOD MITIGATION MEASURES

Implement long-term flood mitigation measures like improving drainage systems and resilience.



# RIVERINE FLOODS

## RIVERINE FLOODS IN PAKISTAN

Pakistan frequently experiences riverine floods, especially during the monsoon season (July-September) due to heavy rainfall and snowmelt in the mountains. These floods cause significant losses in lives, property and infrastructure, particularly in Khyber Pakhtunkhwa, Punjab and Sindh provinces.

## CAUSES OF RIVERINE FLOODS



### MONSOON RAINS

Prolonged and intense rainfall can cause rivers to overflow their banks.



### GLACIAL MELT

Rapid melting of snow in the mountains increases river flow.



### DAM RELEASES

Water released from dams overwhelm downstream channels



### DEFORESTATION

Reduces land's ability to absorb water, increasing runoff into rivers.



### TOPOGRAPHY

Low-lying floodplains easily submerge as river levels rise



### CLIMATE CHANGE

Extreme weather events increase the frequency and severity rainfall and riverine floods.



### URBANIZATION

Reduces natural water absorption areas, increasing runoff into rivers.



### POOR WATER MANAGEMENT

Inefficient water management practices exacerbate flooding.



### SOIL EROSION

Soil erosion fills rivers, reducing capacity and causing overflow in heavy rains.



### BLOCKAGE OF WATERWAYS

Poor infrastructure fails in heavy rain, causing floods.

# BE PREPARED FOR RIVERINE FLOODING



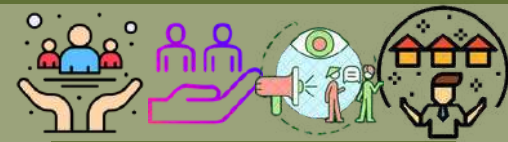
## ACTIONS BY ORGNAIZATIONS

### PRE



#### EARLY WARNING SYSTEMS

Develop and implement robust early warning systems for timely alerts.



#### COMMUNITY AWARENESS

Conduct awareness campaigns on flood risks and preparedness.



#### INFRASTRUCTURE IMPROVEMENT

Invest in flood defenses like levees, dams, and retention basins.



#### VEGETATION AND SOIL MANAGEMENT

Promote afforestation and soil conservation to enhance water absorption and reduce runoff.



#### LAND USE PLANNING

Enforce zoning to prevent construction in flood zones and preserve drainage.

### DURING



#### ADVISORIES & ALERTS

Activate early warning systems to alert communities and provide real-time information on flood progression.



#### EVACUATION PLANS

Execute evacuation plans to move residents to safety



#### RESCUE OPERATIONS

Deploy swift-water rescue teams equipped to assist stranded individuals and animals.



#### ROAD CLOSURE & TRAFFIC MANAGEMENT

Close roads and manage traffic to prevent accidents and facilitate emergency response efforts.



#### PROVIDE REAL-TIME UPDATES

Communicate flood updates and safety instructions through multiple channels to keep residents

### POST



#### DAMAGE ASSESSMENT

Conduct rapid assessments of infrastructure damage and affected areas to prioritize recovery efforts.



#### RELIEF ASSISTANCE

Provide immediate relief and assistance to affected individuals.



#### HEALTH AND SANITATION

Provide medical aid, clean water, and sanitation to prevent disease after floods.



#### FLOOD RISK REDUCTION

Long-term measures such as improved drainage systems, land use planning revisions.



#### REHABILITATION & RECONSTRUCTION

Restore infrastructure and rebuild homes promptly



# BE PREPARED FOR RIVERINE FLOODING



## ACTIONS BY COMMUNITY AND INDIVIDUALS

### PRE



#### STAY INFORMED

Stay informed about weather forecasts and flood alerts.



#### PREPARE AN EMERGENCY KIT

Prepare an emergency kit with essentials like food, water, medications, and documents.



#### KNOW EVACUATION ROUTES

Know the evacuation routes and evacuation plan



#### EARLY WARNING SYSTEMS

Establish and maintain early warning systems to alert residents of potential floods.



#### CONDUCT DRILLS

Conduct drills and exercises to practice evacuation procedures.

### DURING



#### EVACUATE TO HIGHER GROUND

Evacuate to higher ground immediately if advised by authorities.



#### AVOID FLOOD WATERS

Avoid walking or driving through floodwaters; they may be deeper or faster-flowing than they appear.



#### FOLLOW INSTRUCTIONS

Follow instructions from emergency services and local authorities



#### ENGAGE VOLUNTEERS

Engage volunteers for emergency response and build shelters for displaced residents.



