

## Disaster Risk Reduction and Sustainable Housing Strategies in Pakistan

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### Abstract

*The 20<sup>th</sup> century accounts for the safety of communities and human settlements in northern areas of Pakistan, Ministerial Working Group (MWG) of Ministry of Housing and Works (MOH&W) to generate Ministerial DRR based Housing Strategy. The systematic study focuses on six major objectives deducted from parallel guidelines from Hugo Framework of Action (HFA 2005-2015) as a standard and reference to the commitment made by 160 such countries. The data analysis has been conducted for these important objectives on individual basis: exploring Disaster Risk Reduction (DRR) based guidelines; secondly to find out guiding principles from local and global perspectives for planning standards; thirdly to identify DRR based guidelines for safe planning and architectural designing; fourthly making community Disaster Resilient; fifthly safeguarding our culture and structures in villages, towns, cities & regions and finally to establish hierarchy of DRR Units to safeguard housing schemes and projects through DRR strategies and experts. The research paper outlines the respective objectives and strategic approaches to Disaster Risk Reduction (DRR) and resilience within the broader frame to achieve safety for better life in the spectrums of social, economic cultural and environmental aspects within the commitments of HFA. Concrete actions taken at national and ministerial levels through National Engineering Services in Pakistan (NESPAK) and MOH&W have been appreciated but at the same time gaps are identified regarding Architectural and Urban Planning importance in the Earthquake Seismic Codes of Pakistan.*

**Key Words:** Disaster Resilient, Disaster Risk Reduction (DRR), Housing Strategy, Hugo Framework of Action, Human Settlement,

### Introduction

On 8<sup>th</sup> October 2005 Pakistan faced largest earthquake in Azad Kashmir and North-West Frontier. It ruined large areas at massive scales notably, 30,000 sq. km area in northern region. More than that it also caused more than 73,000 deaths, destroyed various levels of human settlements in terms of living shelters, homes, schools, hospitals and physical infrastructure on a large scale as indicated by National Disaster Management Authority (NDMA) in 2007 and various Reports by United Nations Development Program (UNDP)-NDMA records since 2010 (Muhgal H. Ahmed A. 2007). It is understood that regarding northern areas of Pakistan and Azad Kashmir in particular Pakistan has firm commitment regarding common promise of Hugo Framework of Action (HFA). Since the DRR based problems were

complex and technical therefore UNDP and NDMA jointly worked hard through Ministry of Housing and Works (MOH&W).

The services provided by UNDP and NDMA in collaboration with Ministerial Working Group (MWG) under MOH&W after the first decade of 21<sup>st</sup> century and onwards achieved a landmark for development of sustainable housing to affected areas in Pakistan. The issues were well identified through institutional frameworks for subsequent development of housing; to safe guard earthquake disasters using technical planning and architectural techniques in the light of HFA priorities and in a systematic manner. In addition to the lack of Ministerial DRR based Strategies for housing in Earthquake areas there was no proper hierarchy of DRR based Development Plans for redevelopment and sustaining socio-economic and cultural heritage in the respective affected land uses. Therefore following objectives have been formulated for addressing the lack of DRR based solutions for housing settlements in selected disaster hit areas of Pakistan.

### **Literature Review**

The sustainability corresponds to security of future generations and therefore close study of effects of disasters on young children living in earthquake hit areas of Pakistan is related here. The effects of earthquakes on human capital growth for children in the population of affected areas are found very extensive. The quantitative data analysis depict the link of the diversity in effects of earthquake on children with reference to connotation between wages, height and schooling , also the studied researches indicate that these deficits continue to adulthood, children in these age groups may face lifetime earning losses of 15% or more. This establishes a high end requirement of scheduling the disaster risk reduction strategies in housing of disaster prone areas in Pakistan (Andrabi & Daniels, 2005).

A heartening factual detail pertains to the record of plan that was asserted in a very speedy manner; for reconstruction in affected areas of earthquake 2005 ; achieved through institutional mechanism for establishing and implementing the policies for reconstruction. The preferences in these sets of policies regarded wellbeing of both communities as well as the assisting agencies within these areas (Andrabi & Daniels, 2005).

The sustainability drive is suggested as to Post-disaster Reconstruction as a result of continuing energies considered to bring life back to normal after occurrence of disaster. It also attributes to permanent facilitation to population through provision of services for quality enhancement of livelihood. Taking the international practices into account it is suggested that inclusion of international community for post disaster management makes the process productive and active. Henceforth qualitative tools such as Post-Disaster Needs Assessment (PDNA). This is made up of the Damage and Loss Assessment (DaLA) (which analyzes the damages caused by the disaster and the economic losses) and the Human Recovery Needs Assessment (HRNA) ; is also termed as a global standard. The 'Safe Homes, Stronger Communities: a Handbook for Reconstructing after Natural Disasters' prepared by GDFRR (2010)

Through rigorous literature review it is again validated that participation of local population is mandatory to secure sustainability and effective risk assessments.

