

Sim Ex 1- 2023

Floods and Rains Emergencies



March, 2023

National Disaster Management Authority

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General

1. Pakistan is ***amongst the top ten countries which are most vulnerable to the climate change and adverse events, including natural and man-made disasters.***

Climate change / natural disasters have had a cumulative impact on the economy of the country besides causing significant losses to human lives and livelihood. Pakistan is already witnessing the impacts of climate change with increased frequency and intensity of extreme hydrometeorological disasters as was evident in last year's floods.

2. The ***National Simulation Exercise (Sim Ex) 2023 was conducted by the National Disaster Management Authority (NDMA) to enhance the response capacities and preparedness against rain emergencies and floods in Pakistan.*** The exercise was held from 14th to 16th March 2023, at Best Western Hotel Islamabad, and involved participants from various government departments and agencies, as well as international partners, donors, diplomatic cadre, media, and other stakeholders. The exercise was sponsored by the Ministry of Climate Change with NDMA responsible for its conduct.

3. **Objectives.** *To examine technical driven probabilistic recurrence of floods / rain emergencies in mid-year 2023, and enable preparedness plan at all tier of national, provincial and departments.*

a. **Mode**

(1) ***Narrative Impact-based Simulation*** developed by NUST (with assistance from SUPARCO, PMD, Survey of Pakistan etc) will be presented for syndicates' appraisal in advance for consideration and preparation of response.

(2) Syndicates composed of provincial representatives, PDMAs, PIDs, Rescue Agencies and Regional Universities etc would ponder upon the emerging threat spectrum and figure out following: -

(a) Local areas / cities / affected high sensitive areas.

(b) Hazards - Vulnerabilities & Risk.

(c) Anticipated damages / spread.

- (d) Support activities needed in all phases of rescue, relief, rehabilitation / relocation, reconstruction etc.
- (e) Logistics stocking from community to public domain.
- (f) Individual actions.
- (g) Mass communication.
- (h) Rehearsals
- (i) Plenary and feedbacks.
- (j) Syndicates presentations including recommendation, action plan, coordination, etc.
- (k) Comments / conclusions by mentors.

