National Disaster Management Authority

National Seminar

# Disaster Resilient Infrastructure

Infrastructure Advisory & Project Development Wing

# Chairman's Address


Lt. Gen Inam Haider Malik HI(M)

As we strive to strengthen Pakistan's resilience, the importance of disaster-resilient infrastructure cannot be overstated. This endeavor demands proactive, multi-stakeholder collaboration, engaging government institutions, private sector, academia and humanitarian organizations. Also, by integrating global best practices, sustainable engineering solutions, and advanced technologies into our infrastructure projects, we lay the foundation for a safer and more resilient future. Furthermore, it is essential to develop and enforce comprehensive disaster-resilient bylaws and policies that guide our actions. Equally crucial is enhancing early-warning systems and raising public awareness, particularly in disaster-prone areas, to ensure preparedness at every level of society.

# Context

IA&PD wing of NDMA Pakistan organized the 1st National Seminar on Disaster Resilient Infrastructure in Bahria University on 23rd September 2024 to foster a dialogue towards disaster-resilient Pakistan through proactive disaster management approaches specifically addressing quality of vulnerable infrastructure in domains of residential, industrial and communication network.

This seminar focused on need to predict, mitigate and adapt to climate change, emphasizing a shift from reactive responses to proactive strategies for enhancing infrastructure resilience.

Organizing Wing

# Infrastructure Advisory & Project Development

The overall objectives are to develop innovative and sustainable solutions, leveraging cutting edge technologies and collaborative expertise to address disaster affected community challenges and empower positive change for individuals and affected communities.

In addition to this, the wing focuses on assessment of existing infrastructure for vulnerabilities to natural disasters and developing standards for resilient projects that incorporate best practices in disaster risk reduction. It also collaborates with stakeholders to prioritize needs and allocate resources effectively, while providing technical expertise to project teams. Coordinate with government agencies, NGOs and partners to promote knowledge sharing and capacity building for infrastructure resilience.

# Environment

- Pakistan is ranked as 5th most affected country vulnerable to climate change globally (UNDP-2024)
- Growing unpredictability of extreme weather events, seismic activities and other environmental hazards place communities, economies, and infrastructure at severe risk.
- Disaster resilience in infrastructure has become a paramount concern due to increasing frequency and intensity of natural disasters.
- Pakistan faces heightened urbanization, unplanned development and aging infrastructure with little or no maintenance regime.
- Massive shift is warranted to integrate disaster resilience into infrastructure methods and materials selection leading to optimized balance of efficiency & risk evasion.

# Participants

| Category | Name | Organization |
|---|---|---|
| Infrastructure Development Expert | Dr. Muhammad Amjad | MCE Risalpur |
| | Brig Dr. Adeel Zafar | |
| | Col Dr. Arif | Housing Directorate |
| | Dr. Irfan Rana | National University of Science and Technology (NUST) Isb |
| | Dr. Azam | |
| | Asad Mahmood | Enercon |
| | Dr. Zain Saeed | NDMA |
| | Tahir Shamshad | Ex MD NESPAK |
| | Dr. Shafqat Ahmad | Sustainable Development Policy Institute (SDPI) |
| Military | Rear Adm Arshad Javed | Pro Rector Bahria Uni |
| | Brig Muhammad Taimur Ashraf | (Comdt - MCE) |
| | Brig Aqeel | E in C Br |
| | Brig Asad | Engr Dte |
| | Air Cdre Raza Noor | DW&CE PAF |
| | Col Adnan | GHQ |
| | Col Bilal and Maj Jawad | E in C Br |
| Government Departments | Abdul Malik | Addl Sect. Ministry of Railways |
| | Masood ur Rehman | DG SDMA AJK |
| | Dr. Qaiser Khan | DG PDMA KP |
| Academia | Students & Faculty | Bahria University |
| | | Pakistan Institute of Engineering & Applied Sciences (PIEAS) |
| | | University of Engineering and Technology (U.E.T) |
| | | Institute of Space Technology (IST) |

Session 1 – Highlights

# Climate Change Impacts & Infrastructure Resilience Needs

Resilient infrastructure is essential to tackle challenges from climate change, aging systems, and resource constraints. System-wide strategies, aligned with the SDGs, emphasize innovations like Building Information Modelling (BIM) to boost resilience. Pakistan, vulnerable to earthquakes and climate disasters such as floods, requires urgent reform. Past damage from poor building materials highlights the need for enforcing codes and retrofitting. Sustainable solutions like Interlocking Compressed Earth Blocks (ICEB) offer promise. Globally, climate change impacts emphasize the need for better urban planning, disaster management and water practices, making investment, policy reform and early warning systems crucial.

