2015

Earthquake Recovery Plan

KHYBER PAKHTUNKHWA

This plan has been prepared by the Provincial Disaster Management Authority, Government of Khyber Pakhtunkhwa in collaboration with line departments of the Government of Khyber Pakhtunkhwa.

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ACKNOWLEDGEMENTS

The Oct 26, 2015 earthquake caused human losses and extensive damages to public infrastructure, houses and other buildings in various areas of the Khyber Pakhtunkhwa province.

In the aftermath of earthquake, Provincial Disaster Management Authority Khyber Pakhtunkhwa (PDMA KP) initiated relief activities and emergency restoration in the district. The provision of emergency relief was a great support to the affected populations even though it was challenging to make the relief timely and cooperative.

Given the ramification of the devastating earthquake, the relief assistance had been well coordinated and comprehensive. Moving beyond the restoration of the losses and damages, massive rehabilitation and reconstruction of critical infrastructure is necessary to help sustain the lives of the inhabitants of the earthquake affected districts. Risk of vulnerable construction, environmental hazard and climate change will continue to challenge the already vulnerable communities.

On behalf of KP Government, we would like to acknowledge UNDP Pakistan, which has provided technical assistance in validating and analyzing the data, collected by line agencies and PDMA KP teams and further drafting the Recovery and Rehabilitation Needs Assessment and Action Framework. Appreciation goes to PDMA KP and technical support of various line departments in KPK throughout the assessment process, especially during data collection process.

The detailed damage assessment reflected in this report reveals the social and physical vulnerability of the earthquake affected districts to further disasters including the climate change impact.

The priority interventions listed in this document would hopefully be considered and transformed into immediate action that can help restore and support the lives of the affected population in KPK.

Peshawar, December 10, 2015.

Mr. Amer Afaq,
Director General, PDMA

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AKRSP: *Aga Khan Rural Support Programme*

CBDRM: *Community Based Disaster Risk Management*

DRR: *Disaster Risk Reduction*

DDMU: *District Disaster Management Unit*

DDMO: *District Disaster Management Officer*

FATA: *Federally Administered Tribal Areas*

FAO: *Food and Agriculture Organization*

GLOF: *Glacial Lakes Outburst Floods*

KPK: *Khyber Pakhtunkhwa*

NDMA: *National Disaster Management Authority*

PDMA: *Provincial Disaster Management Authority*

PDNA: *Post Disaster Needs Assessment*

PKR: *Pakistani Rupees*

PaRRSA: *Provincial Reconstruction, Rehabilitation and Settlement Authority*

UNDP: *United Nations Development Programme*

UNHAB: *UNHABITAT*

USD: *United States Dollar*

WASH: *Water, Sanitation and Hygiene*

WFP: *World Food Programme*

Executive Summary

Context

On Monday 26 October 2015 at 14:09:32 local time, a 7.5 magnitude earthquake was recorded by United States Geological Service (USGS) near the Hindu Kush region of Afghanistan (SW of Jarm) that occurred as the result of reverse faulting at intermediate depths, approximately 210 km below the Hindu Kush Range in northeastern Afghanistan. The jolts were felt across Pakistan but more intensively in KPK (in thirteen districts), particularly Chitral, Dir Lower, Dir Upper, Swat, Shangla, Malakand and Buner. If the earthquake had struck at night, and not in the middle of the day, there would certainly have been greater casualties.

The human development index (HDI) score in the above mentioned severely earthquake affected districts is lower than the national average, indicating areas lagging status in average income, education and health indicators. The loss of poorly built residential houses, farmland and livestock amplifies the income shock and likely to give a further downward push to the poor households below the poverty line for an extended period if recovery and reconstruction activities are delayed.

In the seven severely affected districts alone, 170 lives were lost and 1070 injured (188 and 1,138 in all the thirteen districts respectively). Details of damages assessed by KPK in all the thirteen districts are available in Tables 14 & 15.

Emergency Relief and Assistance

The destruction was widespread, a provincial emergency was declared, PDMA was mobilized (assisted by the Pak Army) and finances made available to provide emergency relief and humanitarian assistance (by road and air) to the affectees. A major impediment in the relief operations and assessments was the remoteness of the area, rugged terrain, accessibility, scattered population and extreme weather, which added to the logistical difficulties. Details of the up to date relief deliveries are being shared by the Federal and Provincial Governments through NDMA and PDMA websites.

However, feedback coming from the field suggests that the supply of non-food items, particularly tarpaulins and non-winterized tents, proved inadequate and the fear of being trapped drove many families, including those whose houses had not been damaged, to seek temporary shelter in the open or with relatives.

The Government also announced special compensation package for deaths, injuries and for reconstruction of houses. Most of the compensation has been paid and desperate efforts are being made by the government to complete verification of the pending claims and finalization of the balance payment.

In this connection relevant line agencies assisted by other government counterparts and representatives from the local government, military and community representatives were also mobilized to assess the overall damages. Independent assessments have also been carried out by other stakeholders in pockets of the affected zone. Except for the housing sector where some debates are still taking place in relation to the partial or total damages to the houses, the remaining assessment of physical assets appear quite realistic. Details of the public sector infrastructure, damages and estimated reconstruction and rehabilitation cost of the affected districts which has been carried out by the Provincial Government is shown in Table 15 (17 and 18 in respect of the seven severely affected districts) of the Recovery Plan.

Damage Assessment

An overwhelming majority of the estimated losses and damages have been to private property such as residential buildings, commercial buildings, farmland, and livestock. Public property, such as roads, schools, utilities, heritage monuments, and hospitals, also suffered damage in severely affected districts. Subsistence-based rural households suffered the most as the earthquake occurred only few weeks prior to the start of the winter planting season.

When considering individual sectors the distribution of disaster affects provides direction to the recovery and reconstruction strategy. The most affected sectors are infrastructure and housing.

The following major categories of damages have been reported:

1. **Government Buildings:** including government administrative office buildings; health facilities and Hospital buildings; and educational facilities
2. **Water Supply and Sanitation schemes**
3. **Roads and Bridges**
4. ***4.*** **Irrigation networks**
5. **Energy infrastructure (mini/micro hydel)**

Income Shock: The population of the affected districts is heavily dependent on agriculture for livelihood, which has been badly affected by the earthquake and ensuing landslides. Furthermore, these districts have a general reliance on income from livestock which has been equally affected.
The seven worst-affected districts have a high absentee population, which migrate down-country for jobs, and their remittances constitute an important share of household incomes. Thousands of workers have returned to help reconstruct their houses.

Additionally, the deterioration of water and sanitation services, disruption of schools and health services, and the possible increase in food insecurity is likely to result in a multidimensional poverty.

Gender: The disadvantaged social groups in the districts have suffered the largest damage and loss. Majority of the agricultural and informal sector workers are female due to the low capital entry requirement of the informal sector and lack of livelihood options. The widespread loss of food stocks,

potential loss in crop productivity and loss of livestock as well as small scale enterprises is likely to cause a severe income shock for women who rely on this sector. A narrow asset base, burden of domestic work, limited access to economic resources combined with the lack of alternate livelihoods also mean that recovery for women may take longer than for men who have more livelihood options. The destruction of water supply and sanitation facilities have a direct negative impact on women and girls as they now fetch water from greater distance. The work burden on women, and the disproportionate cost borne by them in the household economy, not only limits the time they can spend in economic activities but restricts them spatially and culturally to activities that are compatible with their domestic obligations.

Reportedly, families are deploying different coping mechanisms to deal with the disaster, including distress sales of assets and receipt of remittances. However, for vulnerable families, the loss of assets combined with the loss of family protection, and desperation for alternate livelihoods could have disastrous consequences on women, girls and children who may face heightened risk of sexual and gender-based violence, child labor etc.

Financial Requirements for Recovery and Reconstruction (As per Post Disaster Needs Assessment - PDNA)

Recovery programme involves implementation of a large number of activities in a relatively short period of time, which requires enormous preparation in institutional, financial and logistical terms to support implementation. It also calls for relevant technologies, regulations, and innovations to meet the demands arising from the extremely dynamic context of the recovery programme. The objective is to promote the principle of Building Back Better and Safer in recovery and reconstruction. Given the recurrence of disasters and vulnerability, it is only appropriate that recovery and reconstruction are implemented in a way that it contributes to the resilience of the communities, reflected in its economy, social cohesion and governance.

The needs assessment by the KPK for the damages in all thirteen affected districts totals PKR 19,841 million (details available in Table 15). Of this, the need of the seven severely affected districts is PKR 18,058 million. Therefore, for preparation of the recovery plan, priority has been placed on needs of the seven severely affected districts which all happen to be in Malakand Division. While preparing the recovery plan, the needs have been further reviewed by the UN Agencies (led by UNDP) for including human dimensions and resilience.

The assessed recovery needs amount to **US$ 317.97 million** that take into account the cost of reconstruction with better specifications, equipment, improved governance and risk reduction. Of the total 70.73% (or $224.91 million) is for reconstruction and rehabilitation of infrastructure projects, which include administrative offices, health and education facilities, water supply and sanitation, roads and bridges, irrigation system and micro hydels; 16.95% (or $53.9 million) are in support of safe housing reconstruction (including transitional shelters), 7.81% ($24.83 million) for revitalizing the economy (on-farm and non-farm), and 4.13% ($13.12 million) for building community and

environmental resilience. The balance $1.21 million or 0.38% of the total budget will be invested in strengthening and equipping the RRS Department (including the PDMA-PaRRSA Peshawar and field level units). A summary of the sector wise needs assessment of the Recovery Plan are given in the following table.

Table 1: Consolidated Cost of 2015 Earthquake Recovery

Component	Cost in Million USD Year-1	Cost in Million USD Year-2	Total Cost in Million USD
Rehabilitation of Physical Infrastructure			
Government Buildings			
i- Public Administration	7.23	10.85	18.08
ii- Health	3.62	5.43	9.05
iii- Education	63.07	94.61	157.68
Total	**73.92**	**110.89**	**184.81**
Water Supply & Sanitation	1.51	2.1	3.6
Roads and Bridges	9.31	13.96	23.27
Irrigation	0.83	1.2	2.03
Energy	4.48	6.72	11.2
Total	**90.05**	**134.86**	**224.91**
Housing Reconstruction	**27.09**	**26.81**	**53.90**
Reactivating and Strengthening of Local Economy			
On Farm Livelihoods	12.15	1.26	13.41
Non-Farm Livelihoods	9.28	2.14	11.42
Total	**21.43**	**3.4**	**24.83**
DRR and Environment Recovery			
DRR	**3.15**	**2.95**	**6.1**
Environment Recovery	**2.89**	**4.12**	**7.02**
Total	**6.04**	**7.07**	**13.12**
Reconstruction and Rehabilitation Management Mechanism	**0.63**	**0.58**	**1.21**
Grand Total	**145.24**	**172.72**	**317.97**

The calculation of the recovery needs includes the cost of reconstruction and additional cost of making existing structures earthquake resilient. It also takes into account improvement in agriculture and agricultural practices, introduction of new technologies, improved varieties of vegetable seeds, improved varieties of high value crops and fruits, imparting skills that will enhance incomes through on-farm and non-farm activities, protection of environment and awareness raising in risk reduction and management at all levels.

The following golden principles will be part of all recovery and reconstruction efforts:

- *Build back better and strengthen resilience.*
- *Involve local communities in the overall recovery effort.*

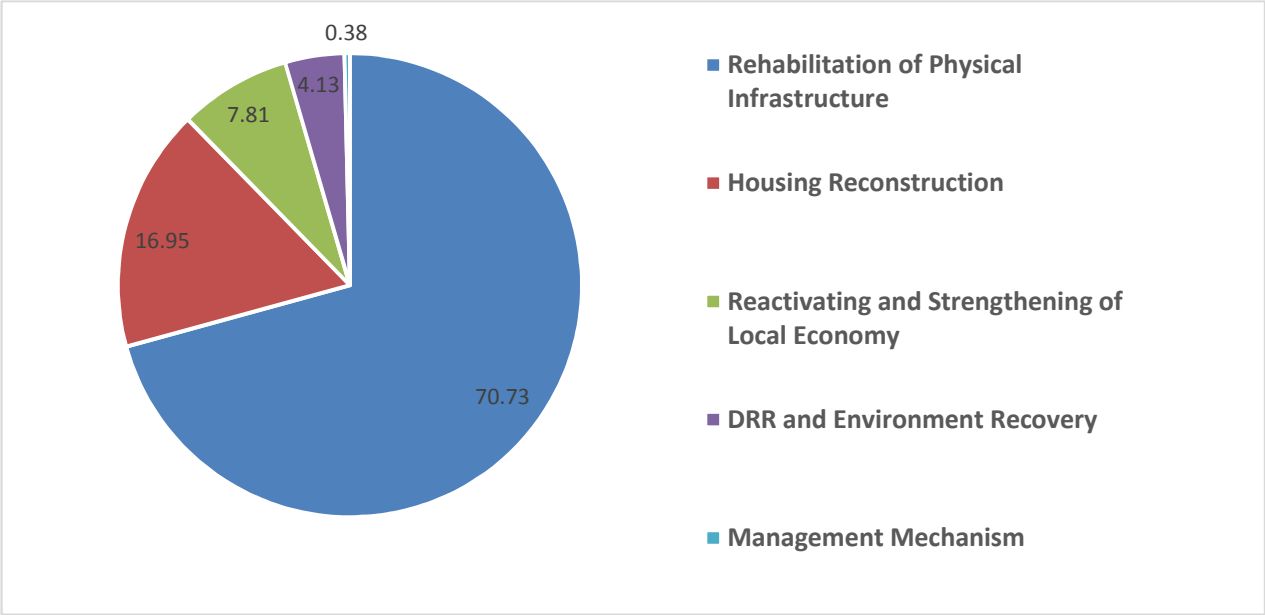
- *Strengthen local capacity.*
- *People-centered, Participatory, Pro-poor, Socially and gender inclusive; and*
- *Environmentally sustainable.*

Managing Earthquake Recovery and Reconstruction 2015

The existing provincial mechanism of managing post-disaster recovery is considered adequate. However, some additional staff help would be needed to supplement the current strength in the districts, divisional and provincial level which has been included in the requirements and added to the recovery plan at a cost of USD 1.21 million.

Sector wise distribution of recovery needs are further summarized as follows:

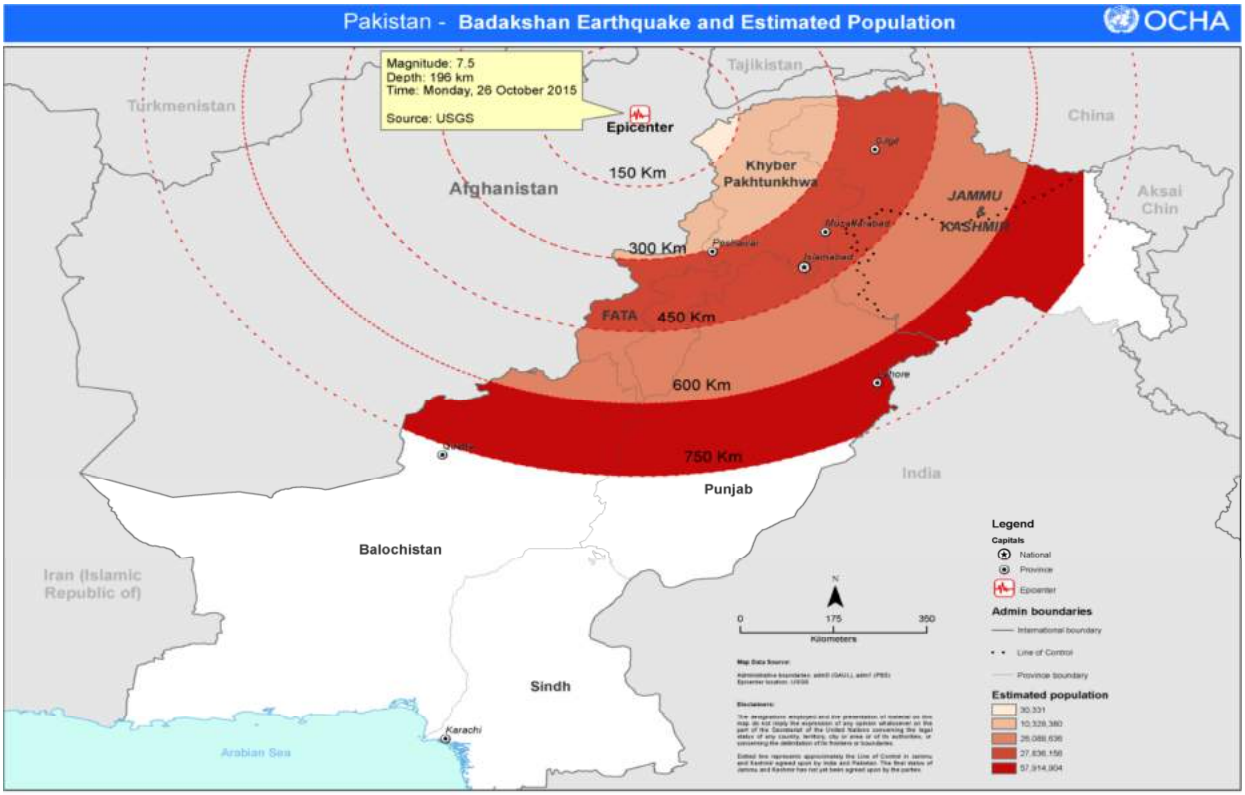
Sector	Cost in Millions USD	Percentage (%)
Rehabilitation of Physical Infrastructure	224.91	70.73
Housing Reconstruction	53.9	16.95
Reactivating and Strengthening of Local Economy	24.83	7.81
DRR and Environment Recovery	13.12	4.13
Management Mechanism	1.21	0.38
Total	**317.97**	**100**



1. Overview

A powerful earthquake of magnitude 7.5 on the Richter scale (USGS) struck Badakhshan Province in Afghanistan on Monday October 26, 2015 and also affected Pakistan including Khyber Pakhtunkhwa (KPK), Gilgit-Baltistan (GB), Federally Administered Tribal Areas (FATA), Punjab, Kashmir and Balochistan. The earthquake struck at 09:09 UTC (14:09 PST) and was 196 kilometers deep. The epicenter was 82 kilometers southeast of Fayzabad, Afghanistan in the Hindukush mountain range. Overall impact of this seismic event includes 280 deaths, 1700 injuries, 107,389 damaged houses[1].

The jolts of the earthquake were severely felt in many districts of KPK and GB; however, the intensity in Chitral was extraordinary because of its close proximity to the Hindukush range. The strong ground shaking in Malakand Division resulted in undeniable damage to 85,255 houses, 2402 government buildings and public infrastructure facilities[2]. Death toll in Malakand Division reached 170 besides 1142 injured. These massive losses concentrated in mountainous remote communities of seven districts including Chitral, Dir Lower, Dir Upper, Swat, Shangla, Malakand and Buner.



