

Earthquake Risk Management Action Plan for Muzaffarabad City



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A Product of
Earthquake Risk Reduction & Preparedness Programme

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National Disaster Management Authority Pakistan



United Nations Development Programme Pakistan

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Foreword

The Kashmir earthquake claimed over 73000 lives, affected over 2.5 million people and unearthed severe discrepancies in the construction trends of the country. Traditionally, Pakistan's approach to tackle disasters has always remained primarily reactive, however the devastation caused by Kashmir earthquake stimulated planning around pro-active disaster risk reduction approach and the focus shifted from Emergency Response to Prevention and Mitigation of Disaster Risks. To cater for the challenges in implementing this pro-active approach, National Disaster Management Authority (NDMA) was established with institutionalization of allied policy and legal instruments as to enable the lead institution to function as per mandate. This new system of Disaster management is supported by legal and institutional arrangements at the Federal, Provincial and District level.

NDMA in collaboration with UNDP's Bureau for Crisis Prevention and Recovery (BCPR) has launched a programme, titled as Earthquake Risk Reduction and Recovery Preparedness Programme (ERRP) in Pakistan. This programme is within the fold of regional initiative, and is being replicated in four other South Asian countries i.e. Bangladesh, Bhutan, India, Nepal. The programme addresses the critical issues around institutional capacities, public education & awareness; enhance community capacities to undertake risk reduction, practical application of risk reduction principles through demonstration projects.

One of the most important components of ERRP was to conduct Earthquake Risk Assessment (ERA) of Muzaffarabad and Mansehra municipalities. Based on this Earthquake Risk Assessment, Earthquake Scenario documents have been formulated for Muzaffarabad and Mansehra municipalities which were shared with all stakeholders before publishing and their inputs have also been incorporated. The main aim of preparing the earthquake scenario is to raise awareness at different level and it provides information on loss estimation of buildings and infrastructures, casualty estimate in terms of probable death and injuries, identification of specific locations where infrastructures damage is worse and identification of gaps and limitations on existing capacities.

It is hoped that this document will help members of civil society, government officials, and general public weigh various risks associated with the earthquake and begin to set priorities that will systematically reduce the impact of the likely future event.

Chairman
National Disaster Management Authority Pakistan



Abbreviations

AJK	Azad Jammu and Kashmir
BCPR	Bureau for Crisis Prevention and Recovery
CDO	Central Design Office
DAM	Development Authority of Muzaffarabad
DDMA	District Disaster Management Authority
DRM	Disaster Risk Management
ERM	Earthquake Risk Management
EQ	Earthquake
EVRP	Earthquake Vulnerability Reduction and Preparedness Programme
GDP	Gross Domestic Product
GIS	Geographical Information System
HFA	Hyogo Framework for Action
ILO	International Labour Organization
ISDR	International Strategy for Disaster Reduction
JICA	Japan International Cooperation Agency
MCM	Municipal Corporation of Muzaffarabad
MDMC	Municipal Disaster Management Cell
MGDs	Millennium Development Goals
NDMA	National Disaster Management Authority
NGO	Non Government Organization
NSET	National Society for Earthquake Technology - Nepal
OFDA	Office of Foreign Disaster Assistance
SDMA	State Disaster Management Authority
TEVTA	Technical Education and Vocational Training Authority
UN	United Nations
UN Habitat	United Nations Human Settlements Programme
UNDP	United Nations Development Programme
WB	The World Bank



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1. Introduction and Executive Summary

UNDP Pakistan has implemented the Project: Earthquake Vulnerability Reduction and Preparedness (EVRP) as part of its technical assistance to the National Disaster Management Authority (NDMA) under the broad framework of National Disaster Management Framework of Pakistan. The project has been implemented as part of the Earthquake Risk Reduction and Recovery Preparedness (ERRRP) Project which is being implemented in five South Asian countries by Bureau for Crisis Prevention and Recovery of UNDP (UNDP/BCPR) with the funding support from the Government of Japan.

In addition to a number of awareness raising and capacity building activities, the EVRP conducted earthquake risk assessment studies and developed action plans for earthquake risk management for Muzaffarabad and Mansehra cities. The current action plan has been developed under the action planning component of the project.

This Action Plan for earthquake risk management for Muzaffarabad city has been prepared after series of consultation meetings, interactions with key stakeholders followed by an Action Planning Workshop organized in Muzaffarabad city. Hence, the current action plan tries to address current needs, current capacities as well as the existing gaps identified by the city stakeholders.

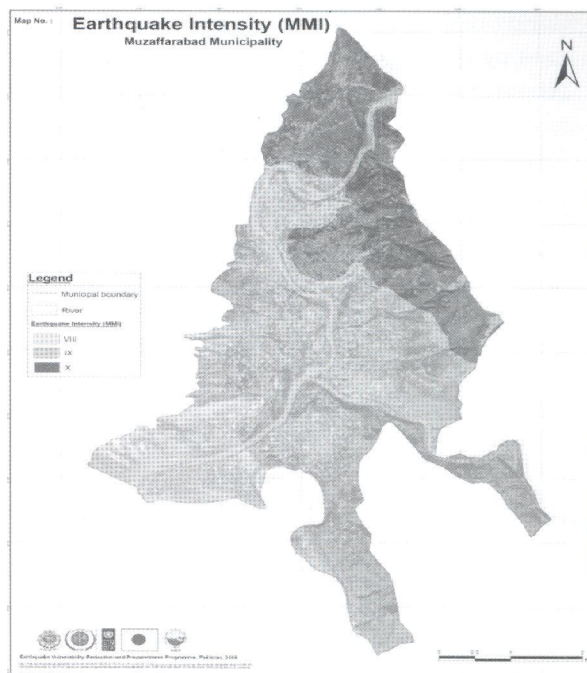
The major actions suggested for short-terms and medium-term periods are:

