



Housing Reconstruction in Urban and Rural Areas

A. Background

1. The destructive Wenchuan Earthquake of magnitude 8.0 occurred at 2:28 p.m. local time on May 12, 2008, in the western Sichuan Province in China. The reconstruction of public and private housing has emerged as a key issue for the Government of China. This note discusses delivery mechanisms and financing strategies for private housing reconstruction, as well as gives examples of recent international experience with post-disaster housing reconstruction programs and key issues for consideration by the Government moving forward.

Urban and Rural Housing Reconstruction

2. **Urban housing reconstruction** programs are generally more complex and costly to implement due to the interim or permanent resettlement of large populations, the need to increase densities in multi-story buildings due to shortage of available land, and the need to accommodate complex tenure situations. The ownership and maintenance of multi-tenement structures requires a more comprehensive legal framework and high construction costs for these more complicated and engineered structures. Recovery programs will need to incorporate responses to these multiple and varied ownership situations.

3. **Rural housing reconstruction** programs, due to the dispersed nature and lower incomes of these communities, rely more on simpler technical solutions and self-help skill inputs. This increases the challenge for Government to support and facilitate, particularly to achieve some degree of code compliance in order to avoid reconstruction of substandard and seismically vulnerable housing. In addition, damage in rural communities will most likely include damage to simple but essential agricultural and livestock structures, these being an integral part of houses as well being vital to livelihood restoration. Damage thus represents a double loss and restoration a double benefit. These specific rural needs and configurations need to be addressed as part of reconstruction.

4. **Renters vs. Owners:** While the loss of owner-occupied housing is very significant, the loss of rental housing assets at such a large scale also significantly destabilizes supply in the rental markets, thereby impacting non-owners. It is usually the poorest members of society who are landless, and will not have access to immediate shelter relief during the long period of housing reconstruction and until the rental market supply catches up to the demand. It is important to make sure policies include provisions that address the needs of the rental population.

5. Based on their particular situation, and the challenges and constraints they face, countries implementing post-disaster reconstruction have used different strategies to



undertake housing reconstruction, such as homeowner driven approaches and the use of large-scale contractors. Below are case study examples from India, Pakistan and Turkey. Annex 1 provides an overview of these and other case study examples.

International experience

Gujarat, India: Housing Reconstruction

6. In **Gujarat, India** following the 2001 earthquake, affected families were given the financial assistance for reconstruction or repair. They themselves organized the process of reconstruction as per their need, pace and will. Owners of destroyed houses were given reconstruction assistance at specified financial scales, while owners of damaged houses were given repair assistance at differential scales, depending upon the extent of repairs required. Grant payments were made directly into newly opened household bank accounts; 660,000 new bank accounts were opened. Payment of assistance was given in 2 to 3 installments to ensure reconstruction standards compliance with hazard resistance norms.

7. The policy of providing minimal housing was adopted to ensure that every affected and eligible family would get at least a minimum safe shelter, even if their home had greater square footage prior to the earthquake. In rural areas, for example, government assistance was limited to the maximum grant amount of Rs 90,000 (US\$2,117) required to construct a safe core housing unit of 45 sq meters. In urban areas, the core unit was estimated to cost Rs 175,000 (US\$4,117) for up to 50 sq. meters.

8. The Government of Gujarat facilitated the housing reconstruction process by providing technical guidance, ensuring material availability and organised technical supervision for constructing multi-hazard resistant buildings. Seismic resilient requirements were provided by the State Government. Designs of 20 model houses were also provided to the public to choose from with an option to have one's own design too so long as the basic features of seismic design were incorporated. This approach ensured that instead of being uniform, reconstructed houses were tailored to owners' and siting needs, as is usually found in the case of organic evolution of the settlements. However, all designs have incorporated the adequate seismic design features.

9. Relocation of villages also occurred in Gujarat. Sites were identified and land use plans developed using technical hazard data and through consultation with affected communities who would be impacted by the resettlement program. Plans were disseminated to and discussed with communities in a transparent manner to ensure ownership in the process.