#### COORD WITH OTHER COMMUNITIES

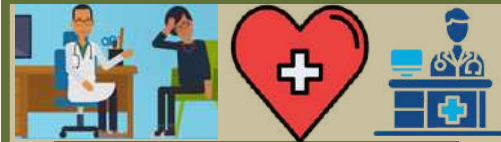
Coordinate with neighbouring communities and authorities for flood condition, mutual aid and support

### POST



#### ASSESS DAMAGE TO PROPERTY

Assess damage to property and prioritize safety during cleanup efforts.



#### SEEK MEDICAL ATTENTION

Seek medical attention for injuries or illnesses related to the flood.



#### ORGANIZE COMMUNITY CLEANUP

Organize community cleanup efforts to remove debris and restore infrastructure.



#### PROVIDE SUPPORT SERVICES

Provide support services such as counseling and relief assistance to affected individuals and families.



#### FLOOD MITIGATION MEASURES

Implement long-term flood mitigation measures like improving drainage systems and resilience.



# URBAN FLOODING

## URBAN FLOODS IN PAKISTAN

Urban flooding in Pakistan, especially during monsoon season, overwhelms poor drainage systems. Rapid urbanization and paved surfaces increase runoff, while blocked drains and fewer green spaces worsen the problem. Climate change and frequent storms further exacerbate flooding in cities like Karachi, Lahore and Rawalpindi etc.

## CAUSES OF URBAN FLOODS



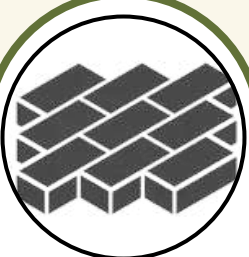
### HEAVY RAINS

Prolonged and intense rainfall can cause rivers to overflow their banks.



### POOR DRAINAGE SYSTEMS

Clogged or inadequate drainage systems can't handle excess water.



### PAVED SURFACES

Concrete and asphalt reduce natural water absorption, increasing runoff.



### BLOCKED DRAINS

Trash, leaves and debris block storm drains, preventing proper water flow.



### LOSS OF GREEN SPACES

Urban development reduces parks and open areas that absorb rainwater.



### CLIMATE CHANGE

Increased frequency and intensity of storms lead to higher flood risks.



### TOPOGRAPHY

Low-lying urban areas are more susceptible to flooding.



### POOR SEWER SYSTEMS

Old or insufficient sewer systems fail to manage heavy rain.



### CONSTRUCTION ACTIVITY

Ongoing construction can obstruct natural water pathways and drainage



### RIVERBANK ENCROACHMENT

Building too close to rivers reduces their capacity to manage overflow, leading to urban flooding.



# BE PREPARED FOR URBAN FLOODING



## ACTIONS BY ORGNAIZATIONS

### PRE



#### REGULARLY MAINTAINANCE

Regularly maintain and improve drainage systems for flood resilience.



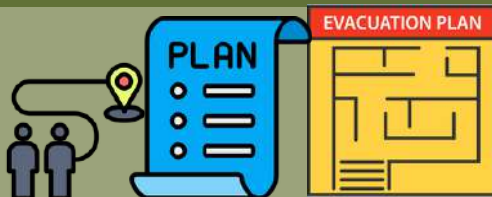
#### ENFORCE ZONING & PROMOTE GREEN SPACES

Enforce zoning to prevent building in flood zones and promote green spaces for water absorption.



#### PREPLACEMENT OF FLOOD FIGHTING EQUIPMENTS

Preplacement of Dewatering pumps, boats and evacuation plan for low lying areas EW



#### PREPAREDNESS PLANS AND EVACUATION ROUTES

Develop flood preparedness plans and evacuation routes; conduct community flood risk awareness campaigns.



#### URBAN AFFORESTATION & SOIL CONSERVATION

Promote urban afforestation and soil conservation practices.

### DURING



#### CLEAR BLOCKED DRAINS

Clear blocked drains and manage floodwater; deploy temporary barriers and pumps to control water levels.



#### ACTIVATE EMERGENCY RESPONSE TEAMS

Activate emergency response teams and coordinate with other departments;



#### PROVIDE MEDICAL AID

Provide medical aid and set up temporary medical camps



#### EVACUATIONS

Evacuate population from low laying areas and set up emergency shelters.