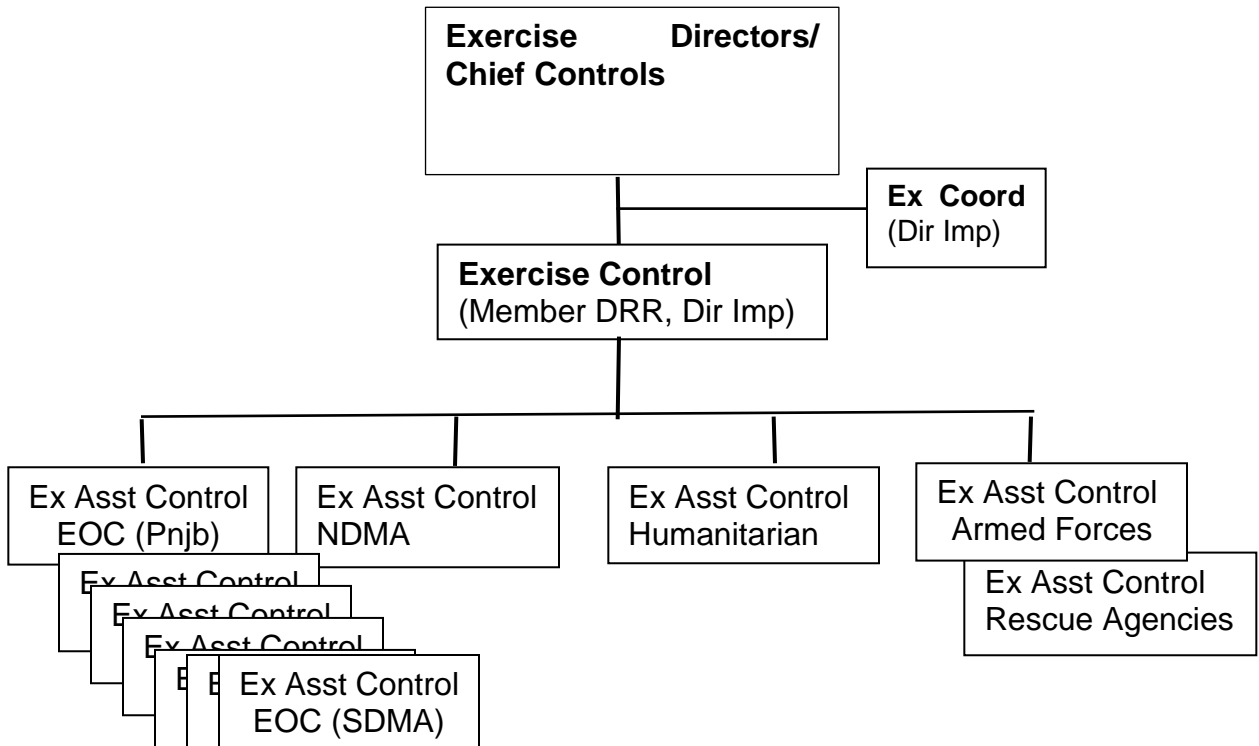
4. **Scope & Structure**

- a. The exercise was ***designed to enhance the preparedness at all tiers of the national, provincial, and district levels***. The participants were grouped into syndicates, while maintaining departmental entities, which assessed and planned responses against various scenarios related to floods and rain emergencies.
- b. A ***total of ten syndicates were formed***, including Balochistan, Khyber Pakhtunkha, Punjab, Sindh, GB, AJ&K, ICT, NDMA, Armed Forces, and Humanitarian Response Agencies, with varying numbers of officers in each. The exercise syndicates operated from cubicles depicted as respective HQs located centrally in the hall of the venue, and the remaining would function from their actual locations and connected through ZOOM.

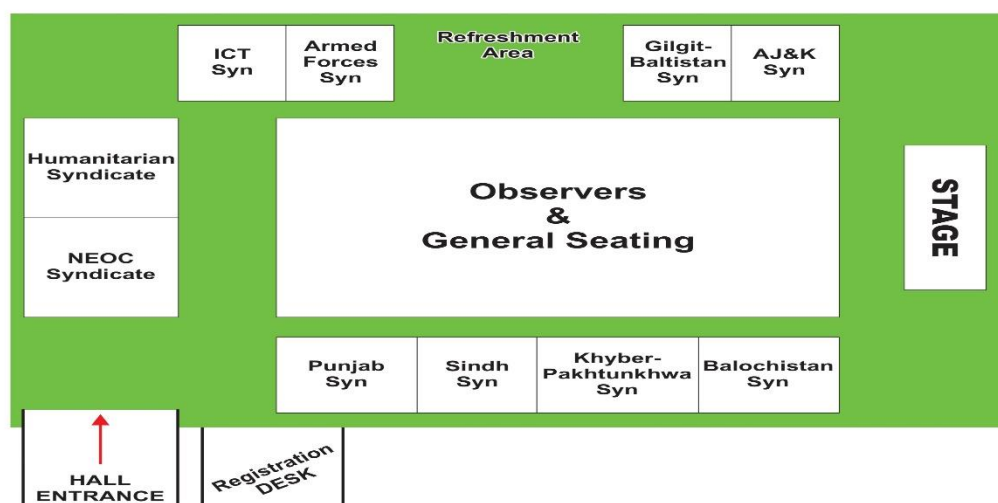
Ser	Syndicate	No of Officers in each Syndicate
(1)	Provincial Syndicates (7 including ICT)	Each Provincial Syn was comprised of 6 officers with following distribution:- PDMA (2), Provincial Irrigation Dept(1), Rescue 1122(1), Planning Dept (1), Health Dept (1)

(2)	NEOC (1)	NDMA (6), PMD (1), FFC (1), PCIW (1), NHA (1), Pak Railways (1), WAPDA (1), SUPARCO (1), GSP(1), IRSA (1), NEHS (1), PCRWR (1), Civil Def (1)
(3)	Armed Forces Syn (1)	JSHQ (1), Navy (2), Army (2), Air Force (2)
(4)	Humanitarian Agencies Syn (1)	UN: RC Office (1), OCHA (2), WFP (2) UNHCR(1), UNICEF (1), UNFPA (1), UNWOMEN (1), IOM (1), UNESCO(1), UNHABITAT (1), FAO(1) NGOs/INGOs: PRCS(1), PHF(1), NHN (1), Muslim Hands (1), WHH(1), Save theChildren (1), KORT (1), AL Khidmat (1), Islamic Relief (1), IRC (1), MSF(1), Concern Worldwide (1)

c. The **Exercise was controlled and managed by an Exercise Control**. The Chairman NDMA served as the Chief Control/Director of the Exercise, while the Member (DRR) and Director (Implementation) acted as Exercise Controls. Additionally, each syndicate was supported by dedicated Assistant Controls.