Similarly the data collection on national level corresponds to monitoring standards for evaluation after the hike in rate of disasters. Local communities should participate in conducting assessments, setting objectives, and monitoring projects. Using reliable national data to establish monitoring baselines after the disaster increases the relevance of evaluations (Kreutner, & Kundermann, 2003).

The sustainability in procedural implementation of planning the communities should reflect the participation of local level organizations/ offices for reconstruction as well as post construction usage and maintenance. Vernacular and local techniques are the best solutions to produce a long term effectively of solutions (Erras, 2005).

The local communities were also ensured for their individual participation in reconstruction of houses so that their experience of being occupants of the damaged homes and settlements was utilized in defining remedies and solutions. An analytic review of report states that uniformity of policies as well as execution of financial grants was ensured through monitoring during rehabilitation period. Similarly restoration process was also strengthened to seismically acceptable standards.

Training of professionals was conducted in a very high number to practice indigenous expertise reviving vernacular information and thereby demonstrating construction practice in buildings and infrastructure to a level that it brought out a coordination between research of academia and construction industry of the country (Erras, 2005).

The role of Pakistan Engineering Congress is noteworthy in the regard of making MG programme effective in towns and cities of Pakistan with a goal to bring engineers, architects and town planners to build framework of mutual consent to work for sustainability in country (Islam, & Piracha, 2006).

## **Material and Methods**

Research methodology has been devised through the exploratory work done by MWG through MOH&W at end of first decade of 21<sup>st</sup> century and after that with the help of the “DRR based Ministerial Strategy” initially developed with specific 6 objectives. Secondly these objectives were reviewed and compared within the main objectives of HFA committed by Pakistan with other 160 nations of the world. A prolific preview of DRR based Guided Development Plans as established by UNDP and NDMA were also reviewed in a hierarchical manner. These development plans are of great significance regarding broader efforts of DRR safety and redevelopment in various human settlements. The vast gaps in the building codes of “Seismic Provision-2007” prepared by MOH&W with NESPAK enlisted in building code book have also been identified in this research.

The DRR based objectives as deduced from research above are enlisted below in table 1. In fact the Ministerial Strategy for DRR based Housing Policies in Pakistan also reflect the features of Objective-1 stated in Table-1:

**Table 1**  
**To explain main DRR based Ministerial Housing Strategy planned and designed at national levels with the respective objectives**

S. No	Objective
1	To explore Disaster Risk Reduction (DRR) based Guidelines with reference to the recommendations of national and international experts for Housing Policy in Pakistan.
2	To explore DRR based Guidelines derived from recommendations from national and international experts for National Reference Manual of Planning Standards in Pakistan.
3	To recognize DRR based Guidelines for Architecture Planning, Designing, planning, and other disciplines in Building Codes of Pakistan (seismic provision) for safe planning, designing and building constructions in Pakistan.
4	To make a Community Disaster Resilient by applying nonstructural measures and provide training to handle disasters.
5	To safeguard our villages, towns, cities & regions, DRR based Guided Development Plans
6	To establish hierarchy of Disaster Risk Reduction Units to safeguard housing schemes and projects by inspections and examinations under respective teams of DRR Experts.

**Source:** MOH&W (2010, 2016):DRR Based Ministerial Housing Strategy for Pakistan-notified

With reference to DRR based objectives of Ministry of Housing and Works deduced in accordance to HFA Objectives as well as in relevance to Ministry of Housing and Works and associated for Pakistan; mentioned below in table 2

**Table 2**  
**Comparison the objectives of DRR based Ministerial Housing Strategy with the aims of the Hugo Framework of Action (HFA) in Pakistan**

Objectives-HFA in Global Context	Deducted Objectives of MOH&W in Pakistan
“a. To review the Yokohama Strategy and its Plan of Action with focus on on disaster reduction strategies for twenty-first century.	1. To explore Disaster Risk Reduction (DRR) based Guidelines based on recommendations from national and international experts for Housing Policy in Pakistan.
b. To identify specific activities aimed at ensuring the implementation of relevant provisions of the Johannesburg Plan of Implementations of the world summit on sustainable development in vulnerability, risk assessment and disaster management.	2. To explore DRR based Guidelines based on recommendations from national and international experts for National Reference Manual of Planning Standards in Pakistan
c. To share good practice, and lessons learned to further disaster reduction within the context of attaining suitable development and to identify gaps and challenges;	3. To identify DRR based Guidelines for planning, architecture designing and other disciplines in Building Codes of Pakistan (seismic provision)-2007 for safe planning, designing and building constructions in Pakistan.

d. To increase awareness of the importance of disaster reduction policies, thereby facilitating and promoting the implementation of these policies	4. Making Community Disaster Resilient through nonstructural measures and training to cope hazards and disasters.
e. To ensure reliability of appropriate disaster-related information to the public and disaster management agencies in all regions, as set out in relevant provision of the Johannesburg Plan of Implementation”.	5. In order to safeguard our villages, towns, cities & regions by adopting DRR based Guided Development Plans
	6. To establish hierarchy of Disaster Risk Reduction Units to safeguard housing schemes and projects by inspections and examinations under respective teams of DRR Experts.