Pakistan: Rural Housing Reconstruction

10. In **Pakistan** following the 2005 earthquake, the Government conducted a multi-sectoral damage and needs assessment to determine the primary areas of focus for reconstruction. The outcome was that rural housing reconstruction was a priority. Upon



independent assessment of the damage based on a common methodology, the government provided cash grants in tranches to individual bank accounts. Homeowners provided their own resources to subsidize additional costs. Beneficiaries were also expected to use their own labor and/or hire contractors, as well as recycle building materials from the debris, to the extent possible.

11. The Government developed a rural housing reconstruction strategy¹, in which Rs. 175,000 (US\$2,917) was provided in four tranches, sufficient to provide each beneficiary with a core housing unit of between about 23-37 m² depending on his/her choice of structural solution. Partially damaged houses received grants of Rs 75,000 (US\$1,250) in 2 tranches. In addition, the compensation program was based on the number of houses affected, and not number of households. So if more than one family lived in one house, only the owner received the grant. This is possible since the homeowners themselves drive the reconstruction process and have signed memoranda of understanding (MOUs) with the government to reconstruct their houses and receive the tranche payments. This has helped increase ownership and sustainability of the program.

12. An interesting aspect of the Pakistan program was the attention to quality assurance. World Bank funded projects included a technical audit of reconstructed buildings, in which a number of construction defects were detected. A manual and program for correcting these defects was developed and successfully implemented, assuring that in the end most of the reconstructed houses had adequate seismic resistance.

Turkey: Urban Housing Reconstruction

13. The 1999 Mw 7.4 **Marmara earthquake**, killed over 17,400 people and injuring a further 44,000 people. Up to 600,000 people were made homeless and over 113,000 housing units were damaged or destroyed. The Government of Turkey sponsored the construction of low-cost apartments to accommodate 200,000 people who were left without homes. The Turkish Government drew up an Emergency Earthquake Framework Program in collaboration with the World Bank, other lenders and UNDP totaling about US\$1.795 billion. Estimated financing provided by the Government per housing unit was estimated at about US\$20,000 including on-site infrastructure.

14. In addition, at the time of the earthquake, housing insurance was not developed in Turkey, in part due to the implicit insurance provided through state guarantees to replace owner-occupied housing losses. Thus the bulk of replacement costs fell on the public budget. A Turkish Catastrophe Insurance Pool (TCIP) was created following the earthquake to address this issue of transferring risk from the public to the private sector. The Pool is supported by the government of Turkey, the World Bank and the private sector reinsurance company, Milli Re; this is a good example of public-private partnership in providing catastrophe risk transfer and financing facility. More information on the TCIP is available in the disaster risk reduction good practice note.

¹ <http://erra.gov.pk/Reports/Rural%20Housing%20final%20strategy-20%20Apr%202006.pdf>



Lessons Learned

15. Common to the two experiences of India and Pakistan is the government provision of a fixed subsidy to homeowners based on an agreed damage assessment methodology. This is one successful approach, since it is transparent, based on sound principles, and can be easily communicated to distressed communities. Reconstruction is subsidized by the government through grant payments disbursed in tranches to ensure compliance with standards. In the case of Pakistan, the first disbursement of about 14% of the total amount was released immediately for immediate shelter needs, while the balance of 86% was used for permanent housing.
16. Through the provision of grants based on the outcome of a damage assessment, the governments of India and Pakistan supported the reconstruction of a core housing unit to higher standards that can be expanded to meet family needs over time. This provides shelter in the medium term while allowing homeowners the flexibility to meet longer term spatial needs. These grants for housing have been complemented by social safety nets for the disadvantaged and absolute poor.
17. Any reconstruction of housing, public buildings, and infrastructure should include disaster-resistant technologies and site selection. There is a need to assess whether the reasons for relocation are technically correct before planning to relocate people or entire villages and towns. When relocating people away from one risk, it is important to keep exposure to new risks in mind.
18. In Pakistan, effective partnerships with “Partner Organizations” (NGOs, international organizations, etc.) have been mobilized to oversee/monitor housing reconstruction progress in the field, contribute to capacity building and emergency preparedness and to ensure compliance with the seismic resistant construction standards. The military has also been working with these partners to conduct regular field inspections of progress.
19. Another lesson has been the importance of training homeowners, builders and local artisans in seismic resistant construction methods and standards. For example, in Pakistan, more than 80,000 artisans, supervisors, beneficiaries, and community members have been taught about seismically safe construction designs and methods. These trainings have provided local artisans with the technical knowledge of how to build to higher standards and reduce the future vulnerability of people's homes to earthquakes.
20. A key lesson from the Turkish example was the development of a mechanism to transfer risk from the public to the private sector. This development, from purely a government subsidy based reconstruction system, to an increasingly insurance financed reconstruction system, is an important step through which markets can be developed to absorb financial risk and thereby reduce the fiscal and capacity strain on governments at the time of a disaster.