Seismic hazard of the region is un-questionable as evident from past events like 2005 Kashmir Earthquake including numerous aftershocks of 26th October Earthquake and very recent earthquake of 5.2 magnitude which happened on 22nd November with its epicenter in the same vicinity as of the October 26 earthquake.

[1] NDMA website updated on 03/12/2015

[2] PDMA/ PaRRSA report on 03/12/2015

On the other hand, inherent vulnerabilities of the affected population have become significantly worse in post-earthquake scenarios. People already live in conditions of poverty, inequality and with limited economic opportunities. The land is fragile and sloping, housing structures are weak, access to public infrastructure and services is generally limited, mountains are generally prone to landslides, flash floods, and other natural calamities. Food grains that had been stored for the whole year have been destroyed under the debris. This has undoubtedly worsened the food security situation in earthquake-affected villages. People here are living in unsafe areas and houses, due to lack of choices and limited capacities. In addition to the challenges of daily living, women and children are now at high risk as they are compelled to dwell under tents in open spaces. Widespread poverty, vulnerability, and remoteness, combined with increased environmental stress and limited economic opportunities, are seriously challenging the ability of mountain people to make a living.

What is needed immediately, in the short, medium and long term to reduce the suffering is:

- **Emergency relief** (food and non-food assistance, provision of medical care medicines etc.), drinking water, and shelter) – addressed to some extent by the Government and partners working in the affected districts from their existing resources.
- **Recovery and reconstruction of public infrastructure and buildings e.g.** roads, bridges, water supply schemes, irrigational channels, health and education facilities, public buildings etc., - proposed to be covered under the Recovery Plan.
- **Other assistance:** Provision of seeds and fertilizer and other agricultural inputs to rebuild livelihoods, financial assistance for reconstruction and repair of houses, rehabilitating irrigational channels, provision of compensation for injured/dead. Compensation for the injured, dead and houses fully/partially damaged being paid by the Government, the rest to be covered under the Recovery Plan.

Some aspects which should be integrated in any recovery and reconstruction projects are:

- **Build back better and strengthen resilience.** Despite the tragedy that each disaster brings, they also offer a unique window of opportunity to address root causes of vulnerability—such as improper land use zoning, poor enforcement of building codes, and gender inequality—and in the process strengthen resilience. The "building back better" process should factor in current and future risks; apply engineering standards for strengthening the resilience of physical assets; and strengthen capacities for managing residual disaster risk through local preparedness.
- **Involve local communities in the overall recovery effort**. The recovery process should give ample time and space for the voice and aspirations of the communities to be heard. Engaging local communities from day one will promote ownership of the recovery process and contribute to its success.

- **Strengthen local capacity** of the implementing partners and the communities.

1.1 Pakistan's Commitment to the Sendai Framework for Disaster Risk Reduction

Pakistan's commitment to the Sendai Framework for Disaster Risk Reduction 2015–2030[3] urges the nation to address disaster risk reduction and building resilience to disasters with a renewed sense of urgency within the context of sustainable development and poverty eradication.

Taking into account the experience gained through the implementation of the Hyogo Framework for Action, the Sendai Framework stresses the need for focused action within and across sectors by States at local, national, regional and global levels in the following four priority areas:

Priority 1: Understanding disaster risk.

Priority 2: Strengthening disaster risk governance to manage disaster risk. (Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery and rehabilitation

Priority 3: Investing in disaster risk reduction for resilience.

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

Disasters have demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of a disaster, is a critical opportunity to "Build Back Better". Adopting the aforementioned priority areas in Recovery Plan for affected communities of recent earthquake (on 26th Oct 2015) would ensure integrating disaster risk reduction into development measures for communities, resilience to disasters.

[3] Third United Nations World Conference on Disaster Risk Reduction (WCDRR) held on 14 to 18 March 2015, Sendai, Miyagi, Japan.

2. Framework for the Earthquake Recovery Programme

2.1. Introduction

The recent October 2015 earthquake resulted in loss of human lives and assets (including housing, livestock etc.), destruction and damages to the communication and irrigation infrastructures, education and health facilities, mosques, drinking water supplies, and government offices throughout the region. Mountainous remote communities in Chitral, Dir Upper, Dir Lower, Malakand, Swat, Buner and Shangla of KPK province were the hardest hit.

A state of emergency was declared in KPK province by the Chief Minister. The PDMA-PaRRSA under the Relief, Rehabilitation and & Settlement (RRS) Department took lead in coordinating the response. At provincial and district levels, the response is being coordinated by the respective provincial agency, divisional and district disaster management authorities. The Government of Pakistan has mobilized all resources to support the earthquake-affected areas. The Pakistan Army started search and rescue operations in affected areas. UN agencies mobilized emergency stocks as a preparatory measure to support government efforts.

So far 29,718 tents, 32,024 blankets, 3,750 plastic mats, 11,760 food packs, 19,000 tarpaulins, bottled water 14 tons, 49 water filter plants, 11 generator sets, 732 quilts, 460 bester, 130 pillows, 1.9 million packets of ORS and 270 packets of Zinc have been distributed in the earthquake affected areas of KPK.(Source: PDMA, State of relief provided 02 December 2015).

The Government also announced special package for the earthquake affectees, which is as follows:

Death compensation:	Rs.600,000
Grievous injury/permanent disability:	Rs.200,000
House damages (fully):	Rs.200,000
House damages (partial):	Rs:100,000
Loss of limb/leg:	Rs. 200,000

All compensation cases are being shared on 50:50 sharing basis (Federal & Provincial).
To-date the following compensation has been disbursed:

Compensation for deaths: 97%
Compensation for injuries: 86% (of the verified)
Compensation for housing: 84% of the fully damaged (16% under scrutiny)
Compensation for housing: 80% of the partially damaged (20% under scrutiny)
(Source: NDMA, Preliminary state of compensation provided 3 December 2015)

Verification process of the earthquake affected and damages is in progress. A complete update on the losses by PDMA KPK as of 7 December is given in tables 14 & 15.

Three grievance redressal cells (Peshawar, Charsadda and Malakand) have been established for earthquake affected missed out areas/to consider leftover cases for grant compensation.

The PDMA-PaRRSA, the lead agency of government, in this crisis, would like to work together with all stakeholders to support the affected districts in three major areas during the recovery phase: (i) Debris management, (ii) Reconstruction of community infrastructures, and (iii) Restoration of public service delivery. Emergency livelihoods and economic recovery is taken as a crosscutting issue that is to be considered as the central focus of all activities under the three focus areas. Under these areas, various interventions will be implemented in an integrated manner as a package with short, medium and long term interventions all starting early but with varying intensities depending on the specific local needs and contexts. The programme will focus on mobilizing the grassroot level organizations such as local service providers, Civil Society Organizations, under the overall leadership of the District Disaster Management Units (DDMU) and Local Bodies.

All activities of this programme will be based on the following fundamental principles:

- Locally viable and contextual
- Culturally appropriate
- Long term consequences (sustainability)
- Strengthened existing local institutions and mechanisms, including local government bodies.

2.2. Objective

The objective of the first phase of proposed recovery and reconstruction programme is to work with and provide necessary support to the local government institutions for debris management, reconstruction of community infrastructures, restoration of public service delivery, and safeguarding emergency livelihoods and economic recovery on the principle of "Building Back Better and Safer".

Despite the tragedy that each disaster brings, they also offer a unique window of opportunity to address root causes of vulnerability—such as improper land use zoning, poor enforcement of building codes, and gender inequality—and in the process strengthen resilience. The "building back better and safer" process would consider adopting a multi-hazard, systems-based, and integrated approach, factoring in current and future risks; apply engineering standards for strengthening the resilience of physical assets; employ strategies and tools for pre-disaster financial planning; and strengthen capacities for managing residual disaster risk through local preparedness.

Restoring livelihoods in the earthquake affected districts of Malakand will be a critical component of recovery and reconstruction effort. This strategy will enable resumption of normalcy in the affected areas and involve rebuilding assets to generate income and employment as well as protecting the most vulnerable members of the community. Livelihoods support is a critical part of recovery and reconstruction effort and would protect the most vulnerable in the short term while reviving economic activity for the longer term.

2.3. Areas of Intervention

The interventions of the Recovery Programme will be based on the following five major sector response strategies:

A. Rehabilitation of Physical Infrastructure

The standards for the repair or replacement would be higher than pre-disaster and activities under the restoration of public service delivery would include establishing a temporary work place for the local government institutions, medical and health facilities etc. that are completely damaged by earthquake and repairing partially damaged. This activity would also repair and restore communication network roads, bridges etc., water supply schemes, irrigational channels.

Reconstruction begins after building safety has been assessed. Rapidly assessing safeties, meaning identifying buildings that need to be demolished, repaired, or are safe. The Seismic Safety Assessment of Buildings is a two-step process. The first step consists of deciding which buildings can be occupied, which are likely needing repairs and should not be occupied, and which are heavily damaged and likely to be demolished. These decisions are made using a standard methodology of visual inspection and evaluation of building components. When inspected, buildings are tagged as follows: Green – Safe to occupy; Yellow – Damaged and do not occupy; Red – Unsafe Do not enter.

B. Housing Reconstruction

The standards for the repair or replacement must be higher than pre-disaster and as such the compensation package would need to be supplemented by provision (cash or kind) to include better construction standards and if need be for retrofitting. Technical advice and training for improved practices would be part of the package.

Considering the extreme conditions transitional shelter could be considered to provide habitable covered living space and a secure, healthy living environment, with privacy and dignity to occupants during the period between a natural disaster and the achievement of a durable shelter solution". Transitional shelters could be:

- **Upgradeable.** Improved over time and become permanent housing, which is achieved through maintenance, extension, or replacement of the original materials;
- **Reusable.** Used for an alternative function, for example, a shop or storage;
- **Re-sellable** dismantled and its materials are used as a resource to sell
- **Recyclable.** The material from the transitional shelter is used in the construction of a permanent structure.

C. Reactivation and Strengthening of Local Economy

The damage and destruction caused by the earthquake goes beyond the physical aspects as it severely affects the immediate, short-term livelihoods of communities. The program would focus on creating short-term livelihood opportunities and economic recovery through cash for work and skill development training as a cross cutting issue across the focus sectors. Provision has also been made to develop projects based on the following specific on-farm[4] and off-farm[5] activities under emergency

[4] **On-farm activities** such as vegetable and other short-term farming support for seeds and fertilizers, renovation of small-scale irrigation and other agro-infrastructures, and training on livestock and vegetable farming.

livelihoods and economic recovery. While designing and implementing projects for emergency livelihoods and economic recovery, a thoughtful attention will be given to ensure that women get equal opportunities for training, cash for work, and equal pay for equal work. Soft social sector needs such as education, health and water and sanitation have also been looked into and provisions made to facilitate rehabilitation of affectees in the seven districts.

D. DRR and Environment Recovery Strategy

Following the initial impact of disasters and environmental impacts of the debris management and disposal, the main pressures are likely to come from solid waste, water consumption and pollution, energy and food needs, and demands on local materials for reconstruction. As it is common in post disaster contexts, affected areas often focus their immediate assistance on humanitarian needs, while recognizing that environmental issues will become increasingly important during the recovery phase over the medium to longer term.

Harmonizing Environmental and Social Guidelines would also play an important role for the various construction and other operations and agencies involved in the recovery and reconstruction, so as to facilitate cooperation and avoid unnecessary complications and transaction costs.

DRR would be mainstreamed in all interventions, awareness raised and capacities enhanced in all sectors of intervention.

E. Reconstruction and Rehabilitation Management Mechanism.

The institutional set-up for leading, coordinating and executing recovery and reconstruction requires leadership by the government which is best placed to lead and coordinate the process.

The institutional set-up for leading, coordinating and executing recovery and reconstruction should be decentralized as much as possible. The Department of Relief, Rehabilitation and Settlement (RRS) is responsible for managing DRM aspects in cooperation with the Provincial Disaster Management Authority (PDMA) /Provincial Reconstruction & Rehabilitation Authority (PaRRSA), under its control for formulating policies, coordinating with partners, mobilizing resources, and monitoring progress, and with local entities (DDMU or PMU) responsible for ground-level implementation.

The following aspects have been considered before proposing to adopt the model: Past experience of the administrative unit in handling post-disaster recovery and/or existence of well-grounded systems for disaster management; preliminary planning and well-practiced administrative and operational procedures, such as additional capacity in government departments to cope with the surge in demands during recovery, which may stretch over time; capacity of local authority and line agencies to coordinate with partners, including familiarity with the policies and procedures of international development partners.

[5] **Non-farm activities** such as food processing, weaving, crafts, small groceries, training on masons, carpenters, plumbers, electrical and electronics good maintenance;

Since the Committees already exist at the Provincial, Divisional and District levels headed by the Chief Secretary KPK, Divisional Commissioner and District Commissioners, respectively, there is no need to create additional entities. Instead it is proposed that the task should be assigned and accommodated within the existing setup and the role and responsibility is included in the mandates of the Provincial, Divisional and District steering committees for fast track approval and implementation of the projects. Project Management Unit (PMU) at the divisional level in Malakand under the supervision of the Commissioner and dedicated units at the district level placed in the respective departments under the control and supervision of the Deputy Commissioners. However, there would be need to enhance their capacities with additional staff and equipment.

3. Rehabilitation of Physical Infrastructure

Infrastructure plays a pivotal role in the development process, but the unrelenting natural disasters in recent years coupled with volatile security situation and population growth have increased pressure on existing infrastructure in Pakistan.

In earthquakes, although much of the human losses occur from damages to the buildings, but the negative economic impact instead arises from damage to critical infrastructure such as roads, bridges, governance buildings, irrigation channels, energy generation units and other utilities.

Considering the terrain of the affected districts, significant interdependence exists between infrastructure systems, meaning that damage to one system may result in disruption of other critical infrastructure.

The Infrastructure sector covers the following sub sectors;

1. Government Buildings
    i. Public Administration
    ii. Health
    iii. Education
2. Water Supply and Sanitation
3. Roads and Bridges
4. Irrigation
5. Energy

3.1. Government Buildings:

I. Context:

Government buildings are the most critical structures and play crucial role in recovery, rehabilitation and ultimately, reconstruction activities. October 26th, 2015 Earthquake caused widespread damages to these, including partial damages to total collapse. The reasons of the extensive damage, apart from the severity of the earthquake include poor quality control, substandard construction material, unfamiliarity of the public sector engineers and other construction professionals with disaster resilient construction and retrofitting techniques. The need for restoration of government buildings is therefore one of the key needs of the early recovery process.

The government department buildings referred to in the PDMA damages assessment include the following:

A. Public Administration:

Functioning of the government revolves around the public administration structure of district governments. The public administration offices are the epicenter of all relief, rehabilitation and reconstruction activities following the earthquake. A total of *231* office buildings were partially damaged whereas *09* were fully damaged as a result of October 2015 earthquake. District wise detail of damages to government buildings is provided in Table 17.

B. Social Services Buildings:

a. Health

Hospitals, Basic Health Units and other health facilities have to cater for the influx of the injured. These facilities are of vital importance for saving lives and hence need to be accorded their due importance. A total of *97* health facilities including *10* Hospital buildings suffered partial damage and *06* were fully damaged. District wise detail of damages is provided in Table 17.

b. Education (Including Elementary & Secondary Schools and Colleges):

School buildings are the worst hit government sector following the 26th October earthquake. Students are thus forced to sit outside under the open sky even during the ravaging winter. The coming winter vacations are likely to be extended considerably in the absence of an organized approach towards school rehabilitation. The resultant closure of schools will keep the children away from the schools and vulnerable to a number of other factors i.e. child labour, extremism and domestic violence etc.

Schools can be used very effectively to propagate the cause of earthquake safer construction as almost every household in a society is stakeholder in the schools' safety.

The 2015 earthquake partially damaged 1370 school buildings whereas 173 were fully destroyed. District wise detail of damages is available in Table I7.

II. Challenges:

- Structural stability of most of the buildings has been compromised and shaken up badly disturbing their load path. A number of buildings being presumed as partially damaged are a potential threat to the occupants. The buildings are being used out of compulsion and lack of awareness about the stability of the structures. The health and education sectors need immediate attention.
- The earthquake affected areas are mostly highlands, with difficult or limited access. The assessment and reconstruction/rehabilitation in these areas is a monumental task considering severed link/access roads, steep gradients with sharp turning radius.
- The capacity of artisans like masons, carpenters, steel fixers and the contractors regarding EQ resilience construction is a big question mark. Even the lack of capacity of the line departments responsible for supervision and the quality control or awareness raising mechanism is also evident from the wide spread damages littered in the cities and the mountain tops.

III. Implementation Strategy:

Implementation will be managed through a two pronged strategy i.e. catering for the short term recovery needs and long term strategic planning will be implemented in parallel. The three phases of implementation strategy are short, mid and long Term.

a. Short Term Strategic Phase:

i. Visual Structural Assessment/Screening of Critical Building:

Visual Structural Assessment will be carried out as a first step to gauge the structural damage incurred to the buildings. Academia from relevant engineering universities and research institutes working in the field of Earthquake Engineering will be engaged to visually screen/ assess the damage through structured checklists and physical assessment done by the engineering students as part of their research work. Communication and Works Department staff and local NGO's will also be involved in the process to instill ownership and build their capacity. These buildings will be categorized as follows; Recommended for Reconstruction, Retrofitting and non-structural repair.

ii. Detailed Assessment and Design:

Based on the outcome of visual structural assessment, buildings requiring structural interventions will be further analyzed structurally for detailed design, cost estimation and subsequent tendering. The Design being a highly technical matter will be entrusted to engineering universities having the requisite capacity and experienced consultancy firms in the private sector. The same practice was successfully employed in the post 2005 earthquake scenario with effective results.

iii. Tendering and Evaluation:

The tendering process for the award of work for retrofitting, reconstruction projects will be undertaken by the respective line departments. A detailed evaluation criterion will be developed and followed for selection of contractors for the execution of works. A technical committee involving the representatives of respective stakeholders and PDMA-PaRRSA will be responsible for evaluation of tenders.

iv. Shelter Arrangements during Transition Phase:

Transitional shelter solutions will be provided so that the institutions can function with a certain degree of comfort and effectiveness till permanent reconstruction or repair and retrofitting work is completed.

Schools will be provided with prefab structures to enable them start functioning on immediate basis. Every such structure takes a maximum of 45 days to get fully functional.

b. Medium Term Strategic Phase:

i. Institutional Arrangements:

The capacity of DDMU of each affected district in supervising the reconstruction and retrofitting activities will be enhanced with the services of earthquake safer construction/Retrofitting experts. The re-construction/retrofitting experts apart from overseeing the reconstruction activities will also provide on the job training to the line departments' staff. These experts will be provided with logistic support including rental transport, requisite equipment and furniture etc.

ii. Trainings:

A "training and quality assurance unit" will be set up and overseen by a reconstruction/retrofitting expert. Basic training on assessment, repair, retrofitting, remediation and seismic improvement to engineers, junior engineers, foremen, and artisans is needed.