#### PROVIDE REAL-TIME UPDATES

Provide real-time updates and instructions through multiple channels

### POST



#### ASSESS AND REPAIR DAMAGES

Assess and repair damaged infrastructure and drainage systems; remove debris and ensure proper disposal.



#### PROVIDE RELIEF AND TEMPORARY HOUSING

provide relief and temporary housing for affected residents.



#### REVENT DISEASE OUTBREAKS

Continue monitoring and providing medical assistance to prevent disease outbreaks



#### LONG-TERM MEASURES

Long-term measures such as improved drainage systems, land use planning revisions.



#### REVIEW AND UPDATE PLANS

Review and update urban planning and building codes; implement long-term flood mitigation measures.

# BE PREPARED FOR URBAN FLOODING



## ACTIONS BY COMMUNITY AND INDIVIDUALS

### PRE



#### STAY INFORMED

Keep up-to-date with weather forecasts and flood warnings.



#### PREPARE AN EMERGENCY KIT

Prepare an emergency kit with essentials like food, water, medications, and documents.



#### KNOW EVACUATION ROUTES

Know the evacuation routes and evacuation plan



#### SAFEGUARD PROPERTY

Elevate valuable items and electrical appliances; seal walls and gaps to prevent water entry.



#### INSTALL FLOOD BARRIERS

Install flood barriers like sandbags & secure outdoor furniture and items to prevent water damage and loss.

### DURING



#### EVACUATE IF NECESSARY

Follow official instructions and evacuate to higher ground if necessary.



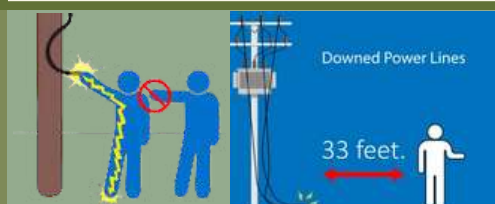
#### AVOID FLOOD WATERS

Avoid walking or driving through floodwaters; they may be deeper or faster-flowing than they appear.



#### FOLLOW INSTRUCTIONS

Follow instructions from emergency services and local authorities



#### STAY AWAY FROM POWER LINES

Avoid downed power lines and report them to the authorities immediately.



#### TURN OFF UTILITIES

If safe to do so, turn off gas, electricity, and water to prevent damage or hazards.

### POST



#### RETURN SAFELY

Only return home when authorities declare it safe.



#### HEALTH PRECAUTIONS

Be vigilant about health, watching for symptoms of waterborne diseases.



#### AVOID STANDING WATER

Stay away from standing water, which can be contaminated or electrically charged.



#### VENTILATE YOUR HOME

Open windows and doors to ventilate and dry out your home.



#### PREVENT MOLD

Clean and dry your home thoroughly to prevent mold growth, which can pose health risks.



# COSTAL FLOODING

## COSTAL FLOODS IN PAKISTAN

Coastal flooding in Pakistan during monsoon season strains infrastructure and communities. Rising sea levels and storm surges overwhelm coastal defenses. Urbanization and development reduce natural buffers like mangroves, worsening impacts. Climate change intensifies risks with more cyclones and higher sea levels.

## CAUSES OF COSTAL FLOODS



### RISING SEA LEVELS

Due to global warming, sea levels are rising, leading to higher storm surges and coastal inundation.



### STORM SURGES

Intense storms, particularly during the monsoon season, generate powerful surges that flood coastal areas.



### URBANIZATION & DEVELOPMENT

Coastal development & infrastructure reduce natural coastal defenses like mangroves & wetlands



### CLIMATE CHANGE

Unpredictable weather patterns and more frequent cyclones exacerbate coastal flooding risks.



### POOR COASTAL MANAGEMENT

Poor planning and coastal protection increase vulnerability to extreme weather.



### DEFORESTATION

Increased frequency and intensity of storms lead to higher flood risks.



### LAND SUBSIDENCE

Some coastal areas experience sinking land levels which increases flood vulnerability.



### TIDAL EFFECTS

Upstream heavy rainfall causes river flooding, increasing water discharge into coastal areas.



### RIVERINE FLOODING

Upstream heavy rainfall causes river flooding, increasing coastal water discharge.



### INFRASTRUCTURE DEVELOPMENT

Poor coastal construction disrupts natural water flow, worsening flooding.

# BE PREPARED FOR COSTAL FLOODING



## ACTIONS BY ORGNAIZATIONS

### PRE



#### FORECASTING AND EARLY WARNING

Establish robust weather forecasting and coastal monitoring systems.



