



**GOVERNMENT OF PAKISTAN
PRIME MINISTER'S OFFICE
NATIONAL DISASTER MANAGEMENT AUTHORITY
ISLAMABAD**



Subject: **Monsoon Infrastructure Advisory – Pre-disaster Phase**

1. **In 2022, Pakistan experienced devastating flood events** that caused widespread destruction across the country, with Gilgit-Baltistan (GB) also facing notable impacts. Although the region experienced fewer damages in terms of numbers compared to other provinces, the floods still caused severe disruptions in the mountainous terrain of GB. **A total of 1,793 houses were damaged**, displacing many families and exposing the region's vulnerability to climate-induced disasters. **Additionally, 33 kilometers of roads and 61 bridges were either disrupted, damaged or destroyed**, cutting off access to remote valleys and hampering relief and rescue operations. The situation was worsened by flash floods and Glacial Lake Outburst Floods (GLOFs) in districts such as Ghizer, Hunza, Skardu and Diamer, which are highly prone to such hazards due to rapidly melting glaciers and unstable slopes. The 2022 flood event underscored the fragility of GB's infrastructure and emphasized the **urgent need for climate-resilient development, early warning systems and targeted mitigation strategies in ahead of the monsoon 2025 season.**

2. **According to NDMA's assessment and projections, near normal to slightly above-normal monsoon activity is expected in Gilgit-Baltistan (GB) from July to September 2025**, significantly increasing the risk of flood-related hazards across the region. The threat is particularly heightened due to Glacial Lake Outburst Floods (GLOFs), as rising temperatures and intensified rainfall accelerate glacier

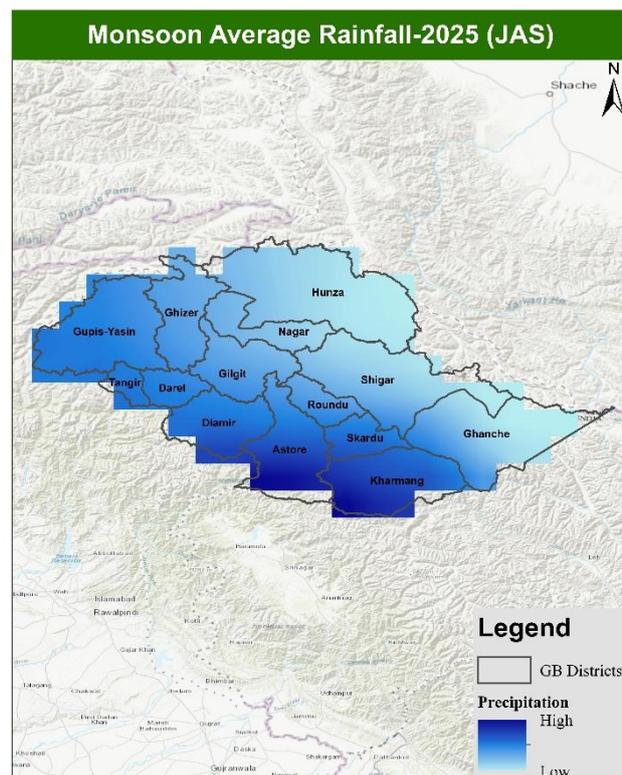


Figure 1: Monsoon 2025 Average Rainfall Projection (NEOC, NDMA)

melt and the formation of unstable glacial lakes. **Mountainous districts such as Ghizer, Hunza, Skardu, Diamer and Ghanche are especially vulnerable, where sudden outbursts can lead to catastrophic flash floods, landslides, and riverbank erosion, endangering communities, infrastructure and critical road links like the Karakoram Highway.** The region's challenging terrain, sparse connectivity, and limited emergency response access further complicate disaster response efforts. These anticipated conditions underscore the urgent need for proactive preparedness, early warning systems, and climate-resilient infrastructure to protect lives, livelihoods, and connectivity in Gilgit-Baltistan. Figure 1 shows the **vulnerable districts that are expected to be affected during the monsoon season.**

3. To enhance resilience against future flood events, **it is strongly recommended that concerned departments should initiate Infrastructure in the vulnerable districts of GB as highlighted in Fig. 1.** These audits should focus on identifying structural deficiencies in public buildings, especially those constructed by using poor quality of materials, unreinforced masonry, or poorly maintained structures. **The findings of these audits will serve as a foundation for retrofitting and reinforcement measures, enabling targeted investments to strengthen key infrastructure ahead of the monsoon season.** By prioritizing retrofitting in schools, hospitals and government offices, the risk of structural collapse and loss of life during flooding events can be significantly reduced.