1. Establishment and strengthening of Municipal Disaster Management Cell (MDMC).
2. Building capacity of relevant institutions for disaster risk management.
3. Develop a system for regular updating of relevant data, earthquake risk studies and updating of existing earthquake risk maps.
4. Conduct awareness raising programs.
5. Capacity building training to all construction related stakeholders on earthquake-resistant construction technology in order to increase their knowledge and skill.
6. Incorporate disaster risk reduction (DRR) issues into school curriculum.
7. Implement School Safety Programme.
8. Effective implementation of building codes, building by-laws and promotion of seismic retrofitting of earthquake damaged buildings.
9. Effective implementation of building codes, building by-laws and promotion of seismic retrofitting of earthquake damaged buildings.
10. Strengthen emergency response capability.

Each of the actions suggested are accompanied with the responsible agency, supporting agencies, tentative timeframe for the accomplishment and tentative budgets required.

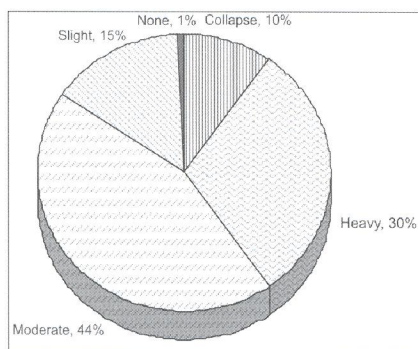
2. Earthquake Hazard and Risk of Muzaffarabad City

A seismic hazard micro-zonation of Muzaffarabad city has been carried out by NESPAK and also seismic intensity distribution map for Muzaffarabad city has been prepared. Series of discussions were conducted with local experts like professors from Department of Geology, AJK University and city corporation officials on the outcome of these studies to select proper seismic hazard for the loss estimation. Finally generalized form of the observed seismic intensity distribution map of 08 October 2005 earthquake in Muzaffarabad city prepared by NESPAK was used in this study for the earthquake loss estimation. As shown in the figure Muzaffarabad city will experience intensity VIII, IX and X in case of scenario earthquake.



A survey for all individual buildings and household survey was conducted in Muzaffarabad involving the university students, providing a short training, in close supervision of project team to receive the necessary information on buildings and population for loss estimations. Thus, a total of 14,240 buildings were surveyed involving local experts and students. Similarly the line agencies were visited for estimating the losses of life line systems. Quick Bird image (2005) was used for individual building identification and other digital database collected from different sources were also used as the base maps and verified in the field.

Considering, earthquake intensity, existing characteristics/condition of buildings and population distribution (spatial and temporal), the building damages and casualties were estimated. Similarly loss of infrastructures such as road, bridges, electricity and water supply (pipelines and reservoirs) etc. were also estimated.

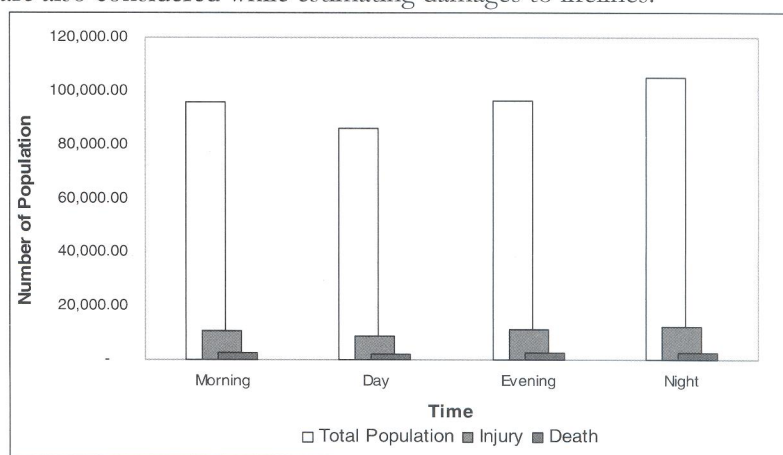


Though the losses were estimated for individual buildings, they were presented by blocks, dividing the whole city in 47 blocks. It was done considering the negative impact on the local people by the results. Considering the different vulnerabilities in the existing buildings Muzaffarabad city, out of 14240 buildings, 10% (1386) buildings were estimated to be collapsed, 30% buildings to be heavily damaged, 44% to be moderately damaged and 15% to be slightly damaged. The estimation has shown that relatively temporary structures are safer than other building structures and which is obvious as well.

As the number of population presence varies by different times, the estimated number of casualties also varies with the time. The maximum building occupancy in Muzaffarabad was recorded during night. The total population present in the buildings during night was surveyed to be 104,969 followed by evening with 96,335. Based on the existing building condition and population recorded during the field survey, 2750 deaths are estimated if the scenario earthquake occurred at night. Similarly the deaths during morning, day and evening are estimated to be 2361, 1995 and 2394 respectively. Maximum injuries estimated during night time is 12, 295 (Figure).

Different vulnerability functions for different lifelines components are used for loss estimation of lifeline systems. However, mainly these functions are taken from ATC-25 for the current study. The material types and connections are taken into consideration when the damage ratio or numbers due to earthquakes are estimated. Secondary hazards like landslide and liquefaction are also considered while estimating damages to lifelines.