5. The syndicates operated from cubicles located in the venue hall, designed to function as their respective headquarters, while the others worked from their respective departments and connected via Zoom. Each syndicate was equipped with ample seating, computers containing reference materials, printers, internet and Zoom connections, whiteboards, and stationery. The reference material provided included maps, relevant publications, sitrep format, resource mapping, presentation format, and other details that facilitated planning. The layout of the syndicates was as under:-



Expected Outcomes

6. Expected outcome of the SIMEX as envisioned were:-
- a. The ***exercise will improve coordination and communication between different stakeholders involved in emergency response and preparedness, including government agencies, humanitarian organizations, and other actors.*** This has ensured that information is shared quickly and efficiently, and everyone is on the same page.
 - b. As a result of the exercise, ***bottlenecks and inefficiencies in emergency response procedures were identified and streamlined, leading to a more efficient and effective response in future emergencies.***

- c. The ***roles and responsibilities of different stakeholders in emergency response have been clarified*** as a result of the exercise, including those of government agencies, humanitarian organizations, and other actors.
- d. The ***exercise has identified gaps or weaknesses in emergency response preparedness, both at the national and provincial levels, and recommended follow-up actions to address them***. This has helped to ensure that the response is more effective in the future.
- e. The national and provincial contingency and response plans will be validated based on SIMEX exercise, ensuring that they are effective in responding to emergencies. This will help to ensure that the response is well-coordinated and efficient.

7. The ***Exercise was scenario-based, featuring floods and rain emergencies scenarios to be played at various locations. Written situations were issued with requirements appended***. The exercise began with a Master Scenario, followed by situations/narratives with appropriate time jumps at different levels. Participants responded to the requirements as a syndicate after careful consideration and planning, and presented their responses to the Exercise Control.

8. The ***disaster situations that were played included Glacial lake outburst floods (GLOF), riverine/rain-induced flooding leading to urban flooding in some cities, overflow/breach of lakes, etc., in some areas with ensuing issues, as well as dam management SOPs, integrated response, camp siting and management, and international relief operations***. The requirements included ***assessment of the situation at different levels, identification of courses of action available and adopted at different levels, coordination measures at all levels, practicing of SOPs, identification of gaps and needs, and clarification of processes, roles, and responsibilities of different stakeholders. Media briefings were also included***. The Exercise ended with a debriefing session in which the nominated syndicates debriefed on the Exercise, allowing participants to reflect on their strengths, weaknesses, and lessons learned.

Exercise Limitations

9. The scope of the simulation exercise was limited to a few key scenarios and disasters due to time and resource constraints: -
- a. Scope of the SIMEX was limited to few key scenarios and disasters, with main focus on hydrometeorological disasters.
 - b. Only relevant federal and provincial stakeholders were invited as participants in limited number owing space constraints.
 - c. Exercise was set during the current monsoon season and chiefly pertained to related scenarios, to avoid extended time jumps.
 - d. SIMEX tested existing response mechanism. There were deviations from real-time (actual) response due to time constraints and depicted ground situation.

National Level Simulation Exercise Conduct

Inaugural Session

10. The inaugural session of the National Simulation Exercise 2023 commenced with recitation of Holy Quran. Minister for Climate Change Ms. Sherry Rehman, Chairman NDMA Lieutenant General Inam Haider Malik, HI (M), and Country Director WFP Mr. Chris Kaye (on behalf of UN RC), delivered their remarks.

11. During his ***inaugural speech, Chairman NDMA emphasized that the simulation exercises were a crucial part of NDMA's preparedness and response system, which would be replicated at the provincial and district levels. He stressed the importance of being vigilant and prepared for emergencies, and how proactive measures could improve overall resilience and the ability to cope with natural disasters.***



12. The **Chief Guest, Minister for Climate Change Ms. Sherry Rehman, called for a 'whole of Pakistan' approach leading to sustainable development for people and recovery in the aftermath of Floods 2022. She praised the efforts of NDMA's relief operations during Floods 2022 and other emergencies, and emphasized the importance of collaboration across government agencies, humanitarian organizations, civil society, and the private sector for disaster mitigation and building a well-prepared & resilient Pakistan.**



13. The **Country Director of WFP, Mr Chris Kaye also commended the efforts and stressed the need for a proactive approach to Disaster Management, particularly in light of the escalating climate change impacts and the growing frequency and intensity of extreme weather events.** The Country Head also reiterated WFP's commitment to supporting the government and other stakeholders in enhancing their disaster response capacities and building resilience against future disasters.