4. In the light of expected situation, **the following actions are to be ensured for Residential and Public Buildings** by all concerned Federal Ministries, Provincial Ministries / Departments, respective Local Government and their line departments:

- a. GBDMA and District Administrations to undertake proactive monitoring to identify the Kacha houses (Mud Houses) in their districts and the estimated residents. These structures are expected to be damaged during the flooding. Shelter provision will be required for people occupying such structures.
- b. Elevate the plinth of adobe houses with flood-resistant materials (brick or RCC fill) and reinforce roofs with bracing or metal/wooden trusses to prevent damage from rain.

- c. Apply waterproof coatings, such as bituminous or lime-cement plaster, to the external walls and flood-resistant coatings or sealants to the lower portions of the walls up to a height of 1.5 meters.
- d. Place sandbags around the outer boundary of houses to act as a temporary barrier. This helps stop floodwater from reaching the building and protects the foundation and lower walls as well.
- e. Strengthen the riverbanks using protective methods such as retaining walls, riprap and geotextile reinforcement to stop them from breaching.
- f. Incorporate rainwater harvesting systems in public and residential buildings such as rooftop collection with storage tanks to reduce surface runoff and manage excess rainwater effectively during flood events.
- g. Retrofit public buildings such as schools, hospitals and offices for flood resilience by reinforcing structural elements with steel or concrete. Apply waterproof coatings, elevating critical utilities / equipment and strengthening roof structures.
- h. Elevate wooden houses on concrete or stone foundations to prevent contact with floodwater and moisture, which can weaken the structure.
- i. Apply water-resistant wood coatings or sealants to external timber surfaces to prevent rotting and warping due to prolonged moisture exposure.
- j. Install cross-bracing in timber walls to enhance structural rigidity and resistance to lateral flood forces.
- k. Ensure that roof trusses and joints in timber homes are tightly secured using galvanized fasteners or metal connectors to resist wind uplift and water pressure.

5. **The following actions are to be ensured for Communication Infrastructure** by all concerned Federal Ministries, Provincial Ministries / Departments, respective Local Governments and their line departments:

- a. Conduct thorough inspections and strengthen vulnerable road sections, bridges and drainage systems before the monsoon season, particularly in high-risk valleys such as Hunza, Ghizer and Skardu.
- b. Ensure that drainage systems are free of debris and functioning properly to prevent water accumulation on roads.
- c. Establish rapid response teams equipped to handle road and bridge repairs during and after floods.

- d. Construct the emergency access tracks or bypass routes particularly in high-risk areas where the roads have higher probability of being washed away or blocked.
- e. Ensure the development of SOPs and contingency plans for re-routing the traffic in the event of road closures.
- f. Install scour protection (such as gabions, riprap, reinforced concrete aprons) at the vulnerable bridge piers and abutments to reduce erosion during high flows. Moreover, retrofitting piers and abutments with RCC jackets or erosion-resistant materials is recommended.
- g. Retrofit and anchor bridge decks to prevent displacement due to high water velocities.
- h. Protect roads in the vulnerable hilly areas of GB from landslides, especially in regions like Gilgit, Nagar and Skardu, it is recommended to implement slope stabilization measures such as constructing retaining walls, rockfall barriers, gabion structures and check dams, along with improving drainage systems through the development of catch drains to mitigate the impact of heavy rainfall.
- i. Install proper slope drainage systems to reduce water infiltration and soil saturation on unstable slopes.
- j. All administrative authorities to ensure the cleaning of cross-drainage structures such as culverts, gutters, road drains and manholes to avoid choking and reduce surface runoff.
- k. Construct drainage channels or siphoning systems to reduce the water level in glacial lakes and prevent sudden breaching.

6. **The following actions are to be ensured for Industrial Infrastructure** by all concerned Federal Ministries, Provincial Ministries / Departments, respective Local Governments and their line departments:

- a. Establish clear evacuation routes and protocols for all employees.
- b. Ensure that all drainage systems are clear of debris and fully operational to prevent water-logging.
- c. Elevate critical machinery and electrical installations above potential flood levels and waterproof essential equipment.
- d. Set up reliable communication systems to receive real-time flood alerts from NDMA and other meteorological agencies.

- e. Ensure the digitization and backup of critical operational records, drawings, client related data and other important documents off-site or on secure cloud platforms.
 - f. Establish direct lines of communication with local disaster management authorities and emergency services.
 - g. Secure hazardous waste and chemicals to prevent contamination during floods.
 - h. In case of fire incidents caused by short-circuits during flooding, install automatic circuit breakers and fire extinguishers at key locations and train staff in using firefighting equipment and safe electrical shutdown procedures.
 - i. Conduct a structural integrity assessment of industrial buildings before the monsoon season to identify and retrofit weak points, ensuring the facility can withstand prolonged exposure to floodwaters and heavy rainfall.
 - j. The concerned departments are instructed to follow the flood alert advisories issued from time to time.
7. Forwarded for information / necessary action by all concerned, please.