

ANNEX 7 – HOUSING

A. Introduction

1. The October 8, 2005 earthquake left an estimated 2.8 million people in need of shelter at the onset of a harsh winter, in a rural, difficult to access, terrain. GoP census data indicates that about 788,000 housing units were in the affected area, and that these were predominantly rural.

2. The typical home in the affected areas houses 6-7 persons, is 400 sq. ft. and consists of one or two main rooms, a veranda and a bath and kitchen which may not be attached. A *Katcha* (non-permanent) house will typically have mud or stone rubble walls with a flat mud roof supported on pole beams. A *Pucca* (permanent) house will have stone rubble or fired brick masonry walls with sand cement mortar and a low pitched sheet metal or reinforced concrete (RCC) flat slab roof. More recently, hollow cavity concrete masonry unit (CMU) block is being used for walls. Virtually none of the housing in affected areas has seismic consideration in design. Compounding this is the generally poor quality of construction.

B. DAMAGE OVERVIEW AND RECOVERY NEEDS

3. Data as of November 9 indicate that, for the affected areas in AJK and NWFP, 203,579 housing units were completely destroyed, while 196,574 were damaged to various degrees. These include 116,572 and 88,368 respectively in AJK and 87,007 and 108,205 respectively in NWFP, and represent 84% of the total housing stock in the affected districts of AJK, and 36% of NWFP (Table 1).

Table 1: Summary by Province of Total, Destroyed and Damaged Housing Units

District	% Urban	Total Units	Destroyed	Damaged	Total Damaged	Total Damaged %
<i>AJK Affected Districts</i>						
Muzaffarabad	12	123,679	69,943	28,278	98,221	79
Bagh	5	59,623	33,806	21,208	55,014	92
Poonch	11	61,678	12,823	38,882	51,705	84
AJK Total	10	244,980	116,572	88,368	204,940	84
<i>NWFP Affected Districts</i>						
Shangla	0	67,003	15,661	10,821	26,482	40
Mansehra	14	203,109	31,323	43,282	74,605	37
Kohistan	0	74,087	4,350	18,395	22,745	31
Abbottabad	19	153,819	6,961	27,051	34,012	22
Batagram	0	44,585	28,712	8,656	37,368	84
NWFP Total	11	542,603	87,007	108,205	195,212	36
AJK + NWFP	10	787,583	203,579	196,573	400,152	51

4. The total value (replacement cost, not depreciated) of the housing in the affected areas is shown in Table 2, and is Rs. 119 billion. These values were determined based on a typical building plan and unit material and labor costs. Material quantities and construction costs were estimated for the value of *Pucca*, semi-*Pucca* and *Katcha* houses, as they existed prior to the earthquake. These values were multiplied by the pre-earthquake housing stock, to estimate exposed value.

5. A similar methodology was employed to estimate loss of value due to destroyed and partially damaged housing. For partially damaged houses, 20% of the cost of a new house was used as the average cost of repair, it being an average of the range of houses which would require repairs (i.e., average of no damage, and 40% damage – houses damaged in excess of 40% were classified as destroyed). Results are indicated in Table 2, which shows that the earthquake destroyed Rs. 61.2 billion of this value, or 51% of the exposed value.

Table 2: Estimates of Housing Values – Total, Lost and Reconstruction

(Rs. millions); (US\$ millions)	Total Housing	Value of Lost Housing (as-was)			Reconstruction Cost (400 sq ft) Seismic design		
		Destr.	Dmg*	Total	New	Repair	Total
AJK Affected Districts	32,000	22,107	3,401	25,508	34,970	7,070	42,040
NWFP Affected Districts	87,000	20,407	5,102	25,509	26,100	8,660	34,760
BOTH PROVINCES (Rs. millions)	119,000	42,514	8,503	51,017	61,070	15,730	76,800
TOTAL including 20% contingencies		51,017	10,204	61,220	73,288	18,876	92,160
US\$ millions	2000	859	172	1,031	1,234	318	1,552

Cost estimate basis: for reconstruction = Rs. 750 per sq ft; for repair = Rs. 200 per sq ft.