14. Mr. Raza Iqbal, Director Implementation and Sponsor Director of the Sim Ex, briefed participants on the exercise's conduct modalities to familiarize them with the setting and subsequent proceedings of the Exercise.



15. During the proceedings, the representative from National University of Science and Technology (NUST) provided a detailed presentation on analysis of the inundation pattern of the 2022 flood, using advanced hydrological modeling techniques.

Scenarios & Simulation Exercise

Day 1 - Proceedings

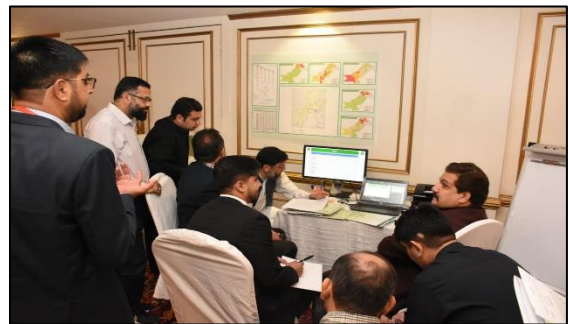
16. At the beginning of the simulation exercise, the syndicates were given a master scenario that provided an overview of the situation and established the context for subsequent scenarios. The purpose of the master scenario was to ensure that all participants had a comprehensive understanding of the environment in which the simulation would take place. The ***Master Scenario outlined the likelihood of facing precipitation generated flash flooding, urban flooding, and heatwaves in the coming years.*** Therefore, all stakeholders need to be prepared to face these challenges in a comprehensive manner. The ***lessons learned from the 2022 floods were also highlighted, emphasizing the need to address issues related to forecasted and actual rainfall, distribution of Flood Fighting Equipment, blockage of drainage system, shortage of de-watering pumps and inefficient sewerage disposal system in major metropolis.***

17. After the issuance of the master scenario, the opening situation was presented, which required all syndicates to take preparatory and coordination measures based on the seasonal forecast and experiences of the previous year. ***The stakeholders were also required to be vigilant to face any situation that could lead to a multi-hazard situation.*** They were asked to identify vulnerable areas, anticipated damages and spread, vulnerable populations, hazards and likely scenarios, and provided detailed resource mapping. They were required to list the preparatory measures undertaken, such as logistic stocking, selecting camp sites, and procedures for evacuations, early warning, mass communication, rehearsals, and support envisaged. ***In addition, the syndicates were to outline the coordination measures required to be undertaken to ensure effective inter-departmental collaboration.***

18. Afterwards, the First Situation 1(a) was issued to the Syndicates of GB, NDMA, Armed Forces, and Humanitarian Community, which reported an unprecedented rise in temperatures for the last two weeks causing the Shishper glacier situated in Western Karakorum at Hassanabad, Hunza, to melt leading to landslide debris and floods that caused damages downstream. The GBDMA, NDMA and Armed Forces syndicate were required to assess the situation and plan to deal with the challenges.



19. The Situation 1(b) was issued to syndicates of KP, GB, AJK, NDMA, and the Armed Forces. ***The situation highlighted a daunting challenge during the heavy rainfall across the north-western parts of the country, resulting in flash floods in secondary rivers and hill torrents. The Munda Headworks had been breached at Charsada, leading to floods in areas of Swat, Charsada, Nowshera, and adjoining areas. The floods caused extensive damage to populated areas, cropped area, public and private infrastructure. Landslides were reported in areas of district Kohistan and Shangla, damaging the Karakoram Highway (KKH) at several places.*** Tourists' vehicles were stranded between Kohistan and Dasso



on the Karakoram Highway, and some of these tourists were reportedly sick without any food and water. Moreover, District Neelum and Muzaffarabad, AJK, also received heavy downpour, leading to flash floods, landslides/mud flows, resulting in casualties

and damage to houses. Road S 2 (Kohala to Muzaffarabad) was blocked at two points, stranding vehicles with passengers onboard.