In Muzaffarabad city there is about 30 km distributed pipeline of different types; of which about 245 breaks are estimated if the scenario earthquake occurred in Muzaffarabad. Similarly out of 34 water tanks, there is probability of >60% damage to all 9 masonry type water tanks and 9 out of 25 get >60% damage probability for the reinforced concrete type of the tanks.



Main roads linking to Muzaffarabad and the local roads distributed inside the city both were assessed during the study. Both the direct damage and possible blockage by debris is considered for the estimation of road blockages. Length of different level of blockage to different types of roads is given in table below.

Table: Probability of different level of blockage to different kind of roads

Type of Roads	Length of Different Level of Probability of blockages to Roads (km)			Grand Total
	10%-20%	50%-90%	>90%	
Main	4	105	34	143
Local	9	1391	365	1765
Grand Total	13	1496	399	1908

Out of 14 bridges studied in Muzaffarabad Municipality, 3 were estimated with the probability >80% chances to get damaged and 3 more have the probability of 50%-80% to get damaged.

Likewise significant damage and losses of other lifeline systems such as electricity and telecom were estimated.

3. Institutions related to Earthquake Risk Management (ERM) and their Responsibilities

Name of Institution	Regular mandates and responsibilities	Identified/potential responsibilities in terms of ERM
Municipal Corporation of Muzaffarabad (MCM)	Solid waste and sanitation, street light, fire-fighting, bus /truck terminal management, building control,encroachment control, reception of VIPs in MZD, price control, management of public parks.	<ul style="list-style-type: none"> Review development plans and provide guidance on mainstreaming disaster risk reduction measures in these plans. Undertake appropriate preparedness measures at municipal level. The exercise may include maintenance of early warning system, identification of buildings to be used as evacuation sites, stockpiling relief and rescue materials and identifying alternative means for emergency communication.
Development Authority of Muzaffarabad (DAM)	Provision of housing, recreational facilities, public facilities, civic amenities etc.	<ul style="list-style-type: none"> Ensuring that new development and construction activities are not carried out in the hazard prone areas. Examine construction in the area and if hazard safety standards have not been followed, direct the relevant entities to secure compliance of such standards. Encourage the people in earthquake prone areas to adopt EQ resistant technologies.
District Disaster Management Authority (DDMA)	Prescribing guidelines for preparation of departmental disaster management plans at district level and monitoring their implementation; Preparation of district disaster management and response plan; Establishing stockpiles of relief and rescue materials and ensuring availability of such material at short notice;	<ul style="list-style-type: none"> Giving direction to district and local authorities for taking necessary for prevention and mitigation; Remove debris, conduct search and rescue operation; Establish emergency communication system in affected areas. Develop a coordination mechanism in case of emergencies.

State Disaster Management Authority (SDMA)	Monitor / Integrate / Enforce DRM in AJK, mission statement "Safer Communities in AJK".	<ul style="list-style-type: none"> • To formulate the State Disaster Management Policy with the approval of the Provincial Commission. • To coordinate and monitor the implementation of the National Policy, National Plan and State action Plan. • To examine the vulnerability of different parts of the Province to various disasters, and specify prevention or mitigation measures. • To lay down guidelines for Disaster Management Plans by the State Departments and District Authorities. • Ensuring periodical disaster management drills. • Coordinating pre and post disaster management activities;
Central Design Office (CDO)	Planning and designing of development works in a AJ&K, preparation of development schemes, Master planning, Vetting of Schemes and designs prepared by private consultants, material testing.	<ul style="list-style-type: none"> • Incorporating Earthquake resilient features in the design and detailing of buildings and infrastructure.
Public Health Engineering Division (PHED)	Provide clear drinking water & sewerage in capital cities and big towns.	<ul style="list-style-type: none"> • Restoration of basic infrastructure facilities, including water storage tanks, supply lines and sanitation carriages. • Making water supply and sanitation arrangements for relief camps. • Maintaining quality of water supplied to relief camps within the tolerable limits.
AJK Electricity Department (AJKED)	Supply & Distribution of electricity in the jurisdiction of state of Azad Jammu & Kashmir. Operation and Maintenance of Power Distribution network in the state of AJK.	<ul style="list-style-type: none"> • Restoration of electricity supplies to critical installations of the city such as hospitals and emergency cells. • Disconnecting damaged transformers /power lines from the distribution system.

Directorate General Health Office (DGHO)	To provide primary and preventive healthcare for people of AJK.	<ul style="list-style-type: none"> • Carry out and disseminate a risk evaluation of the population. • Ensure adequate availability of Emergency Health Kits in high risk areas. • Preparing a list of medical and paramedical personnel in disaster prone areas.
Highways Directorate of Public Works Department	Construction and maintenance of roads in AJ&K.	<ul style="list-style-type: none"> • Take proper steps to ensure that the road links are not blocked in case of disaster. • Ensure that the bridges and other infrastructure are designed using Earthquake resistant design & techniques.
Building Directorate of Public Works Department	Planning of physical infrastructures; preparation of master plans, outlines of development schemes for town improvement; housing, office accommodation as well as residential housing for government functionaries; matters relating to Public Health Engineering Department (water supply, sewerage etc.) including its establishment.	<ul style="list-style-type: none"> • Take precautionary steps for the protection of government property against possible loss. • Formulate guidelines for safe construction of public works. • Prepare list, with specifications and position, of heavy construction equipment in the province. • Organize periodic training of engineers and other construction personnel on disaster resistant.
Education Department	To implement govt. policies, to maintain discipline in the department throughout the state; to make provision for education throughout the state.	<ul style="list-style-type: none"> • Find out space and scope to educate students on disaster related matters in schools, colleges and technical streams. • Arrange for training of teachers and students of disaster prone areas about the steps at different stages of disaster and organise them as volunteers and inspire them for rescue, evacuation and relief works. • Ensure that construction of all educational institutions in earthquake zones is earthquake resistant.
Pakistan Red Crescent Society (PRCS)	Disaster management; psychosocial support; first aid services and training; PHAST; training (First Aid, PSP, H&H etc).	<ul style="list-style-type: none"> • Engaging volunteers to deal with disaster response. • Providing medical supplies to the relief camps. • Conduct trainings on Disaster risk management.