Source: MWG of MOH&W with NDMA (2010-2016) International Strategy for Disaster Reduction (ISRD) “ World Conference on Disaster Reduction” held on 18-22 Jan 2005; Kobe. Hugo Japan, p.3.

In an international perspective a similar set of comparisons were referred towards Safe and Sustainable Human Settlements Development planning in various earthquake prone districts in Pakistan by Mot-McDonald (MM-Pak).

Regarding identification of DRR Based Guided Development Plans, lessons were learnt from the Scottish experiences of DRR consultant regarding “National Planning Guidelines at various levels in Scotland”. Thus later in Pakistan these were attributed as the Guided Development Plans. This was also attributed to inter-ministerial forums for approval as in specific meetings with National Working Group and MWG through MOH&W. These are also tabulated below in sequence and order in Table-3

**Table 3**  
**Identification of DRR Based Guided Development Plans prepared at various levels for Pakistan**

<b>Guided DRR Based Development Plans in Scotland</b>	<b>Guided DRR Based Plans Deducted for Pakistan</b>	<b>DRR Based Guided Development Plans for Pakistan</b>
National Guided Development Plan	Guided National Development Plan	(i) DRR Guided National Development Plan (DRR-GNDP)
Regional Guided Development Plan	Guided Regional Development Plan	(ii) DRR Guided Regional Development Plan (DRR-GRDP)
*Structural Guided Development Plan	Guided District Development Plan	(iii) DRR Guided District Development Plan (DRR-GDDP)
City Guided Development Plan	Guided *Master Development Plan	(iv) DRR Guided Master Plan (DRR-GMP)
Local Guided Development Plan	Guided Local Development Plan	(v) DRR Guided Local Development Plan (DRR-GLDP)

Source: DRR Consultant for MOH&W by UNDP and NDMA Joint Venture-2010, 2016

Although National Engineering Services of Pakistan (NESPAK) with the financial support of MOH&W developed and generated a very useful book on safety of buildings and structures in Pakistan. But it was delayed and it focused mostly on the engineering aspects. Reviewing by DRR consultants at UNDP and NDMA forums various gaps regarding urban planning and architectural based DRR elements were missing. The Director General (DG) of National Housing Authority (NHA) in particular required these gaps to be established. Therefore DRR specialists of UNDP-NDMA explored and identified these gaps for architectural aspects in the respective sections and chapters of the “Seismic Provision-2007” building codes in a tabular form, see Table-4

**Table 4**  
**Building Codes of Seismic Provision by MOH&W and NESPAK in Pakistan**

Chapter	Title Of Chapter	Pages	Tables	Figures/Maps
1	Scope	1-1		
2	Siesmic Hazard	2-1	2.1 To 2.2	Fig 2.2 To 2.5
3	Site Consideration	3-1		
4	Soils And Foundation	4-1		
5	Structure Design Requirements			
Division-1 To 5	5-1 To 5-42	5.1 To 5.21	Fig 5.1	
6	Structural Test And Inspections	6-1 To 6-8		
7	Structural Concrete	7-1 To 7-23		
8	Structural Steel			
Division-1 To 2	8-1 To 8-59	8.1 To 8.2	Fig 8.1	
*9	Masonary	9-1 To 9-68	9.1 To 9.29	Fig 9.3 To 9.17
10	Architecttural Elements	10-1 To 10-3	10.1	
11	Machanical & Electrical Systems	11-1 To 11-2	11.1 To 11.2	
1. DRR Basedplanning For Safety Measures?		Missing	Missing	Missing
2. DRR Basedarchitecttural Safety Measures?				
Appendix-A Background For Siesmic Zoning Map		A-1 To A-5		7 Maps

**Source:** Interviews with stakeholders at NHA and PHA of MOH&W2

## Conclusion

This study identified the development of effective strategies for DRR so that the policy makers adopt for the safety of northern communities and their human settlements in Pakistan under Ministerial Working Group (MWG) of Ministry of Housing and Works (MOH&W). This study also validates the primary significance of implementation for sustainable housing in disaster hit areas of Pakistan in preview of the same standards as adopted at International level. These strategies contain architectural planning, designing and other building disciplines with community based approaches involving organizations in Disaster Management to have more effective and efficient dynamic ongoing policies; executive power and political will, to get help from legislators & law enforcement authorities to provide substantial support frameworks for implementation of DRR principles. The respective objectives and strategic approaches to Disaster Risk Reduction (DRR) help in disaster reduction and improve the resiliency in the country.

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