Day 2 - Proceedings

20. Day 2 of the simulation exercise started with the issuance of the Situation-2. ***The situation highlighted heavy rainfall in the catchment areas of the Eastern Rivers, causing high flows at River Chenab and River Jhelum. Heavy rains downstream Mangla resulted in flooding in Jhelum, Gujrat, Sialkot, and Mandi Bahuddin with requirements.*** The situation was exacerbated by heavy rainfall in Margalla Hills and southwestern Punjab, causing urban flooding and hill torrents that destroyed hundreds of houses, livestock, and crops. In addition, flooding situation also developed in E 11 and surrounding areas in Islamabad.



21. The ***Situation 3 was issued to syndicates of Balochistan, Sindh, NEOC, Armed Forces and Humanitarian Community. The situation highlighted flooding in Sindh and Balochistan caused by heavy rainfall.*** The floods damaged infrastructure and displaced people, adding to the difficulties faced by those already affected by last year's floods. ***Manchar Lake was dangerously full, with a breach causing the evacuation of 50,000 people. Rescue teams need to be deployed to evacuate those at risk.*** Flooding caused damage to agriculture, housing, and community infrastructure, with people and livestock trapped. Electricity and utility services have failed, causing loss of life and contaminated drinking water. The focus of rescue and relief efforts needs to shift from north to south.



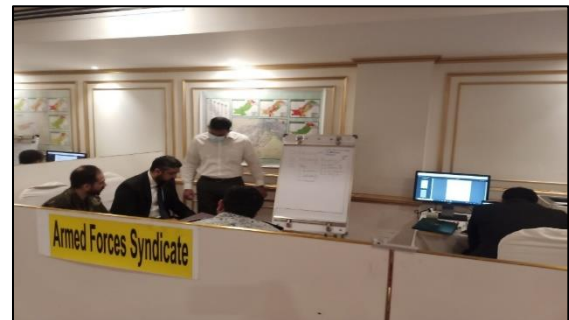
Day 3 Proceedings

22. The Last Day of SIMEX started with issuance of Situation 4 ***which portrayed a multi-faceted disaster in Pakistan requiring external assistance due to the floods of 2022.***

The resources were already stretched thin due to the response against the current flood situation, which was also underway. The ***Government of Pakistan launched the Flash Appeal in collaboration with UN, and some friendly countries quickly mobilized resources, and relief assistance started pouring in.***



23. Finally closing situation was released, which highlighted the need for implementable, out of the box, and cost-effective solutions for a cash-strapped and recession-hit Pakistan reeling from the floods of 2022. Valuable experiences were gained by all stakeholders from the multitude of disasters, and efforts were made to shore up the lessons learned and accrue practical and implementable knowledge from them.



Closing Session

24. The ***Closing Session of the SIMEX 2023 was graced by the Minister for Climate Change, Ms. Sherry Rehman, the Chairman of the National Disaster Management Authority (NDMA), Lt. General Inam Haider Malik HI (M), and the United Nations Resident Coordinator/Humanitarian Coordinator, Julien Harneis.***

25. Minister for Climate Change, ***Ms. Sherry Rehman praised the level of participation during the simulation exercise and commended the efforts of the NDMA for organizing such an event. She highlighted the importance of community-level preparedness following the devastating floods of 2022.*** She underscored that it is a critical time for us to prepare ourselves for the future by learning from the experience

of recent floods. She also indicated the need for conduct of similar simulation exercises for forest fires and other hazards.

26. ***The session began with a quick recap of the past three days, given by Mr. Raza Iqbal, Director Implementation of the NDMA and the sponsor director of SIMEX 2023. The Recap session was followed by a short fly-through simulation of the flood of 2022, developed by the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO). The Chairman of the NDMA, explained the erratic behavior of the flood of 2022, which was the result of heavy downpours that resulted in torrential flooding. It was highlighted that last year's flood was different from the traditional monsoon-induced riverine flooding that follows the alignment of the Indus River and its tributaries running from north to south. The fly-through simulation of the flood of 2022 further illustrated the devastating impact of the floods in Pakistan.***



27. The United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) team then presented the lessons learned from the response to the flood of 2022. Efforts were made to shore up the lessons learned and accrue practical and implementable knowledge from them

28. ***During Closing Session, Mr. Julien Harneis, the UN Resident Coordinator /Humanitarian Coordinator, expressed his appreciation regarding the simulation exercise. He acknowledged the importance of such exercises to prepare for future emergencies and disasters. Mr. Harneis also shared his experience and highlighted the crucial role played by humanitarian agencies in responding to floods 2022.*** Moreover, he appreciated the National Disaster Management Authority (NDMA) for organizing the simulation exercise, which allowed different agencies to collaborate and enhance their preparedness and response to flood and rain emergencies. Mr. Harneis

emphasized the significance of strengthening partnerships among stakeholders to ensure effective and timely response during emergencies.