AJK Rural Support Program (AJKRSP)	Community Development interventions in accordance with its mission: social mobilisation, capacity building, marketing and enterprises development at grass root level livelihood development.	<ul style="list-style-type: none"> • Awareness raising of communities by holding community meetings and gatherings. • Training of community in Emergency response and disaster preparedness. • Disseminating Earthquake safer construction technologies within the communities.
Special Communications Organization(SCO)	To ensure uninterrupted telecommunication connections within the city and with the rest of the country.	<ul style="list-style-type: none"> • Restoration of connections of critical installations of the city such as hospitals and emergency cells.
Civil Defence	To develop safety culture for creating awareness among masses about protection of lives and to develop readiness for calamities and disasters.	<ul style="list-style-type: none"> • Training of volunteers and school children in disaster response. • Conduct emergency response and evacuation drills in the city. • Assist other organization in disaster response related activities.
Pakistan Army	National Security and Defence related activities.	<ul style="list-style-type: none"> • Search and Rescue activities. • Setting up of relief camps. • Maintaining law and order situation in-case of disasters.
AJK Police	<ul style="list-style-type: none"> • Maintaining law and order. • Managing traffic of the city. 	<ul style="list-style-type: none"> • Impart training to the members of Police Force in first aid, evacuation, rescue and relief. • Train volunteers from among citizens and voluntary organizations. • Identify the 'High Risk' and 'Risk' areas for different disasters and instruct the existing police installations located in those areas for keeping themselves in readiness for undertaking emergency rescue, evacuation and relief operations.
UN Agencies	Support government departments in the development of projects related to Education, WATSAN, Health, Environment, Governance, poverty reduction etc.	<p>Carryout relief activities such as provision of shelter, transitory WATSAN and education Facilities.</p> <p>Assist in Rehabilitation of government functioning.</p> <p>Assist in rehabilitation and reconstruction of public infrastructure.</p>

4. The Action Planning Process (How the Action Plan was Created?)

Following logical steps were followed for developing the action plan:

4.1 Loss estimation study (earthquake risk assessment)

Earthquake loss estimation i.e. the estimate of potential losses due to a probable earthquake shaking is assumed to be a crucial information required for developing action plans for risk reduction. The loss estimation serves as the basis for establishing the planning assumptions. Therefore, a systematic loss estimation study was carried out for Muzaffarabad city as part of the action plan development process. The details of such loss estimation have been reflected in a separate report named "Muzaffarabad City's Earthquake Scenario"; summary of the study has also been included in this document in Chapter 2: Earthquake Hazard and Risk of Muzaffarabad City.

4.2 Identification of key stakeholders

Various key stakeholders and agencies that were directly or indirectly related to different aspects of earthquake/disaster risk management were identified through a desk review and consultation meetings. The list of such stakeholders, their normal time mandates as well as their potential role for mitigation, preparedness, response and long-term reconstruction, rehabilitation to the earthquakes are as reflected in Chapter 3 of this document.

4.3 Interaction meetings with stakeholders

Interaction meetings with key stakeholders were organized:

- to share preliminary results of risk assessment and to get their feedback on the results.
- to get inputs on what can/should be done to reduce the risk and to be prepared for responding to the potential disasters.

The results of risk assessment were verified with the recent earthquake disaster of 2005 together with the stakeholders during the meetings. Such combined effort for improving the risk scenarios are believed to generate greater ownership of the stakeholders. Also, the stakeholders provided their thoughts on how to reduce the risk factors; they suggested many new ideas and actions to be included in the plan of actions.

The list of agencies and professionals with whom the interaction meetings were organized is attached in the Annex 2.

4.4 Questionnaire survey

A survey questionnaire was developed and distributed to the organizations during the interaction meetings to collect information about their organizations; their future course of actions; their mandates, roles and responsibilities in terms disaster risk management etc. in a more systematic manner. The organizations were requested to send the filled questionnaires within few days.

A sample of the survey questionnaire is attached in the Annex 1.

4.5 Preparation of long list of actions

Based on the suggestions provided during the interaction meetings and the actions listed in questionnaire survey, a long list of possible actions for earthquake risk management for Muzaffarabad city was prepared. The list was then provided to all the agencies during the action planning workshop to decide the priority actions.

4.6 Action Planning Workshop

An Action Planning Workshop was organized in Muzaffarabad on 19-20 March 2009. The workshop was participated by around 55 senior professionals from 18 number of key organizations. The full list of participants of the workshop is attached in the Annex 2.

Following was the general agenda of the workshop:

- Presentation on methodology and key features of Action Plan and Action Planning Process
- Discussion and decision on who should own the plan
- Group work and presentation on suggesting various objectives and actions based on five priority areas of Hyogo Framework for Action (HFA)
- Group work and presentation on identifying prioritization criteria and prioritized actions

The various objectives and actions as well as the prioritized actions are included in next chapter.

4.7 Finalization and writing the plan

The final action plan was then prepared based on the prioritized actions suggested by different groups. There was some duplication as well as some missing parts in the suggested actions; such duplications were revised and missing parts were completed by the project team following the intents expressed during the workshop which was captured in audio and video records.