* Includes value of household contents such as consumer durables

6. The reconstruction costs were estimated at Rs. 92 billion (of which Rs. 73 billion for new houses) if replacement houses were 400 sq ft and of seismically acceptable structural standards. A 20% additionality for contingencies, under-reported damage and unforeseen expenses was also reflected in arriving at the totals. Details of these designs are found in Notes 1 and 2 at the end of this annex. These designs have been used for costing purposes. Other structural design options may also be considered subject to their seismic appropriateness, affordability, and availability of local building materials.

APPROACH TO HOUSING RECONSTRUCTION

7. The approach that follows outlines 9 principles based on international post-disaster reconstruction experience and consideration of the Pakistani context.

Principle 1: *Promote hazard-resistant construction standards and designs.* The collapse of approximately 200,000 buildings, predominantly housing, was due largely to the lack of any seismic consideration in their design and their poor quality of construction and maintenance. Reconstruction of affected areas should emphasize seismic safety.

Principle 2: *Rebuild in-situ.* Most households should be allowed to rebuild on their original plot of land. This in-situ approach minimizes:

- resistance of the population at attempts at relocation
- demands on GoP to sustain livelihoods in new locations and to build new physical and social infrastructure.
- demands on, and costs to, the GoP to identify and acquire land and issues of land ownership and availability

Principle 3: *Ensure rebuilding is owner-driven.* Homeowners should be in charge of rebuilding of their own homes.

Principle 4: *Rebuild with familiar methods and easily accessible materials.* To be sustainable, promotion of hazard resistant standards and designs must relate to use of readily available materials, familiar modes of construction, and cultural preferences in design.

- Principle 5:** *Relocate settlements only when necessary.* Relocation of some settlements might be inevitable. These should be limited to circumstances where the risks of exposure or contributory effects to hazards remain very high due to topography; soil conditions and other environmental and risk factors.
- Principle 6:** *Ensure urban replanning is limited and strategic:* Such attempts should not be city-wide but instead focus on pockets of strategic urban areas.
- Principle 7:** *Offer uniform assistance package that is not compensation-based.* Compensating households proportionate to the replacement value of their loss increases the GoP's liability significantly and encourages a plethora of litigation.
- Principle 8:** *Coordinate multiple reconstruction initiatives and standards for equity.* It is crucial that the GoP coordinates multiple reconstruction initiatives to ensure full spatial coverage and reduce the risks of beneficiary double counting or any affected household being missed.
- Principle 9:** *Link housing to livelihoods and infrastructure rehabilitation.* The sustainability of housing solutions offered by the GoP will be largely determined by complimentary efforts to restore livelihoods and rehabilitate physical and social infrastructure.

C. RECOVERY AND RECONSTRUCTION STRATEGY

8. The suggested recovery and reconstruction strategy comprises a variety of activities and modes of assistance aimed at helping households transition from their current state of displacement to being re-housed in permanent housing of seismically acceptable standards. Many of these options will operate in parallel as households have a continuum of needs and are not all starting at the same point. The predominant form of suggested assistance is cash grants for owner-driven rebuilding – a mode well suited to the 90% rural affectees. This would be responsive to individual preferences and maximize household ownership thereby keeping expectations of, and demands on, GoP realistic. Simultaneously it would mobilize tens of thousands of mostly self-standing reconstruction and rehabilitation efforts, thereby not burdening GoP administrative capacity with a large volume of contract management. The objective of the grant would be to either replace a destroyed house with a new core unit, or to repair a damaged house. Urgent attention to beneficiary identification and eligibility levels is required, and assistance packages need to be few and standardized. The strategy also identifies the need for extended-term intermediate sheltering options for households, particularly from pockets of urban areas, who will need to be relocated. Although permanent relocation will require time, replacement site identification and replanning are short term priorities.

Sheltering of Affected Population

9. **Tents.** A major effort at providing tents and blankets to affected households by the GoP continues in conjunction with various UN organizations, NGOs and donors. The majority of tents available are more suitable for the lower altitudes. In towns, people may be able to use their moderately damaged houses for cooking and storage while sleeping in the tents. Households who wish to pitch their tents on their original plots should be allowed to do so. Distribution of plastic sheeting in parallel supports the families to protect from rain and cold.