21. Another lesson learned from the Turkish program was that social networks and livelihood opportunities existing prior to a disaster are important to take under consideration when planning resettlement programs. The Marmara recovery program took these issues into account. For example, the reconstructed apartment complexes included health facilities supplied with medical materials and equipment, schools, walkways, sport fields, playgrounds and landscaped parks. Care was also taken to ensure that the apartments not only allowed for the residents to adjust psychologically after the earthquake, but also become owners of homes that have a value on par with the regional real estate market. Consequently, access to transportation and employment opportunities were ensured.

Recommendations

22. The policy decisions made by the Government of China to meet the needs of affected homeowners will set a precedent for financial and technical support following future Chinese disasters. The general lessons learned from previous examples should be kept in mind as guiding principals. While decisions are made to address short term needs, it is important to bear in mind the longer term strategy for housing reconstruction and policy. It is recommended the Government should:

23. Short Term:

- Establish clear criteria and the methodology for conducting a housing damage and needs assessment;
- Quickly undertake a comprehensive and thorough Damage and Needs Assessment of the housing stock, working closely with the affected communities. This assessment could be carried out in two stages: 1) a rapid, initial assessment to provide a basis for quick estimations of needs and related costs; and 2) more comprehensive community-level assessments, which could begin in parallel to the rapid assessment. (Demographic surveys need to factor in the ratio of renters to owners and issues of affordability);
- Create technical capacity to carry out building-by-building inspection; this typically requires special training of a large number of inspectors;
- Establish technical design standards and update the building codes for all building reconstruction in urban and rural areas;
- Undertake comprehensive multi-hazard mapping and evaluation activities to decide on reconstruction criteria and planning of community relocation if necessary. These should be reflected both in technical standards and spatial planning criteria: housing, social facilities, infrastructure, transport, and environmental considerations (e.g. location and transport of toxins, reservoirs).

24. Medium Term:

- Ensure housing policies and operational approaches are integrated with infrastructure reconstruction programs. Housing programs at the minimum need to include budget provisions for basic infrastructure and building service connections ;



- Develop financing and delivery strategies, differentiating between reconstruction, repair, and relocation for both urban and rural homeowners, while maintaining social equity and balance. Preparing a practical policy balancing between grants, loans and affordability, and putting in place social safety nets for disadvantaged groups (elderly, vulnerable, low income, and handicapped) will require careful analysis of the Damage Assessment findings.
- Develop institutional arrangements, including a robust monitoring system for the implementation of the various reconstruction programs;
- Develop a multi-tiered quality control system for the physical reconstruction program;

25. **Long Term:**

- Reduce fiscal exposure to future disasters by examining international experience in catastrophic insurance programs targeting private housing, and tailoring appropriate instruments for China. The Government should now put in place the legal and regulatory framework for insurance mechanisms;
- Identify options and put in place programs for: (a) addressing problems within the banking sector of possible mortgage defaults, and (b) measures to address the social issues caused by negative net worth of mortgage holders due to property destruction.