5. The Action Plan

5.1 List of actions suggested by stakeholders

Following actions were suggested by the stakeholders during the interaction meetings and in the questionnaire surveys:

1. The capacity building of each organization needs to be done in terms of requirement to cope with any disaster in future.
2. Seismic Building Code:
 - a) All new construction be done strictly in accordance to new building code.
 - b) Necessary seminars be conducted to appraise the population of any threat of disaster and remedial measures.
 - c) New seismic building code of Pakistan should be advertised/wide publicity to the knowledge/awareness of general public in addition to Government Department.
 - d) It must be made available in open market to the convenience of general public and be enforced.
 - e) Retrofitting/ strengthening of buildings based on Building codes.
 - f) Building code application and land use regulation needs to be effectively enforced.
3. Awareness :
 - a) Community level measures/trainings to the organized.
 - b) Increased awareness of partner community through which preparedness is ensured.
 - c) Sensitization of communication about incorrect intervention with natural ecological system.
4. Preparedness:
 - a) Identification of alternative resources and resources mobilization.
 - b) Village/area level savings for immediate response.
 - c) Health communities should be formed and equipped with first aid boxes and trainings etc.
 - d) Fire suits to be provided.
 - e) Effective response mechanism and providing emergency stockpiles.
5. Building the capacity of existing system and providing effective and efficient coordination/ communication system as well as response mechanism.
6. Minimum training and preparedness standard needs to be developed and enforced.
7. A central command system at district level under DDMA needs to be established to regularize DRM activities.
8. Effective coordination mechanism needs to be developed.
9. Comprehensive Hazard Vulnerability and Capacity Assessment (HVCA) is required.

5.2 Objectives and Suggested Initiatives

Following main objectives and initiatives were suggested during the action planning workshop. The objectives and initiatives are grouped into different HFA priorities.

HFA Priority 1: Policy, Governance and Institutional Strengthening

(Ensure that disaster risk reduction is a local priority with a strong institutional basis for implementation)

Objective 1: Formation and strengthening of Municipal Disaster Management Cell (MDMC) at the Municipal Corporation of Muzaffarabad (MCM).

Actions:

- Establish Municipal Disaster Management Cell (MDMC) at the earliest.
- Equip the cell with necessary equipment and physical facility.
- Arrange human resources and provide training to them.
- Allocation of sustainable funding mechanism.

Objective 2: Building capacity of relevant institutions for disaster risk management.

Actions:

- Identify capacity of different stakeholders / departments for disaster risk management and assess the gaps.
- Training of professionals and staff of relevant institutions / line departments on various aspects of disaster risk management.
- Identify/ nominate focal persons in relevant institutions.

Objective 3: Establish co-ordination networks among local, national and international organizations to learn from each other DRM efforts and to share the knowledge.

Actions:

- Establish interdepartmental coordination.
- Establish coordination with international agencies.

HFA Priority 2: Risk Assessment

(Identify, assess and monitor disaster risks and enhance early warning)

Objective 1: Regular update of risk assessment

Actions:

- Identification of appropriate risk assessment methodology.
- Regular survey / assessment of buildings and other infrastructures.
- Conduct geological studies.
- Reconfirmation/ regular updating of already prepared maps.
- Updating of existing risk and hazard maps.

HFA Priority 3: Knowledge Management (Capacity Building/Awareness)

(Use knowledge, innovation and education to build a culture of safety and resilience at all levels).

Objective 1: Enhance awareness of common people and authorities on disaster risk, risk reduction measures and preparedness.

Actions:

- Organize disaster awareness campaigns in media.
- Organize workshops, seminars on specific issues.
- Observe disaster days organizing various awareness-raising programs.
- Organize public awareness campaigns.

Objective 2: Incorporate disaster related courses in formal and non-formal education systems

- Prepare and include disaster curricula and school education.
- Impart necessary training to school teachers to make them capable in delivering the courses.
- Develop and publish support materials on disaster risk management.
- Include earthquake-resistant design courses in engineering education.
- Include earthquake-resistant construction technology in technical and vocation training courses.

Objective 3: Enhance capacity of existing masons and engineering professionals to design and construction of earthquake-resistant buildings

- Conduct mason training programs.
- Conduct training and orientation sessions for engineers and technicians.

HFA Priority 4: Implement Disaster Risk Reduction Initiatives

(Reduce the underlying risk factors)

Objective 1: Develop and implement a comprehensive programme for reducing the earthquake risk faced by Muzaffarabad city.

Actions:

- Formulate comprehensive disaster risk reduction and mitigation plan.
- Strengthen the capacities of institutions for implementing disaster risk reduction programs.
- Conduct relevant studies, researches and assessments.

Objective 2: Improve seismic performance of existing building and integrate seismic resistance techniques in new construction.

Actions:

- Prepare and publish simplified guidelines on building codes and regulations.
- Prepare and publish guidelines on retrofitting techniques.
- Conduct assessment of existing buildings.
- Implement comprehensive School Safety Programs.
- Enforcement of local by-laws.

HFA Priority 5: Enhance Preparedness

(Strengthen disaster preparedness for effective response at all levels)

Objective 1: Strengthen emergency response capability

Actions:

- Establish emergency response cell within the municipality and organize Emergency Response Teams.
- Equip the Emergency Response Cell with necessary equipment, physical facilities and human resources.
- Enhance capacity of existing emergency response organizations such as Fire Services, Red Crescent Societies.