This training will be initiated as soon as possible, and will be repeated on need basis throughout the reconstruction period accompanied by awareness raising in the communities. This will be an integral part of the recovery strategy.

Candidates meeting minimum requirements will be awarded certificates. Only certificate holding artisans will be encouraged to work as lead artisans on the construction sites. Engineers/Junior Engineers / sub / master masons working on the projects would also be certified accordingly. Hence efforts would be made to give it priority and initiating this training certification program at the earliest so that adequate numbers of artisans are trained before reconstruction takes off.

c. Long-term Strategic Phase:

Following the evaluation process the selected contractors will initiate the onsite execution of works which will involve Debris Removal, Structural retrofitting/reconstruction, Finishing works, final inspection and Handover.

Detailed supervision of these projects will be done by the line department's staff in collaboration with the Reconstruction/Retrofitting experts of respective District Disaster Management Units (DDMUs) while the top supervision will done by the engineering universities responsible for assessment and design.

Table 2: Reconstruction and Rehabilitation Cost of Government Buildings

S.No	District	Public Admin Buildings Cost (M)	Health Buildings Cost (M)	School Buildings Cost (M)	Cost in Million USD Year 1	Cost in Million USD Year 2	Total Cost in Million USD
1	Chitral	0.863	0.230	22.379	9.389	14.083	23.472
2	Dir Lower	0.863	0.000	30.383	12.498	18.747	31.246
3	Dir Upper	2.442	0.536	11.558	5.814	8.722	14.536
4	Swat	12.650	4.140	56.925	29.486	44.229	73.715
5	Shangla	0.035	0.886	14.122	6.017	9.025	15.042
6	Malakand	0.386	1.725	7.360	3.789	5.683	9.471
7	Buner	0.786	1.024	9.614	4.569	6.854	11.423
				** Sub Total*	71.562	107.343	178.904
***785 Nos. Transitional Shelters/ Prefabs size (40'x20') @USD 85/Sqft. for school buildings.*					5.338	0.000	5.338
Earthquake safer Construction Trainings					0.021	0.031	0.052
Recon/Retrofitting Expert one in each district					0.151	0.151	0.302
Logistic Support for Recon/Retrofitting Experts					0.147	0.063	0.210
				Total	**77.219**	**107.588**	**184.807**

**Includes 15 % additional costs of DRR resilient features and services.*
***SRSP has provided a number of temporary prefabs during the 2010 mega floods. These tested and successfully useful structures are now costing Rs: 850 per sq. ft. This type of structure can be erected in a total of 45 days, at each location.*

3.2 Water Supply and Sanitation:

I. Context:

Safe water supply and sanitation needs are considered to be of high priority by the affected population. 214 water supply schemes have been partially damaged by the earthquake whereas 9 schemes have been fully destroyed rendering them non-functional. Details of the damaged and nonfunctional water supply schemes are reflected in Table 17.

II. Challenges:

- Maintaining water quality standards in the far flung areas will be a major challenge; this can be overcome by training of community in water testing techniques and providing them with the portable water testing kits.
- Ensuring water equity and encouraging vulnerable segments to participate in the design of water supply schemes so that their needs are catered.
- Since the implementation of water supply schemes is community lead initiative, the progress of implementation is likely to suffer because the community will be engaged in reconstruction of their houses.

III. Implementation Strategy:

The implementation strategy for recovery of water supply and sanitation sub sector will again be executed in short, medium and long term phases.

a. Short Term Strategic Phase:

The following works will be conducted through line departments, local NGOs and more importantly by activating the WASH cluster mechanism.

- Restore partially damaged water supply systems by involving communities to repair minor damage to water systems through cash for work and materials support.
- Provide technical supervision to the communities for minor repairs.
- Reconstruction of toilets and hand
  materials support.
- Provision of temporary toilets and hand
  sanitation is covered under the Housing sector.

b. Medium and Long Term Strategic Phase:

- Initiate Community Led Total Sanitation (CLTS) programme in collaboration with local NGOs, line departments and affected communities.
- Rehabilitate damaged water supply systems and construct new water supply schemes with water conservation and disaster resilient features.
- Develop water safety plans incorporating water quality data monitoring.

Table 3: Reconstruction and Rehabilitation Cost of Water Supply and Sanitation

S.No	District	Cost in Million USD Year 1	Cost in Million USD Year 2	Total Cost in Million USD
1	Chitral	0.416	0.624	1.040
2	Dir Lower	0.000	0.000	0.000
3	Dir Upper	0.221	0.331	0.552
4	Swat	0.323	0.485	0.808
5	Shangla	0.146	0.219	0.366
6	Malakand	0.207	0.311	0.518
7	Buner	0.084	0.127	0.211
	** Sub Total*	1.397	2.096	3.494
	Training Cost	0.046	0.000	0.046
Cost of temporary Toilets @USD 80/per school provided with each transitional shelter i.e. 785 Nos.		0.063	0.000	0.063
	Total	1.506	2.096	3.602

**Includes 15 % additional costs of DRR resilient features and services.*

3.3. Roads and Bridges

I. Context:

Road network in all the 7 districts have sustained damage to some extent with Chitral suffering most of the damage in road sector. Relatively a small percentage of the inter-city network suffered settlement or sinking or complete damage due to the earthquake. In the rural roads, landslides caused partial blockage of road traffic for a few days in limited sections only. Major interruption of traffic was experienced in the entire Chitral-Mastuj, Chitral-Garam Chashma and Chitral Bamboorait sections. 222 roads have been partially damaged and 6 roads fully damaged by the earthquake Details of District wise roads and bridges damage is given in Table 17.

II. Challenges:

- Loss/destruction of line department offices responsible for undertaking rehabilitation and reconstruction works.
- The assessment and reconstruction/rehabilitation in the mountainous areas is a monumental task considering severed link /access roads steep gradients and the coming heavy winter/snow.
- Developing and implementing quality control measures to reduce the risk of substandard construction and ensure quality control during the reconstruction phase.

III. Implementation Strategy:

The implementation strategy for recovery involves short, medium, and long term works. Short term works will be completed within 02 months. Medium term works will be completed in 12-18 months. Relatively large works for rehabilitation, reconstruction with earthquake safer features, would need 24 months and are categorized as long term works.

a. Short Term Strategic Phase:

The following works will be executed through line departments through prequalified contractors/ local communities to avoid the lead time required for procurement.

- Multi-disciplinary situation surveys and risk assessments of all damaged roads and allied structures to plan and prioritize the rehabilitation, reconstruction and recovery works done by the expert committee proposed for recovery of critical buildings.
- Debris removal and clearing the right of way for traffic flow.
- Basic restoration of roads and bridges including repair of highly vulnerable sections.
- Maintaining lifeline access to communities through provision of temporary bridges.
- Stabilization of road embankment and vulnerable bridges to endure the harsh winter/snowfall season.

b. Medium Term Strategic Phase:

- Planning and engineering design of large rehabilitation and reconstruction works to be completed. Designing work like in the case of critical buildings will again be entrusted to engineering universities having the requisite capacity and experienced consultancy firms.

- Rehabilitation of intercity and rural roads in accordance with earthquake safer techniques.
- Re-assessment of the structures of all existing roads and bridges to assess the vulnerability to earthquake scenario and to plan and prioritize the necessary retrofit works.
- The tendering process for the award of work for rehabilitation of roads and retrofitting, reconstruction of allied structures will be undertaken by the respective line departments.

c. Long Term Strategic Phase:

- Risk mitigation of the potential landslides on lifeline roads through bio-engineering soil stabilization techniques.
- Award of Work and mobilization of contractors for the large scale rehabilitation /reconstruction works of intercity roads and allied structures.

Table 4: Reconstruction and Rehabilitation Cost of Roads & Bridges

S.No	District	Cost in Million USD Year 1	Cost in Million USD Year 2	Total Cost in Million USD
1	Chitral	1.087	1.630	2.717
2	Dir Lower	4.319	6.479	10.799
3	Dir Upper	1.555	2.333	3.888
4	Swat	0.598	0.897	1.495
5	Shangla	1.513	2.269	3.782
6	Malakand	0.216	0.324	0.541
7	Buner	0.018	0.028	0.046
	*Total	9.307	13.961	23.268

**Includes 15 % additional costs of DRR resilient features and services.*

3.4. Irrigation:

I. Context:

Irrigation sector is the lifeline of rural communities especially in the hilly terrain as it facilitates the self-sustenance of the local communities for reducing vulnerability of food security especially in land locked area like Chitral. In spite of major scale of the earthquake, important structures of the systems such as intake, super
except Chitral where 77 irrigation networks were partially damaged. Details of damage attached as Table 17.

II. Challenges:

- As in the case of water supply schemes, the progress of implementation is likely to suffer because the community will be engaged in reconstruction of their houses.

- Disaster resilient design and retrofitting techniques of irrigation channels is a grey area in the engineering field in the country. Considerable R&D needs to be undertaken for developing such designs and retrofitting techniques.

III. Implementation Strategy:

The overall strategy for recovery and reconstruction is to swiftly restore the performance of irrigation sector with the purpose of minimizing economic losses to the affected communities before the upcoming cropping season.

a. Short Term Strategic Phase:

With the technical assistance of line departments, and provision of tools and materials, community organizations will be able to clear blocked channels, repair minor cracks, or even install make shift pipes in most damaged areas. Material may include PVC pipes, cement, polyethylene sheet, plastic piping, etc. While in parallel, preparation of detailed design and costing, followed by the tendering process is proposed to be initiated.

b. Medium and Long Term Strategic Phase:

Physical reconstructions should be planned in such a way that it does not take more than 12 to 18 month preferably through the participation of community organizations.
Pilot projects of earthquake resilient construction and seismic retrofitting of water channels and allied structures will be undertaken and their efficacy and seismic performance tested through scientific means. Based on the results of the pilot irrigation projects, design guidelines will be updated and retrofitting guidelines formulated.

Table 5: Reconstruction and Rehabilitation Cost of Irrigation Sector

S.No	District	Cost in Million USD Year 1	Cost in Million USD Year 2	Total Cost in Million USD
1	Chitral	0.801	1.202	2.003
2	Dir Lower	0.000	0.000	0.000
3	Dir Upper	0.000	0.000	0.000
4	Swat	0.000	0.000	0.000
5	Shangla	0.000	0.000	0.000
6	Malakand	0.000	0.000	0.000
7	Buner	0.000	0.000	0.000
	**Sub Total*	0.801	1.202	2.003
Development of guidelines for retrofitting and construction of Disaster resilient irrigation structures		0.030	0.000	0.030
	Total	0.831	1.202	2.033

**Includes 15 % additional costs of DRR resilient features and services.*

3.5. Energy:

I. Context:

The districts struck by the earthquake disaster are located in the extreme cold region neighboring Hindu Kush and Karakoram ranges. For the cooking, heating and lighting needs, the population here is largely dependent on the fast depleting forests. The forest cuttings are currently being sold @ Rs 500/- per 40 KG which is even difficult to be afforded by the vulnerable poor. Hydroelectricity generation potential is available in abundance in the area, but it is untapped. The deforestation and resultant denuded uplands send the rain water gushing down their slopes, cause massive landslides and prevent ground water recharge. The water channels passing the barren hill slopes get washed away, multiplying the disaster to other dimensions. Details pertaining to hydro power units are given in Table 6.

II. Challenges:

- Locals have predominantly been dependent on the forests for all their cooking and heating needs besides using Kerosene oil for illuminating lamps.
- Lack of education and awareness towards the use of electricity.
- Lack of capacity in conducting feasibility studies, designing, and construction of hydroelectricity generation units.
- High initial capital costs.
- Hilly terrain for pulling the transmission lines.
- Lack of trained and technical manpower to operate and maintain the power lines and household electricity fittings etc.

III. Implementation Strategy:

The overall strategy will involve construction of additional community hydro power stations to ease the pressure on forests in meeting the demand for firewood. Likewise, energy efficient stoves will be provided to the vulnerable groups of the society where hydro potential is not available.

Micro/Mini scale hydro power developmental project can be executed, operated and maintained by community and fulfill the energy requirements of the natives.

On Job and specialized training will be provided to the operators and management committees. The community 'Power Committees' will be formed to carry out routine operation of the MHP units.

Classification	Power Rating
Micro Hydro	< 100 kW
Mini Hydro	100 kW – 1 MW
Small scale hydro	1 MW – 25 MW

Source: SRSP

The provision/installation of mini/micro hydro power units in the potential areas would help address energy needs i.e. cooking, heating and electricity. It would improve basic standard of living by reducing exposure to the fuel wood smoke; provide hot water for better hygiene. The womenfolk

mainly responsible for collecting fuel wood will have more time to attend to their children and other family affairs. It will also help keep their abode hot and cozy during the long winter nights. Additionally provision of uninterrupted lighting will provide the younger generation with more time for their studies. The provision of mini/micro hydro units will save the environment and natural resources from depletion. The need for preserving forest will make sense to the locals as it will add to their future improved livelihood resource. The preserved forest will in turn put a stop to the environmental degradation; add to the flora and fauna besides holding back the flash floods and the unnecessary landslides.

a. Short Term Strategic Phase:

As a short term measure the transmission lines (LT) from micro hydro units to the communities need to be restored on priority coupled with minor repair of the plant structures i.e. clearing of input channels from debris, realignment/repair of penstocks etc.

The rapid assessment of micro, mini and small hydro for structural damage and subsequent repair and retrofitting will be carried out on immediate basis. Similarly, feasibility studies for potential mini/ micro hydel power units to be carried out in the affected areas immediately.

b. Medium and Long Term Strategic Phase:

The medium to long term recovery activities include repair, maintenance, re operation of micro hydro plants and construction of new community hydropower units.

The introduction of additional mini/micro hydroelectricity units will create more employment opportunities. Number of hydel stations proposed in various districts is based on observations for the potential sites available. However, a detailed survey is to be conducted for actual allocations. The installation/repair and operation needs will be fulfilled by the locals after their capacity building initiatives by the concerned rehabilitation and reconstruction agencies. This would help to reenergize economic activity in the area and help to stop further environmental degradation by reducing pressure on the use of wood for heating and cooking.

Table 6: Reconstruction and Rehabilitation Cost of Energy Sector

S.No	District	No. Of New Hydropower Plants	Cost in Million USD Year 1	Cost in Million USD Year 2	Total Cost in Million USD
1	Chitral	12	0.768	1.152	1.920
2	Dir Lower	7	0.448	0.672	1.120
3	Dir Upper	10	0.640	0.960	1.600
4	Swat	11	0.704	1.056	1.760
5	Shangla	14	0.896	1.344	2.240
6	Malakand	11	0.704	1.056	1.760
7	Buner	5	0.320	0.480	0.800
		*Total	4.480	6.720	11.200

**Includes 15 % additional costs of DRR resilient features and services.*

Table 7: Consolidated Cost of Infrastructure Reconstruction & Rehabilitation Component.

S.No	Component	Year 1 Million USD	Year 2 Million USD	Total Cost in Million USD
1	**Government Buildings**			
	i- Public Administration	7.23	10.85	18.08
	ii- Health	3.62	5.43	9.05
	iii- Education	63.07	94.61	157.68
	Sub Total	**73.92**	**110.89**	**184.81**
2	**Water Supply & Sanitation**	**1.51**	**2.10**	**3.60**
3	**Roads and Bridges**	**9.31**	**13.96**	**23.27**
4	**Irrigation**	**0.83**	**1.20**	**2.03**
5	**Energy**	**4.48**	**6.72**	**11.20**
	Total	**90.05**	**134.86**	**224.91**

4. Housing Reconstruction

I. Context:

Pakistan is a country with high seismicity and has suffered tremendous damage in the last 70 years, (e.g., in 1935 Quetta Earthquake, 2005 Kashmir Earthquake, Awaran Earthquake 2013 and now recent event of Oct 26, 2015). All these earthquakes have proven the fragility of the built environment in Pakistan confirming that "not the earthquakes but buildings kill people".

The recent earthquake caused severe damage to more than 85,000 houses mostly in mountainous regions of North Western part of Pakistan. Although there has been reported minor to moderate damage to buildings in all regions where the earthquake jolts were felt.

Damaged houses in Lower Dir

Damage to building during an earthquake is the function of the level of ground shaking and ability of the buildings to resist ground shaking. According to the 1998 Pakistan Census Records 93 % of the housing in Malakand Division is in rural setting, where dominant construction material is undressed stone with mud mortar and a heavy timber roof. Such evident vulnerabilities of the houses were the main cause of damage in the affected areas causing damaged to overall 17.4% of total housing units in Malakand Division. Unfortunately the affected population has added vulnerability factors which aggravated the situation e.g. located at high altitude areas with difficult access and communication network, extreme weather conditions, lowest income group mostly daily wage labor and very low literacy rate in the area. Therefore, the Government announced an immediate relief to the affected population and distributed PKR 200,000/- for fully damaged and PKR 100,000/- for a partially damage house. This housing compensation money helped people to start constructing their shelter and get at least some relief from early setting winter in the region.

District	Houses Damaged		
	Fully	Partially	Total
Chitral	3378	15921	19299
Dir Lower	6662	11772	18434
Dir Upper	4452	11900	16352
Swat	2881	8988	11869
Shangla	4502	6893	11395
Malakand	1145	3135	4280
Buner	636	2990	3626
Total	**23,656**	**61,599**	**85,255**

Source: PDMA-PaRRSA Report on Dec 07, 2015

In most of the affected area people are busy in rubble removal and re-construction of their damaged houses, but are unaware to deal with vulnerabilities of indigenous construction by stone/mud houses. However, the consciousness is high and they are trying to improve construction material and techniques with their limited knowledge and capacities. There is a need to intervene in the reconstruction process, devise and disseminate knowledge about safer construction methods to the

people. Frequent jolts (aftershocks and new independent earthquake events) since last two months confirm high seismic risk to the area which further strengthened the need of 'safer e-construction' to avoid such damages in case of a future event.

II. Challenges:

Reconstruction of damaged houses in Swat

The affected areas are in pockets and mostly at mountain peaks and in the absence of any detailed mapping on GIS it would be extremely difficult to catch up and access each and every household especially in snow bound areas. Rubble masonry construction which is the most commonly adopted type of building is comparatively weak in earthquake response, therefore making such construction resilient would require specific technical input for retrofitting and improved new construction. This would further require skilled and trained labor as well as a strong monitoring mechanism. Lack of trained masons and artisans would be another obstacle to deal with for "build back resilient".