Session 2 - Highlights

# Recommendations for Infrastructure Resilience Against Disasters in Pakistan

The discussions focused on climate change, urban resilience, and disaster risk reduction, highlighting green infrastructure and nature-based solutions. Urban planning's role in risk assessment and adaptive designs was emphasized, along with academia's contributions like AI-based modeling and disaster-specific infrastructure. Case studies on lightweight concrete and urban flood management practices like permeable pavements and flood sensors were discussed. Smart city planning, data-driven technologies and community engagement were seen as key to resilience. Local Adaptation Plans of Action (LAPA) were also noted for integrating climate resilience into national planning, stressing the need for political commitment and sustainable funding.

# Way Forward

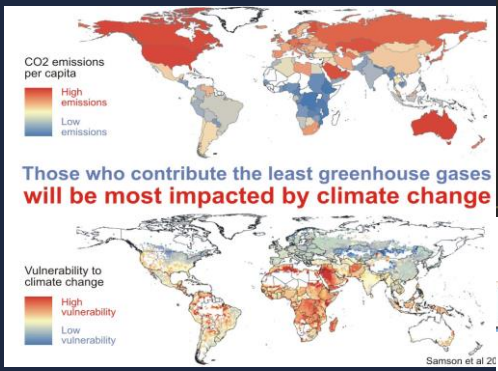
1. This Seminar brought together the subjects experts, policymakers, engineers and stakeholders to discuss following :-
    - Innovative solutions for stronger yet economical designs and features.
    - Global best practices for retrofitting & restorations.
    - Policies required for building infrastructure which can impacts of natural disasters and retain ability of quick recovery.
2. It emphasized necessity of all inclusive and multi-stakeholder approach to foster collaboration between:-
    - Government entities.
    - Private sector.
    - Construction material industry.
    - Architects groups.
    - Academia.
    - Military infrastructure developers.
    - Rural area development organizations.
    - Urban infrastructure development experts.
    - Corporate partners from international business.

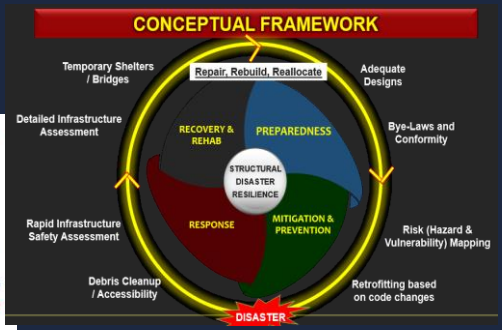
# Way Forward

3. Seminar provided an essential platform to discuss current challenges, future opportunities, and doable strategic steps needed to safeguard infrastructure and communities from future disasters.
4. There is a rising demand and expectations from global community from Pakistan to strengthen its infrastructural sustainability and resilience.
5. All nations prioritize disaster resilience, Pakistan must adopt innovative strategies and best practices to safeguard its critical infrastructure and ensure sustainable development.
6. Pre-emptive infrastructure strengthening necessitates
    - Retrofitting of precarious existing assets.
    - Integration of reinforcing measures into all new construction.
    - Continuing improved rehabilitation systems – to reduce losses in potential disasters scenarios.
    - By prioritizing these enhancements, Pakistan can establish a robust and resilient infrastructural framework that effectively mitigates impacts of future disasters and advancing sustainable development.

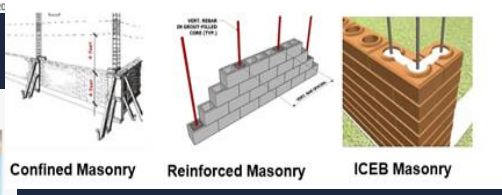
Presentation

# Spotlights



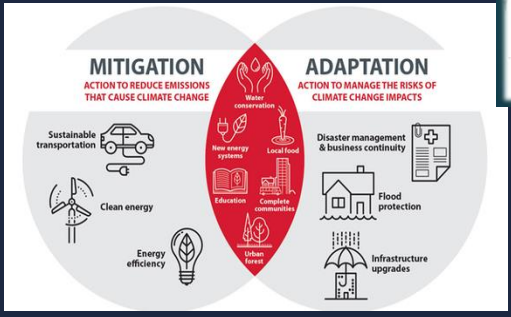




## BACKGROUND: Proposed Block Masonry




## Emerging Technologies


## Lessons/ Recommendations for Pakistan

National Disaster Management Authority – Pakistan

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