Objective 2: Formulate and implement Comprehensive Disaster Management Plans and Action Plans by different relevant institutions for their enhanced emergency response capacity.

- Develop Standard Operation Procedures (SOPs) applicable during the time of disasters.
- Institutionalize a system of budgetary allocation for carrying out disaster preparedness activities.
- Organize seminars, workshops to share the information and knowledge.
- Training and drills.

Objective 3: Encourage, facilitate and implement Community Based Disaster Preparedness Programs.

- Conduct training programs.
- Facilitate disaster preparedness activities in the communities.

5.3 Prioritized Actions

S. No.	Action	Explanation	Responsible Organization	Supporting Organizations	Time Frame	Budgets (PKR)
1	Establishment and strengthening of Municipal Disaster Management Cell (MDMC)	<ul style="list-style-type: none"> ● Capacity Building and institutional strengthening <ul style="list-style-type: none"> ○ Capacity building training to staff for maximum knowledge and skills on disaster risk management ○ Support with necessary equipment ● Include an in-built system of Monitoring and Evaluation <ul style="list-style-type: none"> ○ No system is applicable for ever ○ Need evaluation to see whether they are applicable at the current situation or not ○ Evaluate the success rate ○ Review the progress of implementation and to identify the future improvements 	DDMA	SDMA, MCM, UNDP, UN-HABITAT, NSET	12 Months	15 Millions
2	Building capacity of relevant institutions for disaster risk management	<ul style="list-style-type: none"> ● Identify capacity of different stakeholders / departments for disaster risk management and assess the gaps ● Training of professionals and staff of relevant institutions / line departments on various aspects of disaster risk management. ● Identify/ nominate focal persons in relevant institutions 	SDMA, Relevant Departments	DDMA, MDMC, UN Agencies	5 Years	NA

S. No.	Action	Explanation	Responsible Organization	Supporting Organizations	Time Frame	Budgets (PKR)
3	Develop a system for regular updating of relevant data, earthquake risk studies and updating of existing earthquake risk maps	The earthquake risk scenario maps recently developed are good basis for planning risk reduction activities. However, these maps cannot be valid forever; there will be changes in the situation, building patterns, city planning etc. and hence these require regular updating and validation. Therefore, there should be a properly functioning system for doing regular data collection, risk updating, preparation of relevant maps and dissemination for their proper use.	DDMA, MDMC	SDMA, MCM, CDO, UN Habitat, NGOs.	5 Years	
4	Conduct awareness raising programs	<ul style="list-style-type: none"> • Need to incorporate in formal education system, in the curriculum and the text books • Specialized media campaigns to raise the awareness of common people – information on the disaster and how to prepare for that 	MDMC, DDMA	Education Department, Media, NGOs		
5	Capacity building / training to all construction related stakeholders on earthquake-resistant construction technology in order to increase their knowledge and skill	<ul style="list-style-type: none"> • Training to construction related stakeholders such as masons, engineers, architects, material suppliers • Training and awareness to community, authorities, policy and decision makers 	Technical Education and Vocational Training Authority (TEVTA)	MCM, DAM, NESPAK, UNDP, UN-HABITAT, UNESCO, ILO	24 Months	30 Millions

S. No.	Action	Explanation	Responsible Organization	Supporting Organizations	Time Frame	Budgets (PKR)
6	Incorporate disaster risk reduction (DRR) issues into school curriculum	The disaster risk reduction should become a daily routine of the people, all sectors of lives; it should not be like a project. For this, people should be oriented from the childhood; which obviously can be done when DRR issues are incorporated into school curricula and future generation of the city/country start talking, thinking right during the basic studies.	SDMA, Education Department	Education Dept	5 Years	NA
7	Implement School Safety Programme	<ul style="list-style-type: none"> • Make communities own the schools • Training to school students, teachers and school management committee • Training and awareness to community 	SDMA, Education Department	UNESCO, UN-HABITAT, NSET, UNDP, NGOs.	24 Months	20 Millions
8	Effective implementation of building codes, building by-laws and promotion of seismic retrofitting of earthquake damaged buildings	<ul style="list-style-type: none"> • Prepare and publish simplified materials on safer construction targeting common people. • Simplified materials and enforcement guidelines on building by-laws • Simplified materials on retrofitting techniques • Institutional strengthening for effective implementation of building codes and building by-laws 	DAM	MCM, CDO, NESPAK, UNDP, UN-HABITAT, Engineering Council	12 Months	20 Millions

S. No.	Action	Explanation	Responsible Organization	Supporting Organizations	Time Frame	Budgets (PKR)
9	Preparation and implementation of comprehensive disaster preparedness and response plan	<ul style="list-style-type: none"> • Preparation of plans and implementation • Training and drills • Public Awareness on the plan 	MDMC, DDMA	SDMA, MCM, Red Crescent, NGOs UN Agencies	24 Months	25 Millions
10	Strengthen emergency response capability	<ul style="list-style-type: none"> • Establish emergency response cell within the municipality and organize Emergency Response Teams • Equip the Emergency Response Cell with necessary equipment, physical facilities and human resources • Enhance capacity of existing emergency response organizations such as Fire Services, Red Crescent Societies, 	SDMA	MCM, Civil Defence	5 Years	NA

5.4 Owner of the Plan

After a long and intensive discussion, the participants agreed that the ultimate owner of this action plan should be the Municipal Disaster Management Cell (MDMC) that will be formulated within Municipal Corporation of Muzaffarabad (MCM) as per the Disaster Management Framework of Pakistan. However, the MDMC has not yet been formed and it will take some time for its establishment and functioning. Therefore, the current owner of the plan should be the District Disaster Management Authority (DDMA) which is already functional. The DDMA with the support and involvement of MCM and other relevant agencies will initiate the establishment of MDMC and its strengthening. Until the MDMC is functional, it is the DDMA's responsibility to own this Action Plan and facilitate, support and monitor the implementation of actions prioritized in this plan by the relevant agencies.