Current construction practices involve extensive use of wood, especially for roof, keeping on this trend would be a threat to rapidly depleting forest cover. A feasible solution shall be avoiding wood use but at the same time it should have the least carbon footprints in general.

Low literacy rate and least available communication networks make it more difficult to reach out and capacitate affected communities to learn resilient construction practices. Training and capacity building of the affected communities with demonstrated model (for most vulnerable families like widow, disabled or minor head of the family) of such improved construction technologies and tips is required. Most of the affected people come in the lowest strata of income group of the country so financial support shall be required to enable the community to respond to DRR standards incorporation in their new houses.

III. Implementation Strategy:

Limited time, communication networks and difficult access to the affected areas demand a high pace strategy for reaching out the people with the right piece of information (i.e. retrofitting techniques).

a) Detailed Assessment and mapping of damaged buildings:

Using GIS and satellite images data up to village level can be retrieved and interpreted from the housing compensation record. This would help to study the target areas and in developing appropriate construction solutions/ designs/ techniques as well as devising dissemination mechanism

of such solutions to the public. This mapping along with baseline survey would serve as a main data source for avoiding duplications and ensuring strong monitoring of the quality standards.

b) Transitional Shelter provision for most vulnerable families:

The damaged houses either classified as "full or partial" are not livable and the affected families are sharing space with their neighbors, relatives or forced to live in the tents which are not feasible for the cold weather especially at night and in rain. Transitional shelter shall be provided to the most vulnerable 2000 families where a widow, minor or disabled is heading the family. There are also issues where tenants did not receive compensation money and there is dispute of reconstruction cost being paid by the owner of the land. Such cases can also be taken on priority basis for provision of transitional shelters. These shelters would provide enough insulation for the inhabitants to live comfortably during winter. It would be ensured that material of the shelter does not contribute to environment degradation, for example; excessive use of wood not to be encouraged.

c) Building upon past experience:

After 2005 Kashmir Earthquake, 2010 Floods and 2013 Awaran Earthquake, massive reconstruction activity generated number of feasible ideas and simple solutions for damaged houses. A careful scrutiny of all such designs can help in finalization of feasible designs for houses to be constructed as well as retrofitting of the units already constructed or under-construction.

Karvaan Ghar Swat 2010

d) Utilizing Tested Mechanism of DDMU:

As in the case of reconstruction phase after 2005 Kashmir Earthquake, DDMUs be the focal point of all stakeholders. Financial and technical support to the beneficiaries shall be facilitated and monitored by strengthened DDMUs' structure and carefully developed MIS.

Bhattar construction by UNHABITAT 2012

e) Financial Support and Safer Construction Compliance:

A cash grant of USD 500 shall be disbursed to the affected families for strengthening their houses and improving comfort, paid in two parts i.e. USD 250 upon satisfactory construction/ retrofitting of walls, addition of latrine and energy efficient kitchen and second tranche on completion of roof system. All payments are subject to compliance of safer construction guidelines.

f) Collaboration with Interested Partner Organizations:

INGOs and NGOs shall be facilitated for collaboration at DDMU level in identified target area and sectoral interventions. A well planned, centrally coordinated participation will ensure equal development opportunities for affected communities avoiding duplication of resources. Relevant information and progress updates of all partners shall be managed through designated MIS.

g) Using electronic media for extended outreach:

Considering urgency of the housing reconstruction because of harsh weather threats, safer construction and other relevant information needs to be disseminated very quickly. There may be difficulties of access to some areas, however, a generalized set of information shall be disseminated using media and technology oriented solutions. For example; information regarding appropriate construction material, cash tranches, grievance redress system and training plans.

h) Demonstration of Model Construction Units:

Five model units shall be constructed in each affected UC to demonstrate safer construction and retrofitting techniques. These 200 model units shall be used for training purposes of engineers, labors, masons and monitoring personnel during construction phase. Selection of model units shall be identified to benefit the most vulnerable families at UC level recommended by the committee of local body representative, revenue department, notable of the community and DDMO.

Energy efficient stove/ kitchen (above) and Eco-friendly toilet (below)

i) Ensuring provision of basic wash facilities and comfort to the beneficiaries:

Most of the affected households do not have toilets facilities, independent kitchen area and appropriate heating system for the house. Provision of a latrine unit and kitchen shall be ensured for reconstructed and refitted rubble stone masonry houses. Appropriate heating shall be provided in two ways. Areas with feasible hydel power capacity shall be supported for electrical gadget or using energy efficient mud stoves lowering burden on the forest for fuel wood consumption.

j) Depending upon Local Human and Technical Resources:

A general trend in the area for construction of houses is on self-help basis and community participation. Therefore, planned opportunities shall be provided to affected people to participate in the training programme for acquiring required skills of construction. Educated youth trained as master trainers and local body representatives and TMA staff trained for supervision. Involving local labor for construction, training of small scale entrepreneur and supervision staff is expected to generate livelihood opportunities at local level.

k) Monitoring:

A three tier supervision and monitoring mechanism will ensure desired quality of reconstruction and retrofitting activities. At local level, the elected representative level will be trained for inspection of the damaged houses. DDMUs will be capacitated in human resource with two trained engineers/ architects and four sub engineers for field monitoring and tracking progress. Finally, technical committee involved in infrastructure sector shall be responsible for spot checks and dealing with technical issues in design adaptation.

Table 8: Cost Estimates of Housing Reconstruction Programme

	Activities	**Year 1**	**Year 2**	**Total**
		(USD Millions)	(USD Millions)	(USD Millions)
1	Detailed assessment, mapping and baseline at village levels	0.150	-	0.150
2	Provision of Interim Shelters (2000)	0.666	-	0.666
3	Demonstration unit (model) construction (150 x 2500 – Year 1) and (50 X 2500 – Year 2)	0.375	0.125	0.500
4	Cash Grant for resilient structures USD 500 per HH, construction of a latrine and a kitchen/ stove	22.000	20.630	42.630
5	Support to strengthen DDMUs (personnel & equipment)	0.200	0.100	0.300
6	Training of construction workers, DDMU staff and local house builders	0.500	0.150	0.650
7	Information Dissemination	0.200	0.150	0.350
	Monitoring & Overheads	3.000	5.800	8.800
	Total	**27.091**	**26.805**	**53.896**

5. Reactivating and Strengthening of Local Economy

I Context:

As agricultural households struggle to cope with the impact of the 2015 earthquake, there is the added risk that they will be forced to resort to negative coping mechanisms, such as the liquidation of key livelihood assets and degradation of the natural resources base for their immediate survival needs[6]. These together with pre-existing poverty, inequalities, exclusion and discrimination have a direct bearing on how survivors respond to the disaster and the extent of their resilience to such events in the future. The fragile mountain ecosystem is highly exposed to climate variability and susceptible to frequent natural hazards. Livelihood vulnerability is a function of this exposure to hazards, and the adaptive capacity of the population.

The loss of crops, livestock, stored grain, seeds, and agricultural tools and infrastructure and disruptions in the delivery of inputs and market access may hinder the resumption of agricultural activities during the (rabbi or winter) plantation season and reduce agricultural production. The earthquake has resulted in delays to the regular agricultural operations. The combination of loss of crops and livestock, damage to stored grain, reduction in incomes, and reduced livelihood options may cause more people to become food insecure.

As such reactivating and strengthening of the local economy of the affected area must be the top priority in the reconstruction and recovery process and is a critical component of recovery and reconstruction efforts. The strategy that enables resumption of normalcy in the affected areas must involve rebuilding assets to generate income and employment as well as protecting the most vulnerable members of the community. For further details see the response matrix (attached) for revitalization of livelihoods

Earthquake affected the following key sectors of the local economy:

1. Standing crops, seeds, food stores, agricultural tools, agriculture culture related infrastructure, substantial yield reduction,
2. Livestock
3. Food Security
4. Tourism
5. Migration (Most of the migrant workers have returned home to take care of their family members and rebuild houses though it is difficult to estimate the short-term impact of the change in migration pattern)
6. Employment loss

[6] People, particularly those who have lost their source of income, may be forced to sell essential capital assets such as livestock, land, and agricultural equipment to pay for basic needs, medical treatment, and the reconstruction of houses. This will make them more vulnerable and will further reduce their resilience.

III. Challenges:

The main challenges (risks) that urgently need to be addressed are:

- ***Loss of livelihood assets***
- ***Increase in poverty and vulnerability***
- ***Constraints to reviving agricultural activity***
- ***Increase in food insecurity***

The constraints identified which will need to be addressed soon are:

- Lack of precise data.
- There is no specific institution responsible for the promotion of non-farm livelihoods and employment opportunities.

IV. Implementation Strategy:

The livelihood recovery strategy would adopt an integrated approach that brings together employment-intensive reconstruction work, the skill development of local people, enterprise development, microfinance, and social protection, as well as the capacity strengthening of government officials, local representatives, NGO workers, community-based organizations, and the private sector, to enable smooth and efficient recovery.

To properly address the above goals and related issues, the post-disaster livelihood recovery strategy would be guided by the following overriding principles for the better design and implementation of recovery interventions and be:

- *People-centered* and supporting people of immediate survival needs and building their capacities for improving their quality of life.
- *Participatory* and inclusive.
- *Pro-poor and* focus on the most vulnerable sections of society.
- *Socially and gender inclusive.*
- *Transparent and accountable.*
- *Promote long-term development objective.*
- *Recognize mountain specificities.*
- *Environmentally sustainable.*

Response Needs (See Annex –A for details):

- Addressing farm labor shortages because of labor outmigration
- Provision of seeds and other farm inputs.
- Repairing and rebuilding damaged irrigation canals and water storage ponds
- Replacement of livestock assets (cattle, buffalo, goats, sheep, poultry and fisheries)
- Rebuilding of damaged animal sheds
- Replacement and rebuilding of poultry farms (broiler and layer farms
- Creating jobs in urban areas for migrating people
- Rebuilding of tourism sector as private hotels, inns and trekking trails were damaged

- Developing micro, small, and medium sized enterprises (MSME)
- Creating livelihood opportunities for people affected by the earthquake

5.1. On-Farm Livelihoods

I. Context:

In the absence of a significant industrial base, the inter-action between a rich but fragile agro-ecological environment and increasing population pressures had, before the earthquake, resulted in a region faced with an increasing level of poverty, decreasing food security, an increasing vulnerability to environmental factors and unsustainable pressure on the regional livestock feed resource. The earthquake severely affected agriculture sector and caused damages to input markets, infrastructure such as animal shelter, seed storage bins, irrigation systems, irrigation channels, and feeder roads connecting villages to the outside markets thus having serious implications on food security and livelihoods of the poor farming communities.

The earthquake affected areas belong to the dry temperate zone with farming systems based on mixed subsistence farming including crops, livestock, horticulture and forestry activities. Most farms are owner-operated and small, with an average cultivable land holding of 0.5 ha. The productivity of small-scale farmers' is constrained by small fragmented holdings, harsh climatic conditions, low quality seeds, limited fertiliser use and poor pest and disease control. The livelihoods of most households depends on food crops (maize, wheat, rice and vegetables) produced at the farm level, milk produced by buffalo and cattle, eggs from scavenging poultry flocks, the income generated by some of the family members working as temporary labourers outside of the farm and remittances received both from within Pakistan and abroad.

II. Challenges:

Crops: In most severely earthquake affected areas seeds for the rabi season was lost due to collapse of houses and stores, in some places existing stocks have rotted due to subsequent rains. These include seeds for wheat, winter vegetables such as turnips, onions, radish and cabbage, which were to be planted in November 2015. Maize is the main cereal crop in the earthquake-affected areas of Khyber Pakhtunkhwa. Harvesting was underway when the earthquake struck. In some cases that part of the crop which was already harvested has been lost under collapsed houses or stores. Wheat is the main crop planted in the rabi season, and the last planting date is the end of November.

Agriculture Infrastructure: The earthquake-affected areas have large acreages of infrastructure in terms of field bunds and terraces for rainwater harvesting and watercourses for irrigation, which have been partially damaged to an extent, PDMA KP data reported 77 water channels partially damaged. In places, terraces and retaining walls have fallen and collapsed, frequently over long stretches of steeply sloping and fragile land. Many natural springs and water supply infrastructure have suffered damages causing problems not only for crops but also impacting drinking water supplies for both humans and animals.

Livestock: Livestock is one of the key activities in the earthquake-affected areas. It is one of the main forms in which assets are held and provides the bulk of the value of output at farm level (over 75 percent in most districts). The earthquake caused a considerable number of casualties and injuries

among livestock estimated at 11 million PKR. Animals mainly died as buildings in which they were housed collapsed on them but in some cases they were hit by landslides and rocks. Surviving animals, particularly lactating buffaloes, are likely to face large reduction in yields due to lack of feed and shelter – buffaloes are sub-tropical animals and cold weather substantially reduces milk production.

Feed and Fodder: Although berseem and other green fodder crops have already been planted at lower altitudes, this is not the case in the higher up slopes. Normal winter fodder is comprised of soaked concentrate (khal and cottonseed cake) mixed with chopped wheat straw (bhusa). Both are imported from Punjab and stored. The earthquake struck at peak time for cutting local grass for hay, which is stored in stacks and tree-shelters. These stocks have been damaged by rains that followed during the days after the earthquake. At the same time most of the feed and fodder stocks stored in houses- in case of collapsed houses this opportunity has been missed by many households. Affected households still have access to roughage from maize stalks and range grasses harvested during and after the earthquake devastation, grazing will still be available in places for cattle on shamlat areas (village common lands), and there may be fodder supplements from certain tree species. However, overall there has been a sharp fall in feed and fodder availability.

Forest and rangelands: Massive landslides have been reported but some incidents happened that have reduced tree-cover, and thereby contributed to increased soil instability and erosion. Further depletion of the already scarce forest resources can be expected, as stocks of wood for fuel and rebuilding.

III. Implementation Strategy:

Despite of the difficult winter conditions and terrain majority of the affected population needs to re-start their agricultural and livestock activities as soon as possible in order to recover their food security and dependency on food aid, and generally enhance their livelihoods. In rural areas, where most livelihoods depend on the income generated from agriculture, households need to recover from the losses caused by the disaster as soon as possible. Immediate support is needed to provide households with the necessary inputs for the main agricultural upcoming season. This season provides the main annual harvest and is therefore crucial for household food security, providing most of the grain consumed and agricultural income for the most vulnerable families. Livestock being one of the main assets for most rural households and milk being one of the most important components of rural diets, keeping livestock alive and productive is crucial for the survival of the vulnerable rural households.

In the short term (six to twelve months after the earthquake) stakeholders should be supported to restore the productive capacity through: (i) assisting those farmers who have resumed agricultural production through the provision of selected agricultural inputs; (ii) reducing or preventing further loss of livestock while optimizing production from stock that has survived through provisions of livestock feed; vaccination and livestock shelter; (iii) Restoration and rehabilitation of water harvesting structure and land management e.g. land stabilization, terracing (iv) capacity development and (v) coordination.

In the medium-term (one to three years after the earthquake) outlook, the programme should aim to: (i) assist the Government to re-establish agricultural support services; and (ii) rehabilitate agriculture related infrastructure to facilitate increased agricultural production and diversification and marketing. The Collaborative Watershed Management Approach (CWMA) would be adopted in order to stabilize and restore the productivity of rangelands. Stabilization of eroded hillsides, systematic and long-term

planning is essential, whereby all the land uses are critically evaluated, and a holistic approach to natural resource management is adopted through the active participation of the local communities. In this case, both the social and technical dimensions have to be addressed, this component should aim at:

- Strengthening capacity of local stakeholders to negotiate and jointly implement action aimed at restoring or enhancing selected natural capital assets (e.g. eroded arable land, diminishing water sources, and degraded forests and rangelands);
- Identifying and testing effective, affordable and potentially replicable solutions to local watershed management problems, based on both local environmental knowledge and expert knowledge of the natural and socio-economic functioning of sub-watersheds.

Table 9: Cost of Recovery and Rehabilitation of On-Farm Livelihoods

Sr. #	Activities	Case Load	Unit-Cost US$	Year-1 (USD Millions)	Year-2 (USD Millions)	Total (USD millions)
1	Crop Production and livestock	30,900	350	10.81	-	10.81
2	*Irrigation infrastructure	77	-	-	-	-
3	**Watershed management	25	40,000	0.3	0.7	1.00
4	Capacity Building	-	-	0.54	0.36	0.90
5	Coordination	-	-	0.50	0.20	0.70
	Total			**12.15**	**1.26**	**13.41**

* Cost reflected in the Irrigation Sector under Infrastructure Program.
** In total 25 watersheds across 7 districts are proposed to test and replicate the good practices.

5.2. Non-Farm Livelihoods

I. Context:

The province of Khyber Pakhtunkhwa is the 3rd largest province in terms of population. However it is the smallest province in terms of area, with nearly half the population living in the mountainous and arid areas. Only 30 per cent of the land is cultivable. Income levels are low with per capita income ranging from USD 150 to 200 as compared to USD 480 in rest of the Country.

Nearly 26.4 per cent of the provincial population is below the age threshold and the remaining 73.6 per cent are above it. The latter group constitutes the working age population. Approximately 1/3rd of the working age population is employed in the province and the remaining working elsewhere in Pakistan and overseas. As a consequence of the earthquake, most of the labor has returned for reconstruction of their houses resulting in further loss of income to the already affected families.

Earthquake had its impact on the livelihoods of daily wage workers, small businesses and skilled workers – as their routine work has been disrupted due to loss of workplace, damaged/loss of work

tools and loss of daily wage employments. These are usually the lowest strata of the population in terms of income and have hardly any fallback cushion in terms of savings or access to social security. Therefore, urgent action would be required to support this segment of society in terms of fast-track income rehabilitation by creating daily-wage employments, assets replenishment and business rehabilitation through small scale funding.

II. Challenges

The response plan being proposed is generic in nature and has been developed in circumstances confronting a number of challenges which require adapting the strategy according to the given situation in each of the affected districts. Some of the challenges are mentioned below:

- ***Diversity in nature:*** The Non-Farm Livelihoods encompass a broad range of economic activities in rural and urban settings - starting from formal businesses (industrial activities, shops and trading) down to home-based work, cottage industries and services sector. Therefore, it is hard to make a single strategy to recover the diverse nature of non-farm economic activities. A flexible strategy to accommodate the diversity of interventions is recommended.
- ***Lack of detailed data:*** The lack of precise data on the exact nature of non-farm livelihoods at District level – affected by earthquake - restricts the exact assessment in terms of pre-earthquake livelihoods and employment situation. The findings of Labour Force Survey (LFS) cannot be extrapolated to the District level due to its small sample size. The other forms of data (PSLM, MICS etc), though provide a District-level data for various indicators, but it does not cover the details of non-farm employment. The situation warrants carrying out a detailed pre-intervention needs assessment in each District to determine a baseline which identifies specific groups of right-holders (or ultimate beneficiaries) and devise activities for rehabilitation of non-farm livelihoods in each District.
- ***Lack of specific institution for Employment Promotion:*** There is no specific institution responsible for the promotion of non-farm livelihoods and employment opportunities in KP and FATA. Various departments are dealing with partial elements of non-farm livelihoods separately. This creates further challenge to propose a unified strategy to be implemented by a single organization within the Government.