#### INFRASTRUCTURE ASSESSMENT

Inspect and reinforce coastal defenses such as sea walls, levees and barriers



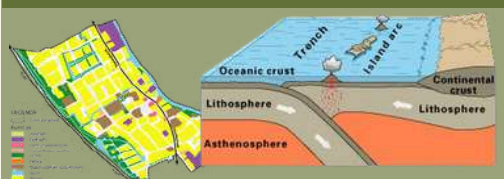
#### RESOURCE ALLOCATION

Ensure resources such as sandbags, emergency shelters and first aid supplies are readily available



#### EVACUATION PLANS

Develop and communicate clear evacuation routes and procedures.



#### ZONING REGULATIONS

Enforce zoning laws to prevent construction in high-risk coastal areas.

### DURING



#### REAL-TIME UPDATES

Activate early warning systems to alert communities and provide real-time information on flood progression.



#### EVACUATION PLANS

Execute evacuation plans to move residents to safety



#### RESCUE OPERATIONS

Deploy swift-water rescue teams equipped to assist stranded individuals and animals.



#### TRAFFIC MANAGEMENT

Manage traffic to facilitate smooth evacuation and emergency response



#### EVACUATION SUPPORT

Assist with the evacuation of residents from high-risk areas.

### POST



#### DAMAGE ASSESSMENT

Conduct rapid assessments of infrastructure damage and affected areas to prioritize recovery efforts.



#### RELIEF ASSISTANCE

Provide immediate relief and assistance to affected individuals.



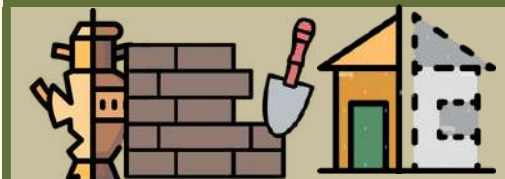
#### HEALTH AND SANITATION

Provide medical aid, clean water and sanitation to prevent disease after floods.



#### FLOOD RISK REDUCTION

Long-term measures such as improved drainage systems and land use planning revisions.



#### REHABILITATION & RECONSTRUCTION

Restore infrastructure and rebuild homes promptly.



# BE PREPARED FOR COSTAL FLOODING



## ACTIONS BY COMMUNITY AND INDIVIDUALS

### PRE



#### STAY INFORMED

Stay informed about weather forecasts and flood alerts.



#### PREPARE AN EMERGENCY KIT

Prepare an emergency kit with essentials like food, water, medications, and documents.



#### KNOW EVACUATION ROUTES

Know the evacuation routes and evaluation plan



#### EARLY WARNING SYSTEMS

Establish and maintain early warning systems to alert residents of potential floods.



#### CONDUCT DRILLS

Conduct drills and exercises to practice evacuation procedures.

### DURING



#### EVACUATE TO HIGHER GROUND

Evacuate to higher ground immediately if advised by authorities.



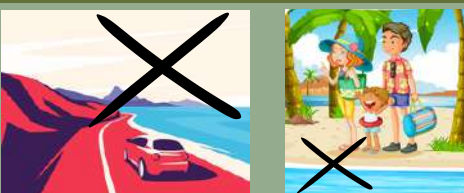
#### AVOID FLOOD WATERS

Avoid walking or driving through floodwaters; they may be deeper or faster-flowing than they appear.



#### FOLLOW INSTRUCTIONS

Follow instructions from emergency services and local authorities



#### AVOID DRIVING ON COASTAL ROADS

Do not drive through flooded areas or on coastal roads or visit beaches in flood season.



#### TURN OFF UTILITIES

If safe to do so, turn off gas, electricity, and water to prevent damage or hazards.

### POST



#### ASSESS DAMAGE TO PROPERTY

Assess damage to property and prioritize safety during cleanup efforts.



#### SEEK MEDICAL ATTENTION

Seek medical attention for injuries or illnesses related to the flood.



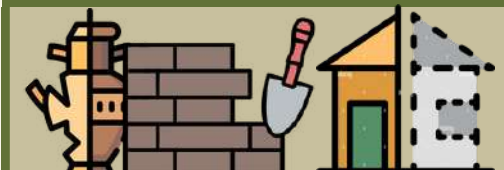
#### ORGANIZE COMMUNITY CLEANUP

Organize community cleanup efforts to remove debris and restore infrastructure.



#### PROVIDE SUPPORT SERVICES

Provide support services such as counselling and relief assistance to affected individuals and families.



#### FLOOD MITIGATION MEASURES

Implement long-term flood mitigation measures like improving drainage systems and resilience.