10. **Distribution of basic building materials and tools/cash.** There are already some signs of affected households recycling building materials such as GI roofing sheets and timber from their damaged houses for sheltering themselves for the winter. Supporting this option by distributing materials and the necessary tools in quantities equivalent to producing a very basic shelter is preferable to tent solutions,

particularly at altitudes above the snow line. It allows families to stay in the same locations, and utilizes their labor, cash and salvaged materials for an immediate shelter solution. Durable, recyclable materials have the advantage of being phased into more permanent structures later on either through dismantling and reusing them or by expanding them. Alternatively cash may be given to the affected households to purchase these materials.

11. **Cash for self relocation and host families.** There is evidence from NGO reports that some families have taken refuge with relatives in other locations. A cash grant support to those families willing to relocate themselves for the winter can accelerate this process and reduce the need for shelter in the winter. Some subsistence support could also be considered for the families prepared to host others.

12. **Relocation to camps/transition shelter.** Thousands of dispersed villages cannot be serviced easily in the winter. On a strictly voluntary basis, some villagers could be encouraged to temporarily relocate to nearby camps that are being established in conjunction with the Army, UN organizations, and the NGOs/CSOs. Existing social and physical infrastructure of towns (even where there is some physical damage) can be fixed more easily than creating new facilities. Shelter solutions will be easier and quicker to deliver and service in ‘hubs’. This will require bolstering the capacity and number of camps. Transition shelter options will be required in these sites for those households who need to remain there beyond the winter because their original settlement sites are being subject to replanning/land consolidation, or because they have to be relocated all together. These longer-term inhabitants would require arrangements for provision of services as well as access to livelihoods.

Repair and Reconstruction of Permanent Housing

13. **Determining loss and eligibility levels.** A detailed assessment of loss and damage to housing assets needs to be undertaken as soon as possible so that assistance packages can be developed using transparent eligibility criteria. Moreover, it will also provide comfort to homeowners to begin self-repair without concerns of not getting legitimate compensation for losses incurred. Teams of engineers from the public and private sectors will need to be identified and trained in assessment techniques and criteria, and the surveys conducted during the upcoming winter season, when reconstruction/repair activity would be minimal. The preparation of an accurate list of reconstruction beneficiaries, following a rapid but thorough housing damage assessment and social verification, is an urgent task. The large number of affected households will require it to continue on an ongoing basis. In order to consider the social and political sensitivities within the concerned Districts, village/community participation in the selection and prioritization processes is crucial.

14. **Seismic, soil and other site investigations.** Detailed studies need to be undertaken to identify land susceptible to future natural disasters like earthquakes, landslides, and erosion/settlement. Rebuilding on original plots in these areas will clearly be ill-advised due to serious future risk to property or life. Other studies of some urban centers where the opportunities for, and potential benefits of, land consolidation are high should also be conducted. These activities will need to be undertaken in parallel with identification of possible sites for needed relocation.

15. **Training for safe construction.** Training in seismically appropriate construction for artisans, contractors, home-owners, and construction supervisors should be an integral part of GoP’s reconstruction strategy. This training should be initiated as soon as possible, and be repeatedly provided on an ongoing basis throughout the reconstruction period. Assistance for permanent housing will need to be tied to the adoption of the improved practices. With the scale of devastation and loss of life fresh in the minds of so many households, there is a unique window of opportunity to gain buy-in for these changes. It is suggested that prevalent construction materials be used as far as possible to avoid the time lag that is created by introduction of radically different ones. This also maximizes recycling of materials and

thereby reduces costs and speeds up recovery. Where necessary, alternate emerging technologies may be adopted only after thoroughly tested for their safety, acceptability, and replicability.

16. **Information Dissemination.** A crucial part of the GoP’s strategy should be effective and widespread consultation and dissemination of information to the affected communities. This should include information on the full range of assistance options, their eligibility criteria, and the means of accessing them, as well as on improved construction methods for seismically safe houses.

17. **Cash grants for Permanent, hazard-resistant basic housing assistance.** The core of the GoP’s assistance to affected households in both urban and rural areas should be cash grants for basic housing assistance. The grants should be released in tranches based on stages of construction, with technical assistance for introduction of seismic features provided by local governments and/or provincial line agencies. There should be few categories of grant so that their administration is simple. In this scheme, households will be able to utilize their own labor, use hired labor, or enter into an arrangement with a partner organization/NGO to rehabilitate or reconstruct their houses. However, close monitoring of reconstruction processes adopted will be crucial.