III. Implementation Strategy

Reconstruction and economic growth stemming from initial recovery efforts will be part and parcel of short-term recovery efforts leading to longer term development. The strategy will bring together employment-intensive reconstruction works, enterprise development, microfinance, skills development, social protection, capacity building of the government officials and social partners, such as representatives of employers and workers, CBOs and private sector.

The exact need for non-farm livelihoods support interventions would be derived from assessments, including pre-programme, gender and labour market assessments. These would require structured coordination amongst all stakeholders, building on comparative advantages.

The strategy will also consider collecting and disseminating information regarding manpower employment market.

While Phase-1 interventions would be mostly implemented at District levels, interventions in phase-2 (Local Economic Recovery) and phase-3 (Sustainable Employment Creation) would be implemented at Provincial/State level.

In view of the given situation, the following sets of interventions are proposed:

Periodicity	**Intervention Description**	**Quantum**
Immediate (First 3 months)	Baseline Survey and Employment Information System	7 Affected Districts
Phase-1: Short-Term (4-12 months)	Stabilizing income generation and emergency employment	20,000 persons
	Emergency Temporary Jobs/ Short-term Employment Creation (Cash-for-Work) (daily-wage laborers)	15,000 persons
	Targeted livelihood and self-employment start up grants Assets replenishment for individual skilled workers	5,000
	Small and Medium-sized enterprise rehabilitation	5,000
Phase-2: (12-24 months)	Local Economic Recovery for Employment and Rehabilitation 1.Local Capacity Development 2.Community Driven Recovery 3.Local Economic Recovery	7 Districts

Institutional Arrangements

The overall responsibility for coordination and supervision for 'Recovery of Non-Farm Livelihoods' will be entrusted to the Secretary Labour & Human Resource Department KPK to ensure provision of labour employment information.

Table 10: Cost of Non-Farm Livelihoods Component

S.#	Intervention Description	Timeline	Unit	Qty	Unit Cost	Year-1 USD Millions	Year-2 USD Millions	Total Cost USD Millions
1	**Employment Information System at District level**	First 12 months	System	7	40,000	0.200	0.080	0.280
2	**Baseline Survey and Skills Profile**	First 3 months	Profiles	15	5,000	0.075	0	0.075
3	**Emergency Temporary employments (Cash-for-Work)**	6 months	Persons	15,000	500	7.500	0	7.500
4	**Assets replenishment for skilled workers**	6 months	Persons	5,000	100	0.300	0.200	0.500
5	**Enterprise rehabilitation**	6 months	Persons	5,000	500	1.000	1.500	2.500
6	**Local Economic Recovery (Skills, microfinance etc)**	12 months	Districts	7	30,000	0.050	0.160	0.210
7	**Technical assistance and support**	24 months	Month	7	50,000	0.150	0.200	0.350
	TOTAL					**9.275**	**2.140**	**11.415**

6. DRR and Environment Recovery Strategy

I. Context:

Resilience of a community to disasters is the capacity to recover from a shock (natural and human induced disasters) and can be measured through certain factors like development indicators, economic wellbeing, literacy rates and access to basic facilities. A snapshot of affected districts of KPK can identify resilience of the communities to disasters in comparison to national indicators (Human Development Index). If details are taken the severity level is expected to be higher at UC and village level. Damage records show around 18% damage to overall housing stock in the affected districts of Malakand Division causing 170 deaths and 1070 injuries[7]. Thousands of other buildings received minor to severe cracks in the structures. Public infrastructure like schools, health facilities, government offices and others also proved their virtual low resistance to the earthquake jolts that the area received on 26 Oct, 2015. A total of 2402 facilities are either fully or partially damaged.

HDI comparison of Malakand Division with Islamabad

District	HDI	District	HDI
Islamabad	0.892*	Shangla	0.534
Chitral	0.606	Dir Upper	0.559
Buner	0.578	Swat	0.666
Dir Lower	0.583	*Malakand*	*0.659*

Source: http://www.relooney.info/SI_Expeditionary/Pakistan

Most of the affected communities generally have rural settings and belong to the lowest strata of the national income statistical range. Low literacy ratio prevailing in region even becomes more severe for female i.e. around 18 %. Generally, construction pattern in rural areas is "Kacha structure[8]" made of load bearing walls of stone/ baked bricks (58 %) or un-baked bricks/ mud (37 %) with heavy timber and mud roofs making these houses extremely vulnerable against lateral loading of earthquake. Lack of enforcement of building codes for public infrastructure has contributed to the vulnerability of even engineered buildings in the region.

There is no single reason but a number of factors to be blamed for such a weak resilience. The impacts of disasters, whether natural or man-made, not only have human dimensions but environmental ones also. Environmental conditions have exacerbated the impact of recent earthquake and floods. Deforestation, fragile forest management practices, improper agriculture systems etc., have aggravated the negative impacts of rains and floods; leading to landslides, flooding, silting and ground/surface water contamination. The earthquake triggered numerous debris slides, rock slides and landslides in Chitral district causing loss to life and property.

[7] PDMA/ PaRRSA report as on Dec 03, 2015
[8] 1998 Census of Pakistan

Land use and land cover changes are eroding the natural buffers that protect communities from hazard risk. These changes often erode people's capacity to recover from disasters. Other environmental changes such as anthropogenic global warming also create new challenges to the security and sustainability of the communities. There are, however, opportunities to reduce disaster risk and enhance community resilience by incorporating globally agreed agenda of "Sustainable Development Goals" within upcoming recovery & rehabilitation plans.

II. Challenges:

- Village level census data not available.
- Poor communication network and mechanisms.
- Social and cultural restrictions particularly women.
- Harsh weather
- Non-availability of hazard, risk and environmental maps.
- Non-availability of trained human resource in local construction industry (masons, artisans, contractors, engineers and architects) especially to deal with disaster resilient and sustainable construction practices.

Principles followed in designing implementation strategy:

All ER interventions will be in line with the following strategic principles:

1. Ensuring Low Carbon Footprints:

Recovery and rehabilitation initiatives/ schemes are to be scrutinized and evaluated against carbon emission and environmental degradation and proposals with least carbon footprints and long term sustainability to be encouraged.

2. Engaging youth and women in ER process and plans:

Literate local youth shall be engaged in research activities like conducting surveys for research studies, social mobilization and training. Whereas illiterate youth can be an effective part of the village level reconstruction and rehabilitation activities. Similarly, women are to be involved in learning process of CBDRM, non-farm livelihoods, improved 'quality of life' interventions, for example construction and use of energy efficient mud stoves.

3. Optimum utilization of natural resources:

Pressure on natural resources shall be minimized, for example around 90% of the rural population in KPK depends on fuel wood for cooking and heating, the ER plans suggest two way strategy to lower the burden on forest cover; either by shifting cooking & heating to another source (mini-hydel where feasible) or at least by encouraging energy efficient kitchen stoves (made of mud) and taking excess energy through pipes to make the rooms comfortable.

4. Empowering Communities for Response & Recovery:

Community's preparedness to respond and prepare for emergencies is always crucial and becomes imminent in remote areas and harsh terrain like affected by Oct 26 Earthquake. Therefore, communities' resilience would be strengthened through training in 'pre, during and post disaster' scenarios relying on local resources.

5. Research on DRR initiatives:

Based on national experience of dealing with different categories of natural and human induced disasters (focusing on past two decades) evaluate structural, financial, environmental, socio-cultural and other humanitarian standards for adaptation as agreed national standards in post disaster scenarios and during emergencies. Such studies/ researches shall include sectoral interventions like shelter, WASH, health and education.

6. Build back resilient:

All public and private buildings either engineered or non-engineered, are to be designed and constructed for improved performance in future disasters like seismic events and floods. Environmental and cultural safety is also to be considered along with economic feasibility.

7. DRR sensitized government and political structure:

Enhanced sensitization among these target groups ensures DRR incorporated development initiatives in the region which are planned by local political representatives and implemented by government officials.

8. Linking DRR with livelihood:

All sectoral initiatives to ensure creating livelihood and 'barefoot entrepreneur' opportunities at grass root level. For example Housing & Infrastructure sector shall ensure capacity building of local masons and vendors for ER repairs and reconstruction activities.

9. Empowering communities for response & recovery:

Community's preparedness to respond and prepare for emergencies is always crucial and becomes imminent in remote areas and harsh terrain like affected by Oct 26 Earthquake. Therefore, communities' resilience would be strengthened through training in 'pre, during and post disaster' scenarios relying on local resources.

10. Improved quality of life:

ER plan includes provision of basic facilities to each affected household with environment friendly indigenous solutions like toilets, energy efficient heating and cooking, access of children to disaster resilient schools and health facilities, etc.

Disaster Risk Reduction and Environment are embedded in all sectoral plans as cross cutting; however, following activities are divided as short term/ immediate, medium term and long term interventions under the themes of DRR and Environment separately.

III. DRR Implementation Strategy:

Short term/ immediate interventions

a) Area profiling:

Prioritize recovery actions on the basis of severity of needs, access, security and weather. For example certain snow bound areas would be in-accessible in coming months, hindering reconstruction activities, but at the same time, interim shelters for households and critical governance infrastructure facilities can be provided on high priority basis.

b) Resource and hazard mapping at village level:

Prepare maps regarding prevailing hazards, vulnerabilities and resources with village level socio-economic indicators. These maps shall be developed through standardized survey tools and techniques (for example GIS) involving students, local NGOs and UC level elected representatives. Potential for different energy source (like hydel, solar and wind) can also be mapped if possible.

c) Repair and Reconstruction Guidelines for Housing sector:

Prepare guidelines for strengthening damaged houses which local masons and self-house builders can understand and implement easily. These guidelines shall cover strengthened foundation and wall system, lighter roof, toilet and kitchen details to be adopted by the affected community.

Medium-term interventions

d) Strengthened PDMA and DDMUs:

Constitute technical committee for vetting short and long term structural design solution at PDMA KPK (may include relevant national level experts) to evaluate structural intervention solutions to evaluate for structural stability, environmental & cultural feasibility and cost effectiveness. The same committee shall also be involved for top level supervision of ongoing and completed reconstruction interventions. Central Information center shall be established at PDMA KPK for responding to queries for reconstruction/ repair solutions on phone calls.

Establish District level knowledge/ information sections in each DDMU with current updates and information of ongoing ER activities.

e) Capacity Building of Government officials in disaster assessment, sustainable recovery and rehabilitation:

Enhance capacity and understanding level of the government officials on nationally set standards for damage need assessment, sustainable recovery and rehabilitation initiatives for post disaster scenarios.

f) Capacity building of Local Political Representative:

Engage effectively newly elected political representatives are very much active in facilitating damage assessment and response processes in social mobilization, construction supervision for housing reconstruction with appropriate training and monitoring tools (checklists).

g) Training of masons & artisans:

Train Local masons on safer construction of houses through construction of model houses at UC/ village level. Participants would be given certificate after successful training and be engaged for engineered and formal construction projects on priority basis.

h) Capacity building of communities (CBDRM):

- Training on safer and improved House, hygiene, emergency management & response.
- "Barefoot Entrepreneur" training shall be organized to encourage local vendors for procurement and supply of material to be used in reconstruction.
- Women centered CBDRM training shall be conducted at UC/ village level.
- Training of women in construction of energy efficient stove.
- Training of farmers for promotion of climate resilient on farm livelihood practices.

i) Wider Dissemination of information through electronic media:

Ensure effective dissemination of required information to each and every household in affected villages; develop video programs through appropriate electronic media.

Keeping in view low literacy rate and understanding level of the local communities and knowledge dissemination on specific interventions (house, latrine and stove construction, CBDRM, health and hygiene, farmers tips, etc.) will be made available at UC/ village level through videos which are played using cell phones, e-Tablets, Satellite etc.

Long term Interventions

j) Strengthened structures following Building Codes:

Ensure implementation of building codes (Seismic Provision 2007) in all engineered and formal construction for reconstruction and retrofitting. Government line department officials and private sector construction trade professionals (engineers & architects and masons) involved in ER and rehabilitation initiatives to be sensitized in building code and standards implementation in the ongoing and future development initiatives

k) DRR initiatives for students:

Sanitize and train student at all levels through DRR training and developing emergency management plans for institutions. Such initiatives shall focus on 1543 damaged education buildings in Malakand Division.

Table 11: Cost Estimates of Disaster Risk Reduction Component

	Activities	Year 1 USD (Million)	Year 2 USD (Million)	Total USD (Million)
1	Detailed assessment, mapping and baseline at village level	0.1	0.5	0.6
2	Support to strengthen DMUs (personnel & equipment)	0.2	0.2	0.4
3	Short term research/studies to evaluate previously implemented schemes for feasibility analysis of adaptation/ extension in post disaster scenarios	1.0	1.0	2.0
4	Training for government line department officials in each district	0.1	0.1	0.2
5	Training for UC elected representatives for coordination, monitoring and Risk assessment	0.15	0.05	0.2
6	Development of information, education and communication material	0.1	-	0.1
7	Technical evaluation committee at DDMUs/ PDMA and establish call center to respond queries related to safer construction	0.4	0.3	0.7
8	Training (CBDRM) at village level for safer construction, hygiene and emergency response	0.5	0.2	0.7
9	DRR initiatives for students	0.5	0.8	1.3
10	Information Dissemination through cell phone, satellite channel, etc	0.1	0.1	0.2
	Total	3.15	2.95	6.1

IV. Environment Recovery Implementation Strategy

Early Environment Response:

Under early environment recovery programme of earthquake affected areas of Malakand division an immediate action plan will need to be launched during the first year of implementation. The activities will include stabilization of landslides, landslips and debris slides triggered by the earthquake. It is important because these landslides will be re-activated during the coming winter rains and next monsoon rains. In Chitral district protection structures will also be constructed to stop river bank cutting at critical points endangering the habitations and roads.

Landslides and debris slides and even the small landslips triggered by the earthquake will be stabilized which are endangering the habitation and high value property buildings in the early environment recovery phase. Landslides/debris slides blocking the roads will be treated to avoid traffic flow disruptions. The landslides will be treated with biotechnical, soil bioengineering and biological measures. In Chitral district the landslides having moisture due to seepage will also be treated with same treatments as mentioned above but the landslide and particularly debris slides having no moisture or seepage will be treated with engineering resistant structures and planted with water harvesting system for stabilizing the debris slides.

The man made factors of landslides are deforestation and improper road construction in addition to the natural factors of earthquakes, geology, soil and slope gradient. The forest vegetation has important role in slope stability due to their soil binding and anchoring effect of their roots and evapo-transpiration component. A study conducted by IUCN in AJK during 2007 showed that more than 70 % landsides occurred in areas without forests in Neelum valley during the October, 2005 earthquake. While the remaining 30 % landslides recorded in forest area occurred because of improper road construction and associated natural factors. Therefore large scale reforestation programme has to be launched for avoiding debris/landslides in the event of the earthquakes or rain storms.

To reduce the pressure on natural forests and vegetation, large scale micro-hydel will be established where perennial water resource is available in mountain areas. The potential for micro-hydel is high in all the districts of Malakand Division. The electric energy for heating and cooking is climatically safe for the households. Normally fuel wood is used for heating and cooking during winter because of the extreme cold climate. If the energy need of the communities is met from the micro-hydel, the pressure on the natural forests will be reduced for fuel wood collection. The work load of women and children will also be reduced because it is the responsibility of the women to collect fuel wood. The households will get rid of pollution of smoke due to burning of fuel wood for heating and cooking.

As it will take time for establishment of the micro-hydel, solar water heaters and fuel efficient stoves will be provided immediately to reduce the pressure on natural vegetation and forests. Provision for these activities has been made under energy component of the physical infrastructure pillar and housing reconstruction programme.

Medium term Early Recovery for Environment:

Under the medium term strategy (2-3 years) Integrated Watershed Management (IWM) demonstrations will be established in the districts having purely dry temperate climate zone and in the transition zone between moist temperate and dry temperate zones for demonstrating suitable participatory IWM models to increase the forest cover in earthquake prone areas. The holistic approach of integrating conservation measures with livelihood improvement measures will be applied. All land use initiatives will be undertaken through participation of communities. Two small catchments will be selected one in Chitral district and the other in Swat or Dir Lower for the establishment of IWM demonstration for replication in future by the line departments. In moist temperate and subtropical chir pine zones, demonstrations of IWM were established in Chakar in AJK and Mansehra district in KPK respectively under UNDP & ERRA assisted project "Environmental Recovery Programme for earthquake areas" during the years 2008-2012.

For improvement of rangelands, planting of fodder trees and bushes will be carried out in the low elevation areas. For alpine pasture improvement, controlled grazing system has to be introduced. The nomads taking the livestock to alpine pastures should be charged for each animal and the revenue so generated used for improvement of the pastures and rangelands.

As the climate of Malakand division is suitable for deciduous fruit trees, more emphasis need to be given to the establishment of orchards in place of traditional maize and wheat crops. Agro-forestry/ farm forestry will be promoted to reduce runoff and soil erosion from agriculture lands and provide fuel wood through their trimming. The traditional slope cultivation with irrigation has to be stopped and replaced with orchards establishment in v-shaped micro-catchment or individual basins particularly in Chitral.

For livelihood improvement in addition to establishment of orchards, cash crops such as potatoes and vegetable cultivation and small poultry units will be introduced through the integrated watershed management. Friesian cross bred cows will be introduced through artificial insemination to replace the local nonproductive cattle and reduce the number of livestock. Vaccination programme for disease control for livestock will also be implemented.

Before implementation of the IWM plans, trainings will be arranged for capacity building of the concerned line departments (Forest, Agriculture, C&W and Local Government), NGOs and the communities in modern techniques for soil conservation and slope stabilization for proper implementation of the IWM Programme.

Awareness workshops will be arranged for the policy makers and political leaders for convincing them to formulate policy for launching the integrated watershed management programme at provincial level to reduce the impact of climate change (flash floods, GLOFs events and landslides due to earthquakes) in the upland watershed areas which are also located in the earthquake prone zone.

Long term solution: A provincial level programme would be launched for integrated watershed management through community's participation in the earthquake prone areas of KPK. The integrated watershed management programme is also needed in northern upland watershed areas of Pakistan in the light of climate impacts; frequent flash floods, glacier lake outburst floods, frequent droughts and expected future acute shortage of water after glaciers are exhausted. Therefore this programme will be useful for minimizing the damages of earthquake as well as in reduction of flash floods intensity.