5.5 Implementation Strategy

The key activities suggested as the implementation strategy are:

1. Building Support for the Plan and Earthquake Risk Management in General

- Using transparent and inclusive processes.
- Making decisions rationally.
- Using open financial policies.
- Building relationships with all possible groups.
- Raising general awareness.
- Educating decision makers through awareness efforts.
- Conducting regular public hearings.

2. Supporting the Individual Initiatives

- Coordinating initiatives.
- Planning initiatives.
- Arranging technical support.
- Conducting peer review of initiatives.
- Seeking external funding for respective agencies.
- Publicizing successful initiatives.

3. Keeping the Plan Going

- Monitoring the initiatives annually.
- Evaluating the objectives and strategies periodically.
- Creating new edition of the plan periodically.

6. Annexes

6.1 Annex 1: Typical Survey Questionnaire

Earthquake Vulnerability Reduction and Preparedness Program

Earthquake Scenario Development and Action Planning for Risk Reduction

Interview Questionnaire for Critical Facilities and Lifeline Agencies

Name of Agency:	
Address:	
Name and Designation of Respondent:	

- 1 When was your organization established?
- 2 What are the regular mandates and functions of your organization?
- 3 What main services does your organization provide to the people?
- 4 What are the organizational capacities of your organization? (Physical infrastructures, facilities, departments/divisions, human resources/staff etc.)
- 5 How effectively do you think your organization has been providing its services?
- 6 What were the effects of October 2005 Earthquake to your organization? (Damages to physical facilities, casualties, disruption of services etc.)
- 7 Are the buildings/structures damaged during the earthquake repaired, retrofitted or reconstructed?
 - If yes, how they are done? Earthquake-resistance is considered or not? Who assisted?
 - If not, why? And what is the plan?
- 8 Do you believe that Muzaffarabad is earthquake prone area and similar earthquake may hit Muzaffarabad area in the future also?
- 9 What could be the situation in case similar earthquake re-occurs affecting Muzaffarabad?
10. Is your organization prepared or preparing for the future possible earthquakes? What types of preparations/preparedness have been or are being done?
11. What precautionary measures are taken against earthquake by your organization keeping in mind the possible consequences?
12. What are the main problems faced by your organization in delivering normal services and functions?
13. What will be the main problem that your organization faces during an earthquake disaster?

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14. Are there any points in your critical facility / lifeline system that seems especially vulnerable to earthquakes?
If yes, please explain it.
What may be the consequences of damage to these points?
15. Which points are most critical for operation of the entire system even during the earthquake disasters?
16. Do you have any specific plan or program for the time of disaster?
17. Are these plans or programs formally documented and known to the staff?
18. How aware are the staff and decision-makers about the risk of earthquake or other disasters?
19. Does your organization practice emergency exercises and drills?
20. Your organization is responsible for designing and constructing structures in Muzaffarabad Municipal area; how many (no. of length) such structures are constructed per month/year?
21. Is there any defined system for maintaining the proper design and construction of such structures? Process: needs assessment, design, check, construction?
22. Does your organization have sufficient capacity to properly maintain the required quality of such constructions in the ground?
How many staff is dedicated for this job? And what categories of staff?
23. How much does your system depend on other systems (i.e. electricity/transportation or others to operate)?
24. Can your system operate if these systems are not available?
25. How much does your organization's emergency response depend on other systems, i.e. communications, electricity, roads etc.
26. Are there any laws, codes, standards of practice, inspections etc. that regulate the safety of your system?
27. If so, how well are they enforced?
28. Do you have any plans for expansion your system in the municipal area? If yes, what type of expansion? How do you consider earthquake safety during such expansion?
29. Does your system store spare parts?
30. How difficult would it be to get spare parts at short notice?
31. Does your system have reserves in case of disaster (i.e. stored- water, fuel, electric generators etc) ?
32. How long would such reserves last?
33. What other organizations have reserves that could help your system in time of need?
34. How long would the city be without service if system is damaged from the disaster?
35. How long would it take to rebound from a disaster?

36. Are there existing arrangements to secure funding to recover from a disaster?
37. Has your organization thought of doing any mitigation work for earthquakes or other potential disasters?
38. Have any detailed studies been made about the vulnerability of your system to natural disasters? If yes, mention in brief.
39. How feasible are mitigation measures for your system?
40. Is it possible to get funds and other support for mitigation work? What would be the process to initiate mitigation work?
41. Who would need to be involved in order to successfully undertake a mitigation project?
42. What are the immediate actions to be taken to improve the system keeping in mind the possible consequences of a future disaster?
43. What do you think are the most important and critical activities to avoid the disaster like that of 2005?
44. Can you please suggest some critical actions in detail?