29. The ***simulation exercise culminated in the debriefing by the syndicates***. The main points of the sessions are summarized in the following section as key outcomes and recommendations. The ceremony concluded with the distribution of certificates.

Key Outcomes & Lessons Learnt

30. The simulation exercise culminated in the debriefing by the syndicates during the closing session. Each syndicate made a brief presentation on the lessons learned and challenges identified during the proceedings of the simulation exercise. Key outcomes are summarized below:

- a. One of the critical takeaways from the exercise is ***the imperative need for disaster preparedness, which entails the development of early warning systems, contingency planning, and the availability of radar and remote sensing platforms for monitoring water levels in eastern rivers. Additionally, enhanced coordination, augmented national preparedness*** through the provision of multi-hazard specific risk maps, the construction of resilient infrastructure capable of withstanding extreme weather events, the provision of flood fighting equipment and de-watering pumps to prevent and manage urban flooding are all crucial.
- b. The ***exercise presented a unique opportunity to assess the effectiveness emergency protocols, contingency plans, and flood response mechanisms***. It also facilitated an evaluation of response aptitude and analysis of the emerging situation for the purpose of effectual action.
- c. The ***exercise served to validate and enhance preparedness for all hazards and strengthen response plans, procedures, and systems***. Stakeholders were able to assimilate their roles in a disaster scenario and refine their emergency response skills.

- d. ***Access to precise hydrological data of eastern rivers during flood season is paramount.***
- e. The ***early warning system is critical in mitigating the impact of disasters.*** Therefore, the government should invest in enhancing the accuracy and coverage of the early warning system. This will enable communities to take necessary precautions and evacuate promptly.
- f. The ***government must prioritize climate change adaptation efforts, which could include measures such as implementing sustainable land use practices, constructing resilient infrastructure, and improving water management.***
- g. ***The government should invest in predictive modeling-based solutions that can accurately forecast the impact of disasters.*** Furthermore, the use of space-based solutions such as satellite imagery can aid in disaster management by providing real-time information on the affected areas.
- h. ***Effective disaster management necessitates coordination and cooperation among diverse stakeholders, including government agencies, NGOs, communities, and the private sector.***
- i. The ***exercise enabled continuous monitoring of changing situations to align response actions, identifying and correcting gaps, errors, and deficiencies, as well as determining strengths.***
- j. The ***availability of disaggregated data and access to National Socio-Economic Registry data*** is necessary to avoid duplication and ensure complementarities.
- k. The ***government response requires greater visibility and more robust coverage,*** necessitating the need for a ***thorough analysis of gaps and needs.***
- l. The ***transition from relief to early recovery, recovery, and reconstruction needs to be better comprehended, and it is imperative to understand the roles and challenges of different departments and institutions.***

- m. The ***importance of having a well-defined communication plan in place during a crisis situation cannot be overstated.*** Collaborative partnerships with internal and external stakeholders are critical in responding to a crisis situation.
- n. ***Accurate information is pivotal in making informed decisions.*** Similarly, regular drills are imperative for ensuring effective and up-to-date response plans while also promoting innovative ideas and out-of-the-box solutions.
- o. ***Early warning is indispensable, and impact-based forecasting*** is required, while awareness and recognition of potential hazards are essential.
- p. ***Proactive and timely stocking is crucial.*** The capacity to predict and forecast and enable preparation is necessary.
- q. ***Disaster-resilient developments, mitigation, preparedness, and rehabilitation are essential.*** Mass and grassroots-level awareness is needed to sensitize those at risk. Similarly, Community-based monitoring and response capacity need to be strengthened for effective disaster management.