It is a positive sign that the present KPK Government is giving high importance to reforestation and integrated watershed management programmes through its own resources but it is also needed at national level all over the north western mountain areas of the country.

Table 12: Cost Estimates of Environment Recovery Component

S. No.	Subsector	Year 1 (USD M)	Year 2 (USD M)	Total (USD M)
1	**Reforestation/ range improvement**	1.84	2.76	4.60
2	**Landslide/ debris slide stabilization**	0.19	0.28	0.47
3	**Soil Conservation (gully & river bank erosion control)**	0.44	0.66	1.10
4	**Livelihood activities Orchards, cash crops, agro-forestry, livestock improvement etc. under IWM plan**	0.40	0.40	0.80
5	***Energy input (Micro-hydel, water heaters, fuel efficient stoves)**	-	-	-
6	**Capacity building of stakeholders**	0.023	0.023	0.046
	Total	2.893	4.123	7.016

*. Provision for Micro-Hydel made under "Energy" in Infrastructure and fuel efficient stoves in Housing Reconstruction.

7. Management Mechanism

The following aspects have been considered for proposing the management structure in the present situation: Past experience of the administrative unit in handling post-disaster recovery and/or existence of well-grounded systems for disaster management; preliminary planning and well-practiced administrative and operational procedures, such as additional capacity in government departments to cope with the surge in demands during recovery, which may stretch over time; capacity of local authorities and line agencies to coordinate with partners, including familiarity with the policies and procedures of international development partners.

The proposed approach for management of the recovery and reconstruction will rely on line department to supervise and implement projects and has already started with joint preparation of a master plan, blueprint, or action plan for the recovery where the respective roles and activities of the line ministries are identified. The government budget is the main medium for channeling recovery financing to line departments, though parallel off-budget activities, such as through United Nations (UN) agencies and non-governmental organizations (NGO), are usually critical. The line departments then implement projects and programs while supervising related off-budget efforts.

Lessons learned from strengthening line departments following disasters revolve around the establishment of project management/implementation units. These units can:

- Help line departments make decisions that are supportive of both recovery and a longer-term reconstruction framework.
- Provide a mechanism for day to day management of recovery activities within a given department.
- Monitor recovery and reconstruction finance.
- Ensure that mitigation measures are adopted to avoid negative impacts.
- Adjust implementation based on lessons learned from early results.

As such it is proposed that recovery and reconstruction be coordinated by existing departments, which would synergize with existing local governments, promoting local ownership, and ensuring the return of staff to routine work with enhanced capacity.

The institutional set-up for leading, coordinating and executing recovery and reconstruction should be decentralized as much as possible, with a centralized agency responsible (in this case the Relief, Rehabilitation and Settlement Department – RRS) for formulating policies, coordinating with partners, mobilizing resources, and monitoring progress, and with local entities (DDMU or PMU) responsible for ground-level implementation.

Provincial Disaster Management Authority (PDMA) was established as a sequel to the devastating earthquake of 8 October 2005. A National Disaster Management Ordinance was promulgated with a view to establish and regulate an enhanced and progressive Disaster Management Framework at the National, Provincial and Local level for disaster mitigation, preparedness and response. The NDMO provided the establishment of a Provincial Disaster Management Commission (PDMC) as well as Authority (PDMA) to cope with the challenges of Disaster Management in a professional and efficient manner. Both the national and provincial setups have been mandated to effectively establish a system to look after disasters and calamities whether natural or human induced. The Government of Khyber

Pakhtunkhwa established a Provincial Disaster Management Commission (PDMC) as well as a Provincial Disaster Management Authority (PDMA) on 27 October 2008, to promote enhanced disaster preparedness and management within the province. The establishment of PMDC and PDMA is based on the National Disaster Management Ordinance (NDMO) of 23rd December 2006 which forms the legal basis for the implementation of the National Disaster Management Fame work (NDMF) provided by the National Disaster Management Authority (NDMA). Previously the Provincial Relief Commissionerate had been responsible for the relief, compensation and rehabilitation of people affected by natural disasters. With the establishment of PDMA, the functions of the Relief Commissionerate have been incorporated into the new organization.

Functions/structure of PDMA: PDMA Khyber Pakhtunkhwa is responsible for Disaster Risk Management. It formulates policies of disaster risk management, mitigation and preparedness and hazard risk reduction. It coordinates and communicates with all stakeholders (Federal Government, District Government, INGOs, and IDPs) before and after a disaster for preparedness and response. PDMA provides relief to disaster affected population of Khyber Pakhtunkhwa. It helps in the Recovery and Rehabilitation of affected communities. It handles the crises of IDPs and manages the camps established for displaced population. It also works on Reconstruction and Development projects in the affected areas for the restoration of life in hazard stricken areas. PDMA acts as Donor's facilitation and coordination desk, while, it coordinates with donors for relief and rehabilitation on behalf of the Provincial Government.

The structure is decentralized to the District level and provision made for District Disaster Management Unit (DDMU).

Provincial Reconstruction, Rehabilitation & Settlement Authority (PaRRSA) function and structure: PaRRSA was created in July 2009. Initially, it was aimed for reconstruction & rehabilitation in Malakand Division and then its scope was extended to the rest of the province in 2012. Its core objective is to plan and coordinate overall reconstruction, rehabilitation and resettlement projects in the province.

It also provides one-window facilitation to national and international development partners. It supervises and monitors the projects implemented by different agencies for reconstruction and rehabilitation. It establishes standards and internal controls within and outside the organization. Besides that, it is responsible for execution, implementation and monitoring of all projects proposed and funded by various international partners. In fact, it provides the requisite ease, speed, facilitation, coordination and supervision to the reconstruction and rehabilitation programs and linkages to all the parties involved in and helping the Provincial Government in its endeavor in the affected areas. It provides a platform for fast track approval process for the projects and activities undertaken for the reconstruction and rehabilitation of the affected regions.

The authority has a Project Management Unit (PMU) at the divisional level under the supervision of the respective commissioners and dedicated units at the district level under the control and supervision of the Deputy Commissioners.

The DDMU/PMUs, both under the office of the Deputy Commissioners have a presence in the disaster affected areas and would remain connected with the ground realities of implementation. This presence and visibility helps promote grassroots consultations and involvement.

The management mechanism being proposed would need oversight and it is proposed to establish a Provincial Level Steering Committee (or its existing equivalent) with representatives from relevant line agencies, local government and donors, led by the Chief Secretary Government of KPK. The task force model can provide greater scope for participation by civil society and donor organizations, as task forces tend to be more flexible than permanent government structures.

At district level, a DDMU/PMU Executing Committee (or its existing equivalent) under the chairmanship of the Deputy Commissioner of the affected Districts already exist for programme guidance and to monitor and coordinate various implementing agencies. At the lower tier e.g. Tehsil Level Committee could be constituted under the chairmanship of the Assistant Commissioner and comprising representatives from the local government and civil society including Community Based Organizations for programme implementation, monitoring and coordination. Also, in this model, staff remains in the parent organizations with enhanced capacity.

Since the Committees (under different names) already exist there is no need to create an additional entity, instead it is proposed that the task should be assigned and accommodated within the existing setup and the role and responsibility is included in the mandates of the Provincial, Divisional and District committees for fast track approval and implementation of the development projects. Project Management Unit (PMU) at the divisional level in Malakand under the supervision of the Commissioner and dedicated units at the district level placed in the respective departments under the control and supervision of the Deputy Commissioners. However, it appeared during discussions with the RRS that the dedicated units were not established in all the seven districts affected by the recent earthquake. As such, these would need to be established and capacities of existing ones enhanced equipped and staffed to serve as a secretariat for the Provincial, Divisional and each District Level executing committees.

Table 13: Cost of Management Mechanism (office space co-shared in 7 DC Offices, 1 Commissioner's office, Malakand and 2 at Peshawar in PDMA-PaRRSA).

Items	No. of persons/Units	Year 1 Cost in USD	Year 2 Cost in USD	Total cost
Level 1	10	228,571	228,571	**457,143**
Level 2	9	102,857	102,857	**205,714**
Experts	8	137,143	137,143	**274,286**
Coordinator in PDMA	1	34,286	34,286	**68,571**
Laptop	28	21,333	0	**21,333**
Printer	10	3,810	0	**3,810**
UPS	10	3,810	0	**3,810**
Cell phone	28	3,200	0	**3,200**
Office Furniture	10	19,048	0	**19,048**
Office running expenses	10	5,714	11,199	**16,914**
Vehicle rental (with driver)	10	68,571	68,571	**137,143**
Total		**628,343**	**582,628**	**1,210,971**
		Say 0.628 M	**0.583 M**	**1.211 M**

Table 14: District-wise details of Deaths, Injuries and Damaged Houses in the 13 Earthquake Affected Districts of KPK

S.No	District	Human Losses			Damaged Houses		
		Deaths	Injured	Total	Partially	Fully	Total
1	Chitral	33	200	**233**	3378	15921	**19,299**
2	Dir Lower	26	248	**274**	6662	11772	**18,434**
3	Dir Upper	16	162	**178**	4452	11900	**16,352**
4	Swat	36	253	**289**	2881	8988	**11,869**
5	Shangla	49	181	**230**	4502	6893	**11,395**
6	Malakand	2	7	**9**	1145	3135	**4,280**
7	Buner	8	19	**27**	636	2990	**3,626**
8	Upper & Lower Kohistan	16	52	**68**	3066	1964	**5,030**
9	Torghar	0	0	**0**	1691	865	**2,556**
10	Battagram	0	0	**0**	149	28	**177**
11	Mansehra	2	15	**17**	31	0	**31**
12	D.I.Khan	0	1	**1**	22	0	**22**
13	Lakki Marwat	0	0	**0**	16	0	**16**
Total		**188**	**1,138**	**1,326**	**28,631**	**64,456**	**93,087**

Source: PDMA-PaRRSA *Dated:07-12-2015*

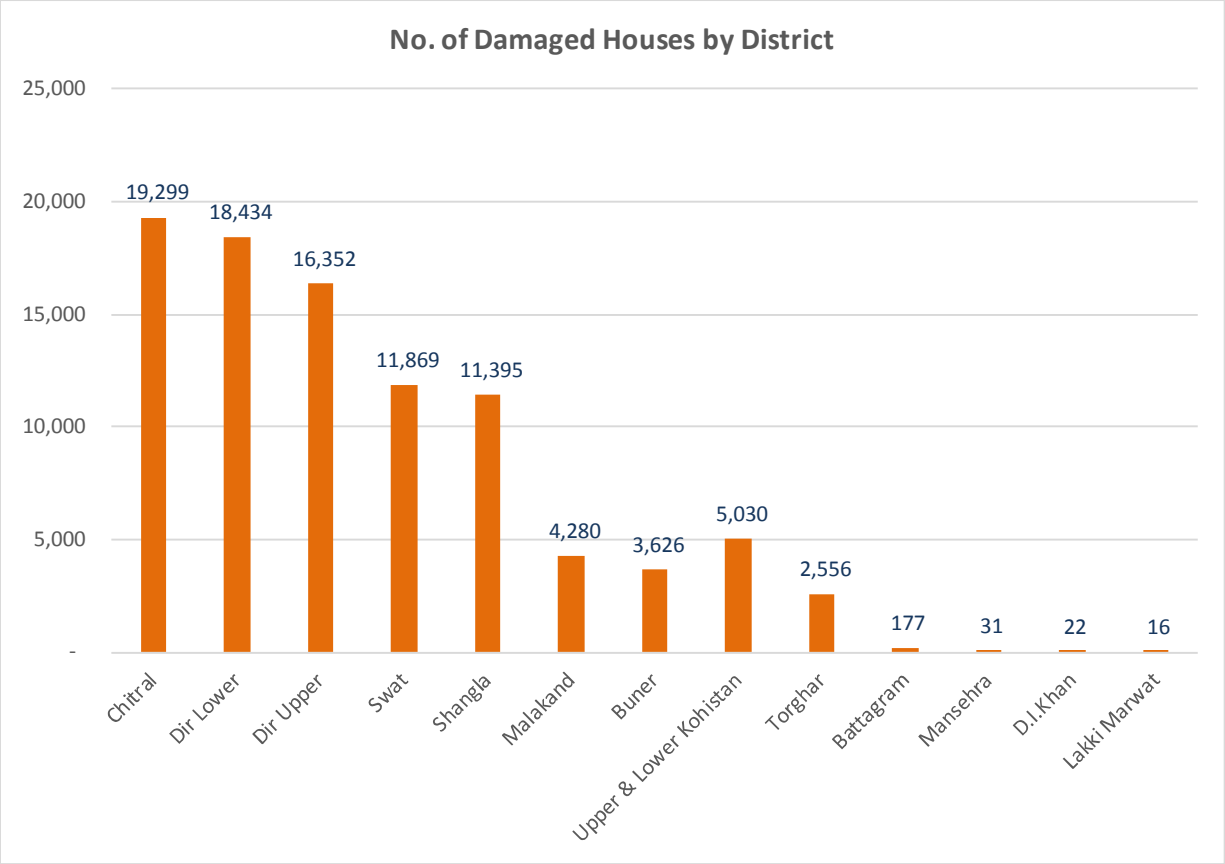
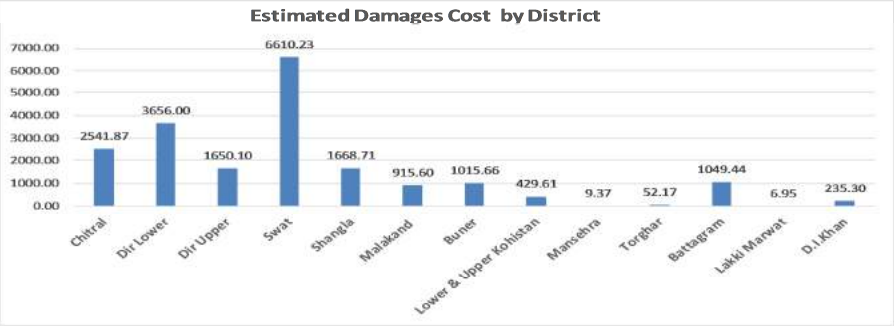


Table 15: Summary of Partially & Fully Damaged Infrastructure and Reconstruction/Rehabilitation Cost Estimates of 13 Earthquake Affected Districts of KPK

(Based on Government estimates without inclusion of resilience factors)

S.No	District	Administrative Buildings			Health			Education			Roads/Bridges			Irrigation			Water Supply & Sanitation (PHED+TMA)			Total Estimated Cost in Rs. (M)
		Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially/Fully
1	Chitral	14	1	75.00	2	0	20.0	167	0	1946.00	45	0	236.30	77	0	174.16	46	0	90.41	2541.87
2	Dir Lower	4	0	75.00	0	0	0.0	342	16	2642.00	24	5	939.00	0	0	0.00	0	0	0.00	3656.00
3	Dir Upper	44	0	212.39	27	2	46.6	259	52	1005.00	62	0	338.10	0	0	0.00	51	0	48.00	1650.10
4	Swat	125	6	1100.00	29	0	360.0	253	54	4950.00	13	0	130.00	0	0	0.00	49	0	70.23	6610.23
5	Shangla	1	0	3.00	8	2	77.0	117	29	1228.00	59	1	328.91	0	0	0.00	45	0	31.80	1668.71
6	Malakand	16	0	33.60	14	0	150.0	64	0	640.00	16	0	47.00	0	0	0.00	0	9	45.00	915.60
7	Buner	27	2	68.31	11	2	89.0	168	22	836.00	3	0	4.00	0	0	0.00	23	0	18.35	1015.66
8	Lower & Upper Kohistan	0	0	0.00	11	0	9.0	38	15	321.87	26	0	40.70	25	0	14.80	50	0	43.24	429.61
9	Mansehra	0	0	0.00	2	0	9.4	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	9.37
10	Torghar	3	2	12.50	0	0	0.0	15	2	34.67	4	0	5.00	0	0	0.00	0	0	0.00	52.17
11	Battagram	8	0	36.60	0	0	0.0	76	1	159.63	85	0	279.50	0	0	0.00	41	0	573.71	1049.44
12	Lakki Marwat	0	0	0.00	12	0	7.0	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	6.95
13	D.I.Khan	0	0	0.00	0	0	0.0	0	0	0.00	1	0	235.30	0	0	0.00	0	0	0.00	235.30
Grand Total		242	11	1616.40	116	6	767.9	1499	191	13763.2	338	6	2583.81	102	0	188.96	305	9	920.74	19841.01
		253			122			1690			344			102			314		2825	

Source: PDMA-PaRRSA *Dated: 07-12-2015*



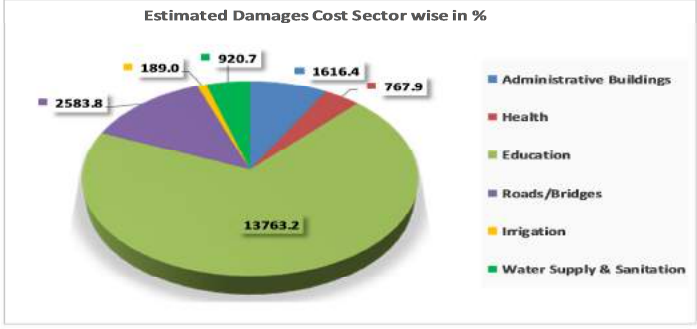


Table 16: District-wise details of Deaths, Injuries and Damaged Houses in the 7 Severely Earthquake Affected Districts of Malakand Division, KPK.