18. **Urban planning and development.** While the earthquake has been a terrible disaster for all six towns in the affected areas (four in AJK and two in NWFP) it also presents an opportunity to properly plan, reshape and rebuild parts of these towns into modern efficient communities. Also in some cases the original nature and intensity of the land use in relation to land prices was highly inefficient. Under normal circumstances, improving the towns would be difficult as various vested interests would resist change, but in the aftermath of the earthquake residents may be amenable to change. These efforts for the most part should not be city-wide but instead focus on localized pockets of urban areas.

19. Reconstruction of urban infrastructure is one of the most complicated aspects of disaster rehabilitation and reconstruction. This requires up to a year of time to prepare proper plans, maps, and land use/zoning bylaws, followed by design/tendering, and construction of infrastructure. Often old town areas have to be redesigned to allow for access and utilities, this in turn requires land acquisition and provision of alternate land, if available. The new development plan then has to be legalized in the normal process. To be successful, this should follow a consultative process with stakeholders and will need to be governed by explicit legislation or regulation some of which may be in the form of Government Orders.

D. ENVIRONMENTAL AND SOCIAL ASPECTS

20. The main environmental risk remains the threat of over-exploitation of building materials including timber and stone which may be conveniently located but serving vital environmental functions such as slope stabilization and soil protection. Since strict policing of a highly dispersed owner-driven process would be difficult, widespread public education programs on the risks posed by these practices and others such as clearing of rubble into river courses would be required, together with measures to ensure adequate supply of suitably sourced materials.

21. Loss of land records, depending on extent, can also be a significant source of social risk associated with housing recovery. Initial assessments suggest that none of the District Revenue Offices in the eight affected districts has been damaged to the extent that the land records cannot be salvaged intact. They will however need to be retrieved quickly, before the winter rains and snow arrive and cause their deterioration.

22. Where records have been lost and are not retrievable even through backups, other community-based evidence mechanisms will need to be deployed for re-mapping of parcel boundaries, certification of redefined boundaries; landlord/tenant claims; previously unregistered land; allocation of community land; identification of rightful heirs; and claims of informal settlers.

23. Affected persons in the areas that require re-planning will need longer term sheltering with reasonable access to basic facilities, as their house reconstruction has to wait for the planning process to be completed. Since most small cities and towns do not have the capacity to initiate and implement such major activities, additional institutional capacity will be needed.

24. Site selection and intra-site household dislocation, when settlement relocation or land consolidation is deemed the appropriate course, are key junctures in managing potential social and environmental risks associated with housing recovery. Such efforts should be voluntary with incentives favoring relocation. Access to livelihood and provision of social and physical infrastructure should be an integral part of relocation plans. Where relocation takes place near existing settlements, impact on the 'host' community should be considered. A useful way of attempting to mitigate these risks would be to have these processes formally overseen by a multi-party tribunal.

25. Finally, affectees residing in relatively inaccessible areas or belonging to socially disadvantaged groups will be at a risk of being left out and not benefiting from the compensation packages. A concerted effort will be needed to avoid this from happening.

Technical Notes

Note 1 The retrofit conceptual designs basically consisted of (a) for the *Katcha* house: Remove the mud roof; Install reinforced concrete frame (RCC columns with spread footings and perimeter bond beam) interior to the mud or stone masonry walls; install welded wire mesh (WWM) on both faces of the walls, anchored around its perimeter to the bond beam and columns, and intermittently field anchored. Cover the WWM with a cement mortar plaster (and point if stone masonry); install new Tin roof; and (b) For the *Pucca* house: without removal of the existing Tin or RCC roof, install RCC columns with the existing wall, by saw cutting or hand removal of the masonry. Remove top course of the wall and cast a bond beam integral with the columns; for rubble stone masonry walls, WWM may be required as for the *Katcha* House (this needs to be examined further). For fired brick masonry walls, the masonry is infill to a concrete frame, and does not require WWM facing. Point the brick or stone masonry with cement mortar.

Note 2 For houses that had been totally destroyed, the conceptual design for a replacement house was developed, consisting of a RCC frame (i.e., columns and bond beam) with ladder reinforced stone masonry or brick infill, with a tin or flat slab RCC roof. The same cost was used whether urban or rural housing, on the assumption that rural housing owners will have higher costs for materials transport compared with urban owners, and will compensate by using lower cost locally available stone masonry.