Annex 1: Comparison of Recent Disasters and Housing Reconstruction Financing Policies

Location	Severity of the event	Affected population	No. of damaged & destroyed houses	Government Housing Reconstruction Financing Policy
Gujarat, India	An earthquake measuring Richter Scale 6.9 and impacted a large part of Gujarat State in India on January 26, 2001.	The earthquake affected area was 182,639 sq kms and covered 7633 villages in over 9 districts in the western part of the state. A comprehensive multi sectoral plan for reconstruction at a total cost of US\$1.76 billion.	1,118,052 (including damaged houses and 233,660 destroyed houses)	A range of grant amounts were provided based on rural versus urban context, housing type, and level of damage. In rural areas a maximum of Rs 90,000 (US\$2,117) per destroyed house to reconstruct a core unit of 45 sq. meters. In urban areas, maximum grants of Rs 175,000 (US\$4,117) were provided to reconstruct a core unit of 50 sq meters.
Pakistan 2005	7.8 Richter scale Earthquake: October 8, 2005	73,000 people died • Damage & losses: US\$5.2 billion • Impact on economy: 0.4% of GDP (excl. Azad Jammu and Kashmir/ AJK)	204,000 destroyed and 197,000 damaged houses. After the detailed building survey the numbers indicated 500,000 needed complete reconstruction and 100,000 needed repairs.	Rp175,000 (US\$2,917) was provided as a grant per household for destroyed houses and Rs 75,000 (US\$1,250) was provided to repair damaged houses.
Indonesia-Yogyakarta	5.9 Richter scale earthquake: May 27, 2006	More than 5,700 people killed • Damage & losses: US\$ 3.1 billion • Impact on economy: 14% of Yogyakarta and Central Java province GDP	An estimated 154,000 houses were completely destroyed and 260,000 houses suffered some level of damage	Rp 15-20 million (US\$1,670-2,200) was provided as a grant per household, through a community-based approach



Location	Severity of the event	Affected population	No. of damaged & destroyed houses	Government Housing Reconstruction Financing Policy
		or 1.3% of national GDP		
Indonesia -Aceh	Tsunami on December 26 2004, followed by several aftershocks in Aceh, with a major earthquake occurring in March 2005, affecting adjacent islands	130,000 people killed Damage & losses: US\$4.5 billion • Impact on economy: 97% of Province GDP or 2% of national GDP	125,000 destroyed and some 20,000 damaged	Destroyed houses replaced where families identified. Community based implementation. Funded as grants from multiple sources (Government, Bilaterals, multilaterals, and NGOs). Target core area 36sq meters initially, 100% financed. Repairs were supported through grants based on the level of damage.
Marmara earthquake, Turkey	On August 17, 1999, an earthquake measuring 7.4 on the Richter scale	Over 17,000 lives were lost, about 200,000 people were left homeless; the total fiscal burden arising from the earthquake to be in the range of US\$1.8-2.2 billion	113,000 housing units damaged or destroyed	Housing was reconstructed using contractors, with emphasis on rebuilding communities, incl. social and other infrastructure and access to employment opportunities. Estimated financing required per unit at about US\$20,000 including on-site infrastructure.
Kobe, Japan earthquake	7.3 magnitude earthquake	Damage and losses were estimated at	110,000 damaged or destroyed	300,000 yen (US\$2,700)/household ² . Private house

² Complementary to public funding, private banks provided ¥900 billion (about \$8.8 billion) in long-term loans to the prefecture and city, and in turn the central government established a similarly-sized fund to ensure against default. Over time, the reconstruction fund provided interest-free, long-term loans to more than 30,000 businesses and households, and supported other reconstruction activities that were not covered by the central government programs.



Location	Severity of the event	Affected population	No. of damaged & destroyed houses	Government Housing Reconstruction Financing Policy
	on January 7, 1995	US\$87 billion		reconstruction was responsibility of individuals; loan funds made available from Restoration Fund, subject to individuals' ability to service loan.
North China Earthquake	1990 in Hebei and Shanxi Multiple quakes between 5 and 6.1		25,000 mainly privately owned houses, plus schools, clinics and public buildings destroyed	Private houses reconstructed through 1.3% 15 year loans. Village level managed.
Lijiang Earthquake, China	1996 earthquake of magnitude 7.0	309 reported died; significant stock losses	410,000 houses reported damaged or destroyed	House reconstruction by homeowner, Local Government provided grants covering 25 to 30% of total reconstruction cost provided according to the level of damage.