S.No	District	Human Losses			Damaged Houses		
		Deaths	Injured	Total	Fully	Partially	Total
1	Chitral	33	200	**233**	3378	15921	**19299**
2	Dir Lower	26	248	**274**	6662	11772	**18434**
3	Dir Upper	16	162	**178**	4452	11900	**16352**
4	Swat	36	253	**289**	2881	8988	**11869**
5	Shangla	49	181	**230**	4502	6893	**11395**
6	Malakand	2	7	**9**	1145	3135	**4280**
7	Buner	8	19	**27**	636	2990	**3626**
	Total	170	1,070	**1,240**	23,656	61,599	**85,255**

Source: PDMA-PaRRSA *Dated:07/12/2015*

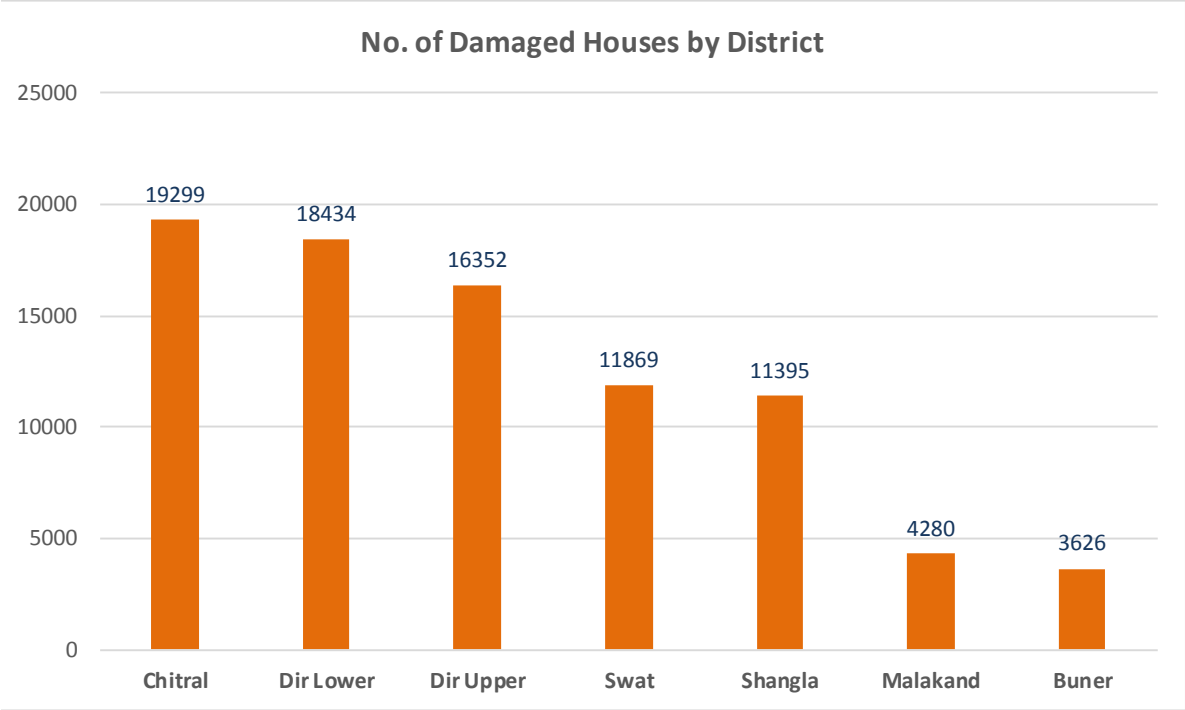


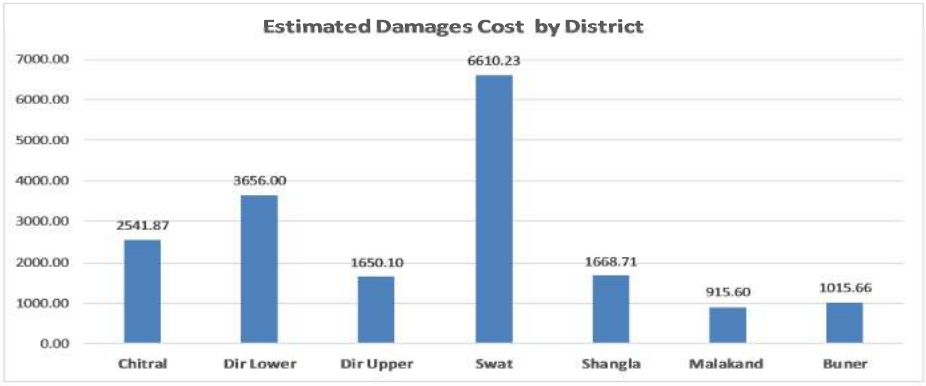
Table 17: Summary of Partially & Fully Damaged Public Sector Infrastructure Reconstruction/Rehabilitation Cost Estimates of 7 Severely Earthquake Affected Districts of Malakand Division

(Based on Government estimates without inclusion of resilience factors)

S.No	District	Administrative Buildings			Health			Education			Roads/Bridges			Irrigation			Water Supply & Sanitation (PHED)			Total Estimated Cost in Rs. (M)
		Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially	Fully	Cost (M)	Partially/Fully
1	Chitral	14	1	75.00	2	0	20.0	167	0	1946.00	45	0	236.30	77	0	174.16	46	0	90.41	2541.87
2	Dir Lower	4	0	75.00	0	0	0.0	342	16	2642.00	24	5	939.00	0	0	0.00	0	0	0.00	3656.00
3	Dir Upper	44	0	212.39	27	2	46.6	259	52	1005.00	62	0	338.10	0	0	0.00	51	0	48.00	1650.10
4	Swat	125	6	1100.00	29	0	360.0	253	54	4950.00	13	0	130.00	0	0	0.00	49	0	70.23	6610.23
5	Shangla	1	0	3.00	8	2	77.0	117	29	1228.00	59	1	328.91	0	0	0.00	45	0	31.80	1668.71
6	Malakand	16	0	33.60	14	0	150.0	64	0	640.00	16	0	47.00	0	0	0.00	0	9	45.00	915.60
7	Buner	27	2	68.31	11	2	89.0	168	22	836.00	3	0	4.00	0	0	0.00	23	0	18.35	1015.66
Grand Total		231	9	1567.30	91	6	742.6	1370	173	13247.0	222	6	2023.31	77	0	174.16	214	9	303.79	18058.17
		240			97			1543			228			77			223		2408	

Source: PDMA-PaRRSA

Dated: 07-12-2015



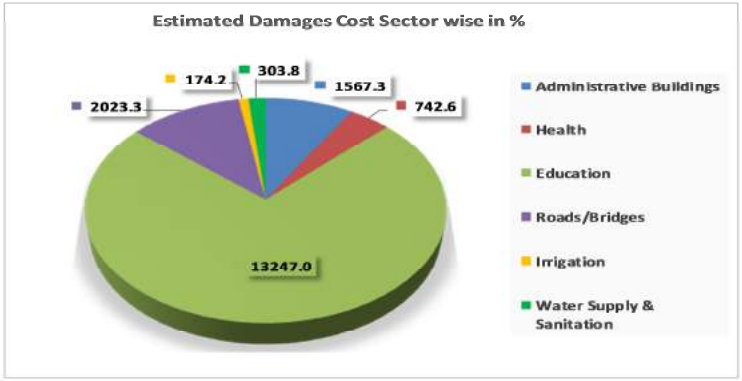


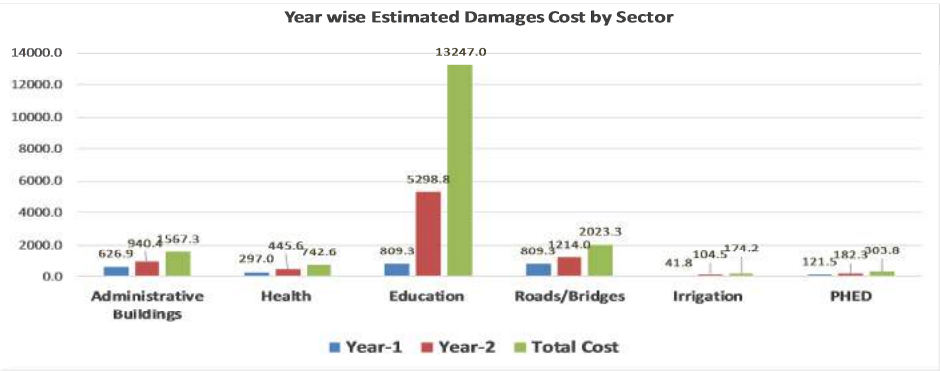
Table 18: Year-wise details of Public Sector Infrastructure Reconstruction/Rehabilitation Cost Estimates of 7 Severely Earthquake Affected Districts of Malakand Division

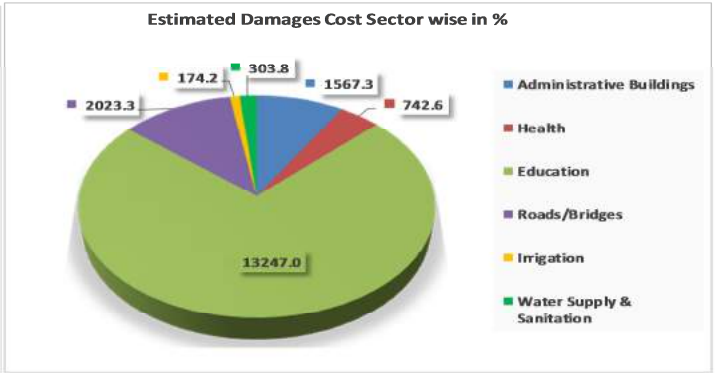
(Based on Government estimates without inclusion of resilience factors)

S.No	District	Administrative Buildings			Health			Education			Roads/Bridges			Irrigation			Water Supply & Sanitation (PHED)			Total Estimated Cost in Rs. (M)
		Year-1	Year-2	Cost Rs. (M)	Year-1	Year-2	Cost Rs. (M)	Year-1	Year-2	Cost Rs. (M)	Year-1	Year-2	Cost Rs. (M)	Year-1	Year-2	Cost Rs. (M)	Year-1	Year-2	Cost Rs. (M)	Partially/Fully
1	Chitral	30	45	75.00	8	12	20.0	778	1168	1946.00	95	142	236.30	70	104	174.16	36	54	90.41	2541.87
2	Dir Lower	30	45	75.00	0	0	0.0	1057	1585	2642.00	376	563	939.00	0	0	0.00	0	0	0.00	3656.00
3	Dir Upper	85	127	212.39	19	28	46.6	402	603	1005.00	135	203	338.10	0	0	0.00	19	29	48.00	1650.10
4	Swat	440	660	1100.00	144	216	360.0	1980	2970	4950.00	52	78	130.00	0	0	0.00	28	42	70.23	6610.23
5	Shangla	1	2	3.00	31	46	77.0	491	737	1228.00	132	197	328.91	0	0	0.00	13	19	31.80	1668.71
6	Malakand	13	20	33.60	60	90	150.0	256	384	640.00	19	28	47.00	0	0	0.00	18	27	45.00	915.60
7	Buner	27	41	68.31	36	53	89.0	334	502	836.00	2	2	4.00	0	0	0.00	7	11	18.35	1015.66
Grand Total		627	940	1567.30	297	446	742.6	5299	7948	13247.0	809	1214	2023.31	70	104	174.16	122	182	303.79	18058.17

Source: PDMA-PaRRSA

Dated: 07-12-2015





Annex – 'A'

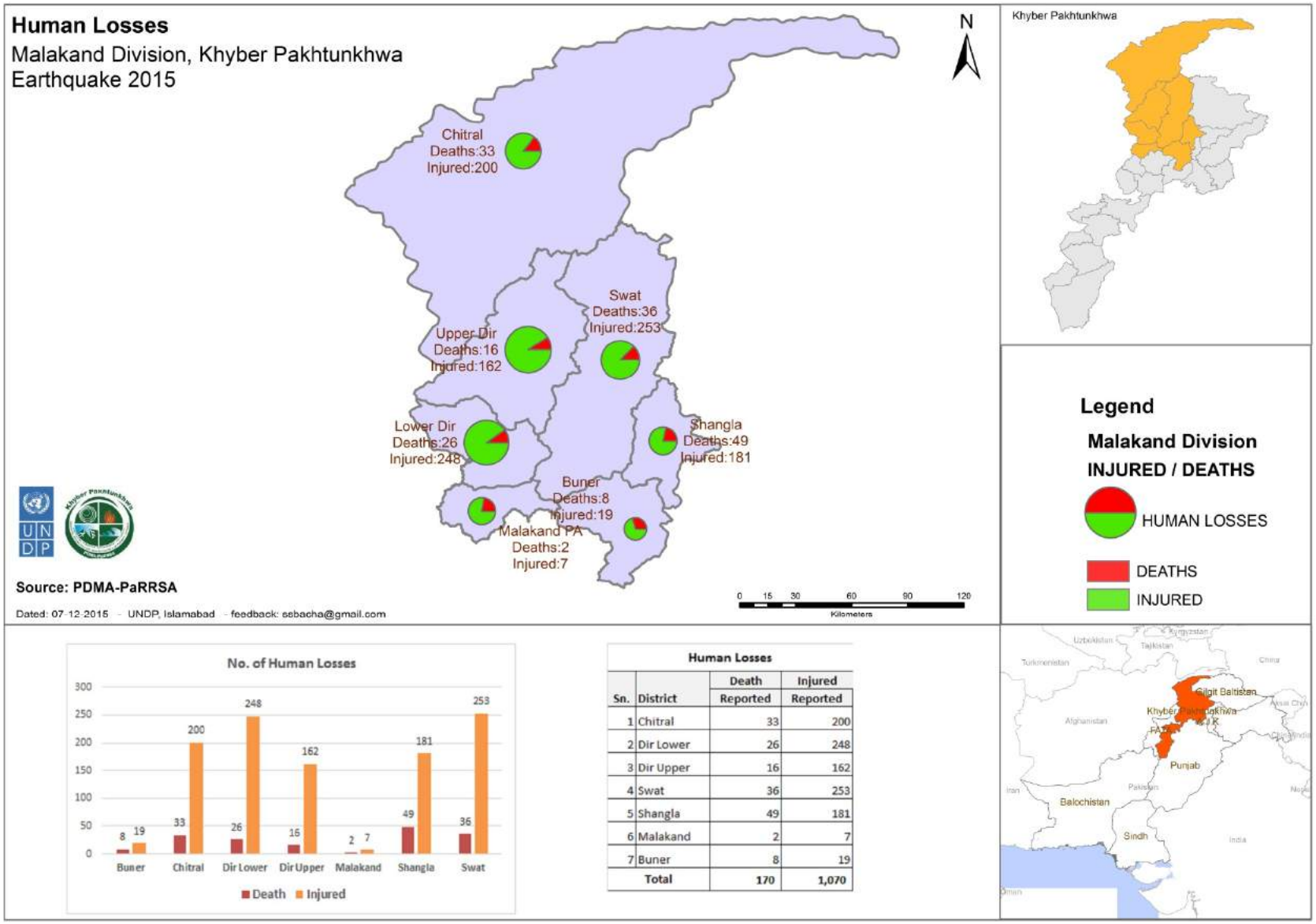
Response Matrix for Revitalization of Livelihoods

Response needs	Response options	Suggestions
Provision of seeds and other farm inputs urgently as seed stocks were destroyed	• Supply seeds and seedlings free so that farmers do not lose cropping season • Facilitate supervised soft loans for sourcing agriculture inputs including seeds, fertilizers, and tools • Introduce a contingency cropping plan (e.g., promotion of short duration crops such as legumes, lentils, and vegetables) wherever farmers are unable to grow their main crops • Introduce new technologies and better quality seeds for cash crops • Introduce high value agriculture products (horticulture) • Establish nurseries with appropriate rootstock	• Provide free seeds and seedlings for the first coming season • Establish community seed banks and storage facilities • Support start-up business for input suppliers (e.g., One Stop Farmers' Shop) specializing in the supply of seeds, fertilizers, pesticides, and agriculture tools through the provision of loans and storage facilities; loans need to be supervised to reduce the chances of fungibility • Provide in kind credit to farmers in the form of inputs, equipment, fertilizer, etc. • Introduce crop insurance to safeguard farmers in the disaster-affected areas from crop failures due to disease or unforeseen risks
Addressing farm labor shortages because of labor outmigration	Promote the use of farm machinery (power tillers, furrowers, land levelers) by individual households or by communities	Provide farm machinery on a cost-sharing basis • Promote community farm machinery service centers so that farmers can hire machinery at a reasonable rate
Repairing and rebuilding damaged irrigation canals and water storage ponds	• Rebuild damaged irrigation infrastructure • Rebuild damaged irrigation channels by the communities on cash for work basis. • Rebuild damaged irrigation infrastructure using communities through support schemes (such as on the job vocational training for masonry and other cement works) • Promote the use of solar pumps to source spring water for irrigation	• Provide materials (pipes, cements, tools) free of cost from local manufacturers • Use emergency relief such as cash-for-work or food-for-work for repair and reconstruction • Promote alternative crops that require less water in areas where irrigation channels are damaged beyond maintenance (heavy landslides) • Repair and rehabilitate farmer manage small irrigation system by using cash/food for work programme • Form local water users associations for better ownership of facilities
Replacement of livestock assets (cattle, buffalo, goats, sheep, poultry and fisheries) lost due to Earthquake	• Provide livestock and fish seed on a cost-sharing basis • Facilitate soft loans to individual farmers or to farmer cooperatives to replenish their stock • Promote improved breeds with supplementary veterinary and artificial insemination services • Support rebuilding of local milk collection centers by providing cash for work to resume milk marketing	• Support livestock purchase and fish pond's rehabilitation/reconstruction through cost-sharing mechanisms or by giving soft loans • Support mobilizing farmers into livestock groups and to optimize profits from collective efforts across the livestock value chains • Support start-up businesses by providing supervised soft loans to make enriched feed blocks from crop-residues and by-products at the village

	• Support construction of fish ponds wherever needed	level • Support village animal health workers through trainings and soft loans • Introduce livestock insurance to safeguard farmers' livelihoods from livestock loss due to diseases and other unforeseen risks
Rebuilding of damaged animal sheds	• Provide soft loans to buy local raw materials for animal sheds (zinc sheets, cement, bricks) • Mobilize community labor and local raw materials for reconstructing animal sheds. • Carry out reconstruction work on cash-for-work or food-for-work basis • Use cash/food-for-work for building animal sheds	• Use cash/food-for-work for building animal sheds and mobilize community labor • Promote construction of separate animal housing from human housing through awareness and regulatory measures for better health, hygiene, and sanitation • Support integrated livestock-biogas facilities
Replacement and rebuilding of poultry farms (broiler and layer farms	• Provide local materials for shed construction and poultry equipment on a cost sharing basis • Provide soft loans for the purchase of day-old chicks and poultry feed • Provide free veterinary services (vaccination and de-worming) for one production cycle • Set minimum support price for broiler and egg products	• Provide time-bound subsidies to local poultry hatcheries and local poultry feed manufacturers so that they can supply these inputs at a reasonable rate to farmers • Strengthen poultry value chains (feed suppliers, veterinary service providers, processors, and marketing agents) by providing soft loans and capacity building initiatives to various actors/ entrepreneurs • Introduce farm insurance to safeguard farmers from loss of poultry business due to disease outbreaks and unforeseen risks
Creating jobs in urban areas for migrating people	• Strengthen vocational training institutes/programmes to produce skilled labor force for various sectors (e.g., construction, hospitality, processing, manufacturing, heavy equipment)	• Provide soft loans to help start self-employment in micro-enterprises (repair and maintenance shops, beauty salons, tailoring, plumbing, carpentry, gardening, etc.) • Facilitate skilled labor recruitment in the international job market
Rebuilding of tourism sector as private hotels, inns and trekking trails were damaged	• Provide soft loans to rebuild inns and tea houses, and tourism-linked micro-enterprises such as handicraft shops • Promote cash-for-work or food-for-work to renovate trekking trails in safe areas by displaced and unemployed local people who were dependent on tourism activities (porters, guides, and cooks) • Market destinations not affected by the earthquake • Provide soft loans to entrepreneurs to restart their	• Promote safe destination marketing through active communication, including the use of mass media and international celebrities • Support tour operators and travel guides to resume their business through the provision of favorable loans • Provide alternative vocational skills (plumbing, carpentry, electrician, masonry, etc.) for large numbers of local people who were dependent on the tourism

	businesses (e.g., operational needs for hotels, restaurants, shops, tourism services, etc.)	sector, and link them to employment in the reconstruction of public and private infrastructure, as well as with authorized manpower agencies • Advance loans to existing small tourist establishments to restart businesses
Developing micro, small, and medium sized enterprises (MSME	• Promote agro-enterprise development (e.g., rice-mills, flour and grinding facilities, and agriculture cold stores) through cost sharing support • Provide soft loans to promote value addition, processing and agribusinesses (e.g., tomato sauce pickles etc.)	• Provide policy and financial support with low interest to MSMEs in affected areas. • Develop insurance mechanisms for MSME sector with public-private partnerships to mitigate risk • Support standardization, quality control, certification, branding, and market linkages • Support infrastructure and equipment for value addition and processing through favorable loan terms • Support capacity development for entrepreneurship
Creating livelihood opportunities for people affected by the earthquake	• Create employment through cash-for-work or food-for-work • Support skills development to enhance employment opportunities	• Engage displaced people in major public sector works (roads, bridges, buildings, hydropower)