6.2 Annex 2: List of Participants during Scenario and Action Planning Workshop

EARTHQUAKE SCENARIO AND ACTION PLANNING WORKSHOP

19 - 20 March 2009, Pearl Continental Hotel, Muzaffarabad

Sr. No.	Participant's Name	Designation	Organization	Contact Number
1	Ms. Fiza Hamdani	Master Trainer	NRSP	0302-5194239
2	Ms. Tasneem Yasin	Dy. Dir.	Education Elementary	0301-9838427
3	Ms. Mehwish Batool	Education Coordinator	DRU	0301-5235358
4	Mr. Adnan Ahmed Qureshi	Assistant Director	DAM	0300-4304229
5	Mr. Mohamamd Farooq Awan	Dir. Architecture	CDO	0300-5063323
6	Mr. Akhtar Hussain Khawaja	Project Coordinator	DRR - ERRA	0302-6472741
7	Mr. Istar Arbab Abbasi	IT & Telecom Specialist	PRCS	0300-4406870
8	Ms. Syeda Shazia Zaheer	Dissemination & Tracing Head	PRCS	0302-2292200
9	Mr. Arif Yasin Chohan	Town Planner	DAM	0334-5072190
10	Mr. Adeel Ahmed	Assistant Town Planner	DAM	0333-4711510
11	Mr. Syed Imran Kazmi	Coordination Officer	SDMA	0332-5196991
12	Ms. Shabnam Rani	Chairperson	DMC	0332-8986805
13	Ms. Gul Nasheen Akhtar	Chairperson	DMC	0334-5724703
14	Mr. Jawad Latif	District Housing Coordinator	ERRA	0300-5144309
15	Mr. Nisar Ahmed	Research Officer	LG&RD	0333-5733239
16	Mr. Wasim Haider	Engineer	Farooq & Associates, Quetta	0321-8012506
17	Mr. Farooq Hassan	CEO	Farooq & Associates, Quetta	0300-8381588
18	Dr. Kamran Riaz Dar	Assistant Director Health	AJK Health Dept.	0300-5213021
19	Mr. Syed Shakil Gillani	Secretary	MCM	0300-4854598

Sr. No.	Participant's Name	Designation	Organization	Contact Number
20	Major Mohammad Saeed Chughtai	Assistant Director	Civil Defense	0300-5358565
21	Mr. Syed Wajid Ali Shah	DFC Muzaffarabad	Food Dept.	0300-5141445
22	Mr. Mohammad Hassan	MID Officer	Children First	0300-9869636
23	Mr. Syed Saad Ali Gillani	Project Officer	Children First	0307-8963123
24	Mr. Sarwat Khawaja	Monitoring Officer	WFP	0346-9666941
25	Mr. Malik Mohammad Sadiq	Dist. Planning Expert	DRU / SERRA / ERRRA	0302-4495836
26	Prof. Dr. Munir ul Hasan Munir	Professor	AJK University	0343-9525174
27	Dr. Syed Ghulam Haider Kazmi	Provincial Planning Expert	SERRA	0300-5252125
28	Mr. Mohammad Akhlaq Khan	DPI School	Education	0346-5932877
29	Mr. Zahid Durani	OIC Field Office	UNICEF	
30	Mr. Faheem ud Din	Assistant Program Officer	Islamic Relief	0334-5769004
31	Mr. Syed Manzar Hasan Gardezi	Assistant Director	NDMA	0333-5362550
32	Mr. Raks ud Din	Reporter	Dunya TV News	0345-9729510
33	Mr. Sarfraz Ahmed Abbasi	Coordinator / Dy. Dir.	Social Welfare Women Development Dept.	
34	Mr. Saqib Abbasi	Reporter	AAJ TV	0346-5200848
35	Mr. Mohammd Basharat Mughal	Business Manager	Voice of Kashmir FM 105	0344-9536701
36	Ms. Sundas Khan	Studio Assistant	Voice of Kashmir FM 105	
37	Ms. Urooj Kazmi	Marketing Director	Voice of Kashmir FM 105	0345-5513177
38	Mr. Khurram Shahzad But	GIS Specialist	AJKED	0300-9858948
39	Mr. M. Zulfiqar Alam	Chief Officer	MCM	0344-5464318
40	Mr. Sabir Hussain Awan	Sr. Social Mobilizer	HN-Habitat	0300-5691711
41	Ms. Syeda Gillani	Dy. Dir. Schools	Education	0301-5640345

Sr. No.	Participant's Name	Designation	Organization	Contact Number
42	Ms. Rakshnda Nadeem	DPI Elementary	Education	0301-5640345
43	Mr. Mukhtar Ahmed Kiani	Assistant Engineer	LGV	0300-9131067
44	Mr. Anees Akram	Focal Person to DEO Officer	Education	
45	Mrs. Kaneez Kabir Khan	DEO (E) Muzaffarabad	Education	0300-9811266
46	Mr. Moazzam Zaffar	Dy. Dir.	SDMA	0300-9869094
47	Mr. Qazi Tasveer	Social		0301-5002214
48	Mr. Inayat ur Rehman	SAC	Education Colleges	0300-5348616
49	Mr. Sheikh Ehsan Ahmed	Regional Technical Expert	UN-Habitat	0300-5211940
50	Mr. Raja Sajjad Khan	Director	SDMA	0300-5582385
51	Mr. Tariq Aziz Mir	Dy. Dir. Logistic	SDMA	0301-5185191
52	Mr. Noman Shafique	Dy. Dir. Admin	SDMA	0321-9802172
53	Mr. Nadeem Ahmed Mughal	XEN	Local Govt. Board	0301-5675789
54	Mr. Mohammad Owais Awan	Data Officer	UN-Habitat	0300-5567559
55	Mr. Ehsan ul Haq Khan	Dy. Dir.	CDO	0333-5716121

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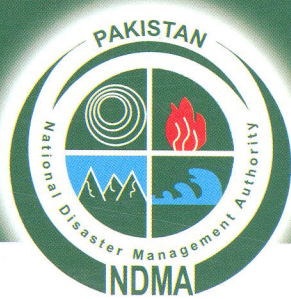
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