Recommendations

31. The following recommendations have been identified based on the experiences and learnings of participants during a simulation exercise, aimed at improving Pakistan's response system and future disaster preparedness activities:

- a. It was agreed that ***similar simulation exercise should be a regular feature of the disaster preparedness efforts and replicated at the provincial and district level.*** Moreover, simulation exercises should also be conducted for other emergencies such as forest fires, heatwaves, and other prevailing disasters.
- b. The government should ***establish a provincial disaster management audit system to oversee and evaluate the disaster management***

- functions of provinces.** This system will ensure that each province is fully prepared for disasters and is taking necessary measures to mitigate risks.
- c. There is **a need for increased engagement with local communities for disaster preparedness and emergency response.**
 - d. There is a **need to transit from relief to early recovery, identifying needs, and developing recovery plans accordingly.** Monitoring and reporting of the situation for providing sectoral updates must be done through formulation of technical working groups and organizing regular working group meetings.
 - e. **Early warning, impact-based forecasting, awareness and recognition of likely hazards, proactive and timely stocking, disaster-resilient developments, and community-based monitoring and response capacity are essential components of disaster response efforts.**
 - f. **Sustainable infrastructure solutions, such as building flood walls, improving drainage systems, and constructing medium or large dams,** can help prevent future flooding.
 - g. **Government financial assistance and cash transfer programs, low-cost housing schemes, and social protection programs, can provide support to affected individuals and families.** Engaging donor and funding agencies and launching behavior change and awareness campaigns for climate change impacts can also be effective.
 - h. The **exercise highlighted the need for coordination and engagement of all key stakeholders to ensure effective implementation of solutions. Mapping existing stocks, human resources, and equipment, pre-identifying camp areas at elevated places, and improving the production side to fulfill the need for relief supplies are all critical components of disaster response efforts.** Separate routes for the supply of relief items, continuing school education in camps and tent cities, and maintaining the supply of hygiene kits and the establishment of field hospitals to tackle health emergencies and public health outbreaks are also essential.

- i. ***Restoration of natural waterways, free from all encroachments, timely start of rescue and relief assistance in targeted and vulnerable districts, and the enhancement of the capacity of LBOD and allied drains are also critical components of effective disaster response.***
- j. ***Increased engagement with media is required to apprise them on responsible reporting during emergency situations, while capacity building of relevant authorities is also required on effectively engaging with media.***
- k. As part of national response, hazard specific anticipatory actions may be identified and implemented.
- l. Some area specific recommendations accrued from the discussion during the Sim Ex are: -
 - (1) ***Major weakness felt during riverine flooding was lack of AWS-EWS and river gauges in upper areas of KP for gauging of accurate rainfall and waterflow.***
 - (2) ***Enhancing the service capacity of Rescue 1122 in Upper KP (Shangla / Kohistan) needs to be undertaken for a timely and affective response.***
 - (3) ***During recent floods, some of the bridges in GB and KP collapsed/ got washed away due to extensive pressure exerted by flash floods. These bridges need to be restored as soon as possible with abutments which can withstand the impact of flood water.***
 - (4) The ***construction of zamindara bunds in Rajanpur hindered the free flow drainage of hill torrent waters into River Indus***, subsequently large areas of Rajanpur remained inundated while Local Administration was forced to negotiate the breaching of bunds.
 - (5) The ***lack of EWS for Hill Torrents of DG Khan and Rajanpur remains a significant hindrance to effective response.***

- (6) **Major gaps in PMD observational stations, AWS and radar coverage continues to prevent effective forecasting and early warning.**
- (7) **In Sibi and Naseerabad Divisions, the flood water caused considerable damage to road as well as railway infrastructure. Balochistan was isolated from rest of the country for a fairly long period of time, thus necessitating planning/ construction of alternate road and/or railway link.**
- (8) The matter related to **severe bottleneck at LBOD/ RBOD for effective drainage of water needs addressal.** The drainage system especially at RBOD side needs to be supplemented.
- (9) There is a **need to build capacity of Provincial Irrigation Departments in terms of earth moving machinery and plugging material for plugging of breaches in minimum possible time.**
- (10) **Manchar lake bund's capacity to sustain high volume of pressure needs to be enhanced. Options to ascertain escape spillway directly to River Indus from Manchar need to be worked out.**
- (11) **Dredging of drainage system in Islamabad to avoid repeat of E 11 situation is a necessity.** Similarly, **all reservoirs need to be desilted for preservation of the structure itself**, for restoring the storage capacity and enhancing flood storage/ mitigation capacity.