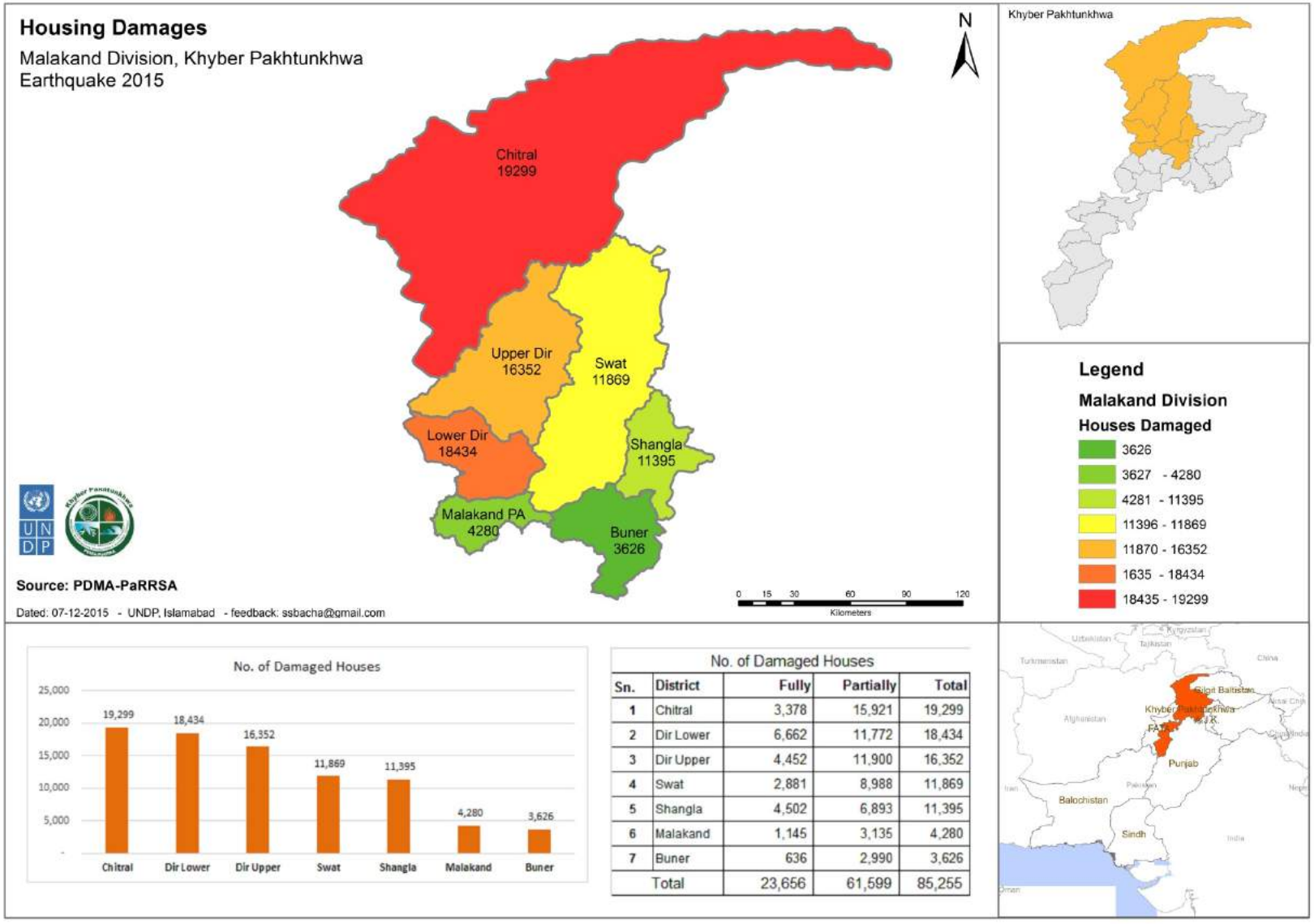
Map-1



Human Losses

Sn.	District	Death Reported	Injured Reported
1	Chitral	33	200
2	Dir Lower	26	248
3	Dir Upper	16	162
4	Swat	36	253
5	Shangla	49	181
6	Malakand	2	7
7	Buner	8	19
	Total	**170**	**1,070**

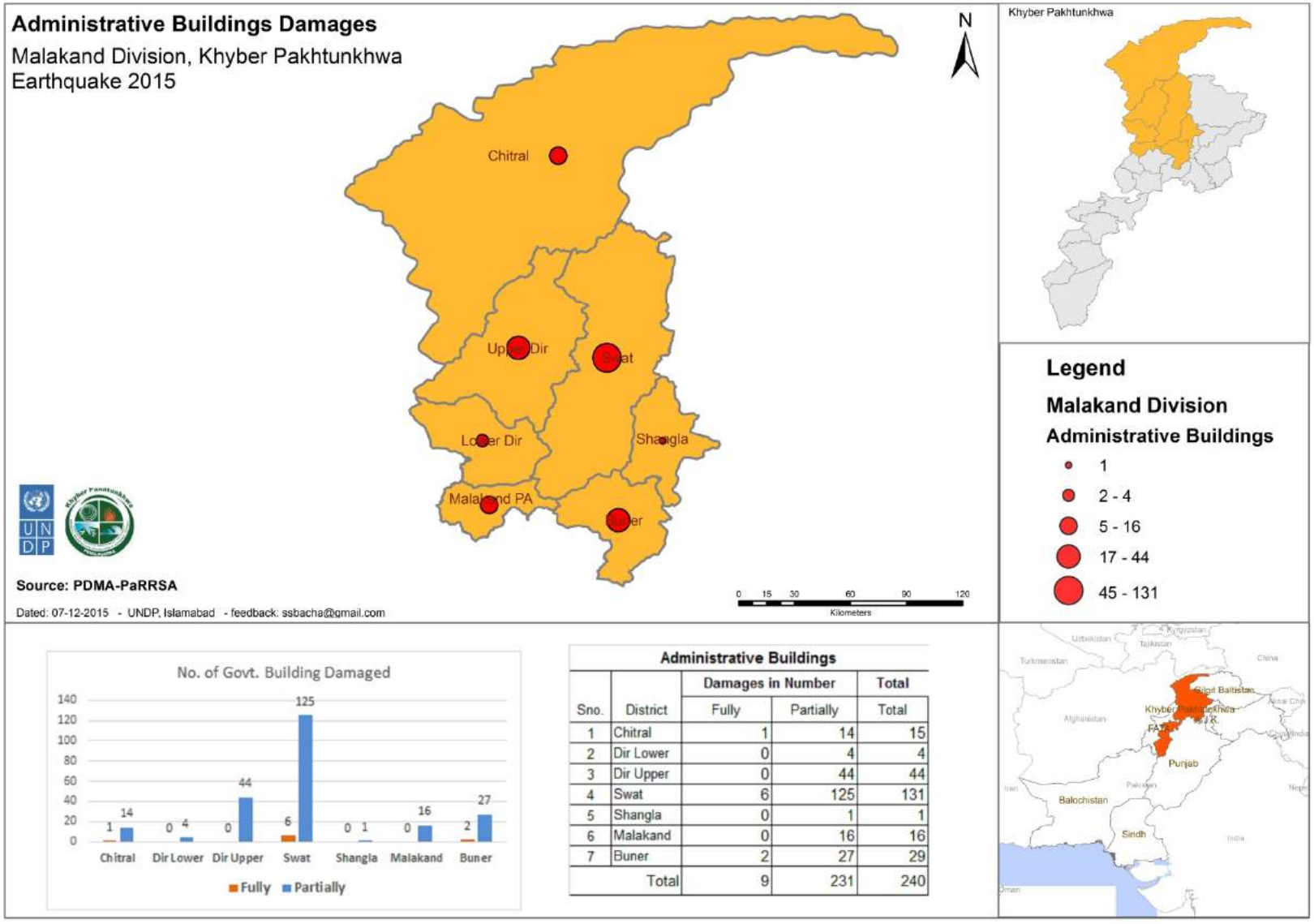
Map-2



No. of Damaged Houses

Sn.	District	Fully	Partially	Total
1	Chitral	3,378	15,921	19,299
2	Dir Lower	6,662	11,772	18,434
3	Dir Upper	4,452	11,900	16,352
4	Swat	2,881	8,988	11,869
5	Shangla	4,502	6,893	11,395
6	Malakand	1,145	3,135	4,280
7	Buner	636	2,990	3,626
	Total	23,656	61,599	85,255

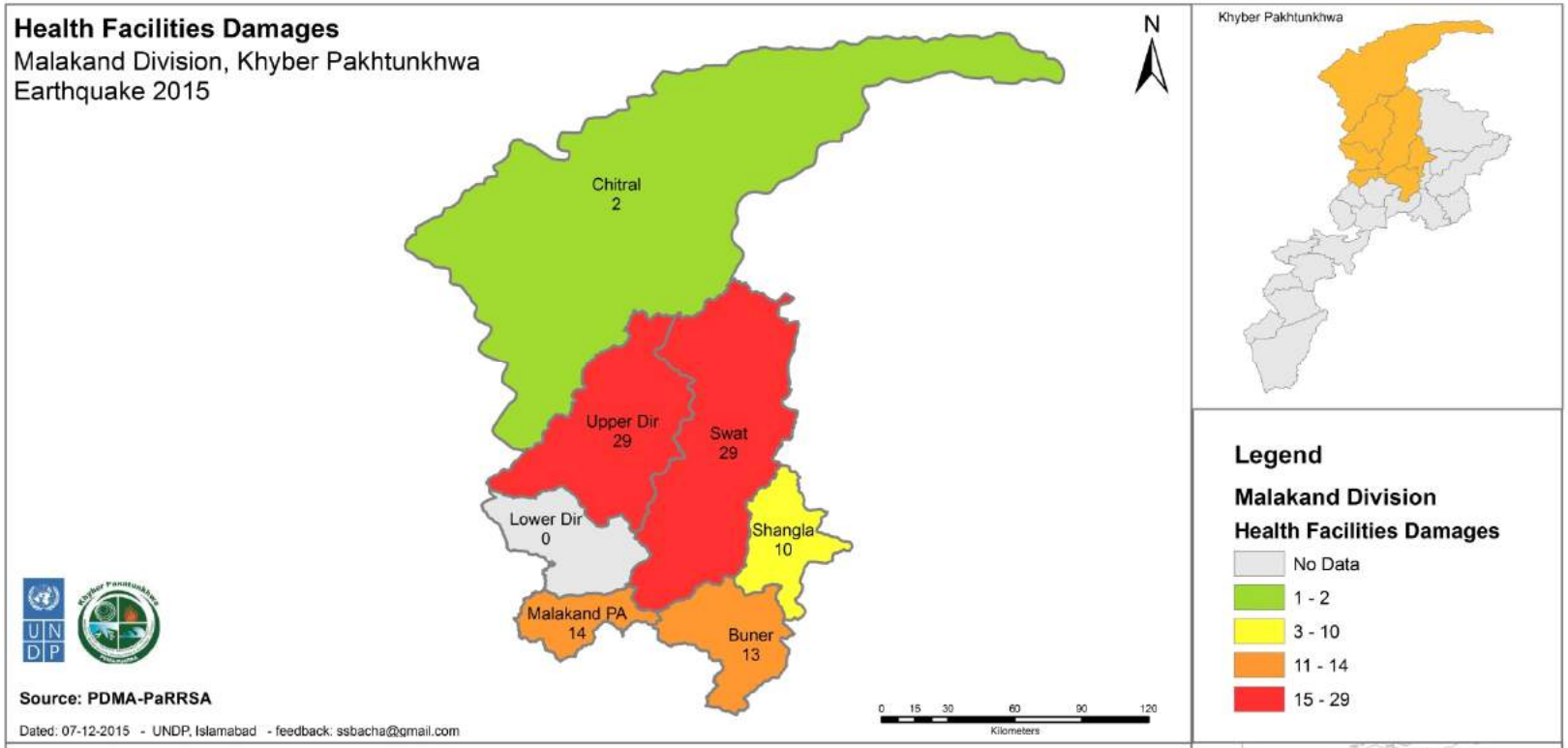
Map-3

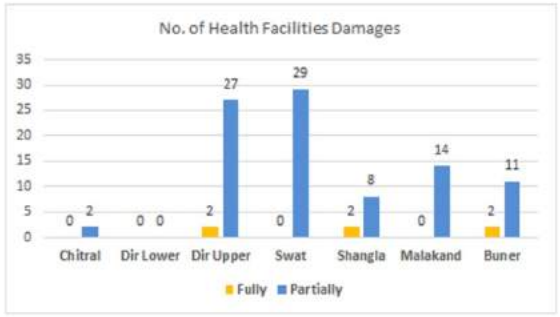


Administrative Buildings

Sno.	District	Damages in Number		Total
		Fully	Partially	Total
1	Chitral	1	14	15
2	Dir Lower	0	4	4
3	Dir Upper	0	44	44
4	Swat	6	125	131
5	Shangla	0	1	1
6	Malakand	0	16	16
7	Buner	2	27	29
	Total	9	231	240

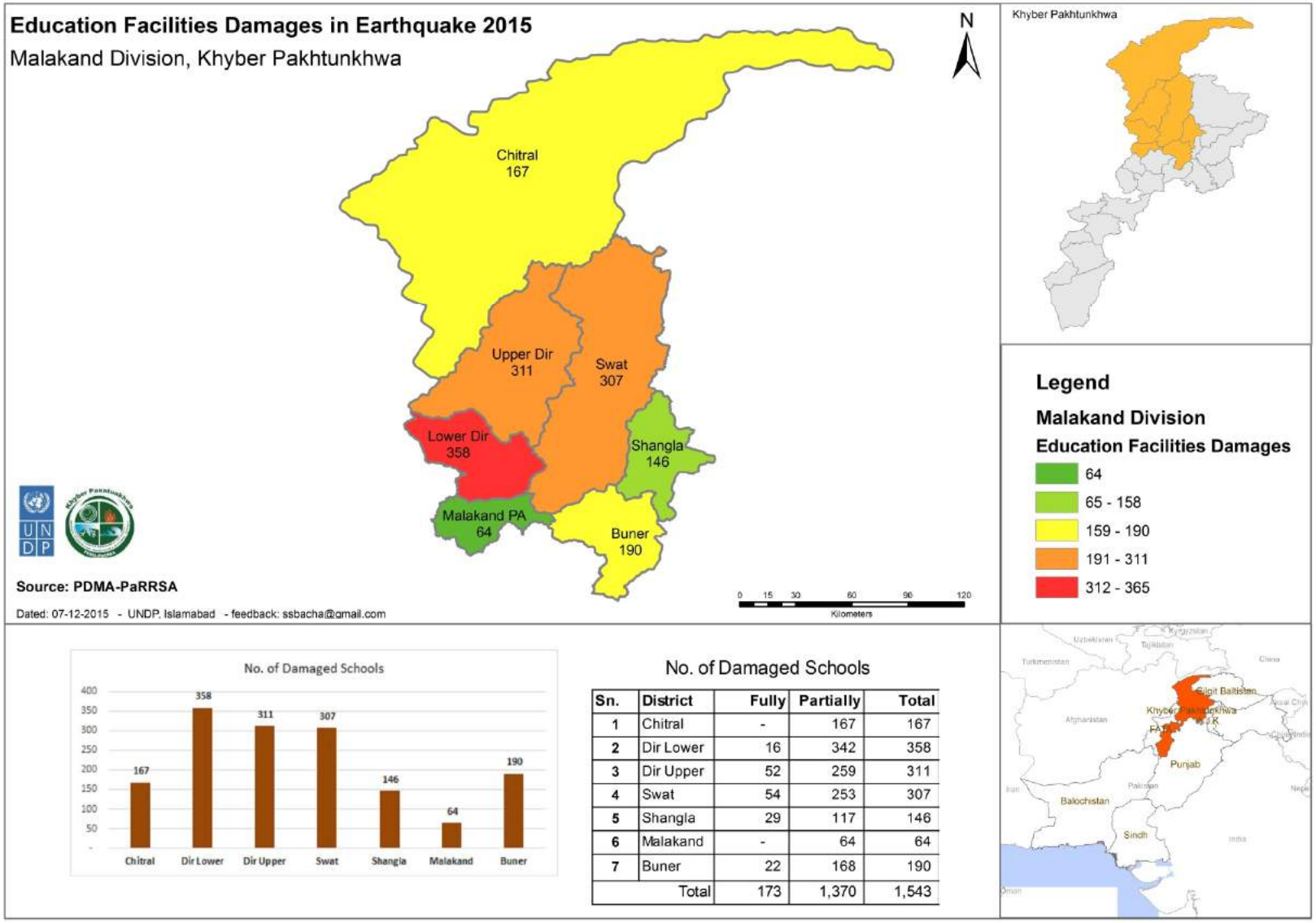
Map-4





Health Facilities				
Sno.	District	Damages in Number		Total
		Fully	Partially	Total
1	Chitral	0	2	2
2	Dir Lower	0	0	0
3	Dir Upper	2	27	29
4	Swat	0	29	29
5	Shangla	2	8	10
6	Malakand	0	14	14
7	Buner	2	11	13
	Total	**6**	**91**	**97**

Map-5



No. of Damaged Schools

Sn.	District	Fully	Partially	Total
1	Chitral	-	167	167
2	Dir Lower	16	342	358
3	Dir Upper	52	259	311
4	Swat	54	253	307
5	Shangla	29	117	146
6	Malakand	-	64	64
7	Buner	22	168	190
	Total	173	1,370	1,543