



Planning for Urban and Township Settlements After the Earthquake

A. Introduction

This Note builds on the Government's proactive measures already announced in:

- State Council's "Decree of Wenchuan Earthquake Construction" (hereafter, 'Decree') issued on June 9, 2008
- Directive on Counterpart Assistance ('Directive') of June 11, 2008
- Ministry of Land and Natural Resources "Land Policies to Support Wenchuan Reconstruction" ('Land Policies') of June 11, 2008.

The Note cites selected international experience in reconstruction from recent earthquakes in Kobe (Japan), Gujarat (India), Bam (Iran), and Marmara (Turkey).

The Wenchuan Earthquake has affected a wide spectrum of rural and urban settlements in varying geographic contexts across a large area. The Government has already defined the extent of "Extremely Affected", "Heavily Affected", "Moderately Affected" and "Affected" Areas in Sichuan, Gansu and Shaanxi provinces. Analysis of interim information on affected towns, townships, counties, and cities suggests that settlement planning efforts will need to respond to very different contexts.

In "*Extremely Affected Areas*" (EAAs), reconstruction will need to address:

- Small towns and villages in isolated, mountainous valleys (e.g. throughout Wenchuan and Beichuan Counties). These require village-based planning approaches (including consolidation and construction of new villages in a few areas)
- Medium-size towns in isolated, mountainous valleys (e.g. Nanba Town in Pingwu County, Qiaozhuang in Qingchuan County, Qushan in Beichuan County). These require structured planning.
- Suburban villages and small towns near small- and medium-sized cities (e.g. the cluster of extremely affected towns and townships around Dujiangyan). Planning could improve integration of these villages and towns with the cities. Extension of some infrastructure services can be achieved.
- Large- and medium-size towns adjacent to county-level cities at the edge of the Sichuan Plain (e.g. Hangwang and Zundao Towns near Mianzhu City in Deyang)
- Suburban and urban areas of these county-level cities may require major adjustments or expansion of city master plans. The scale and scope of reconstruction efforts are likely to be very wide in EAAs.



In “*Heavily Affected Areas*” (HAAs), although the severity of damage is more limited, the numbers of settlements are greater and include:

- suburban villages and small towns (e.g. around Chongzhou and Deyang)
- and villages and towns adjacent to medium and large cities (e.g. Mianyang and northern districts of Chengdu). These cities require adjustments to City and District master plans to better integrate these areas into urban regions
- outer areas and pockets of inner urban areas of these cities, possibly requiring the planning of large-scale redevelopment of more formalized precincts and communities.

The type of development planning needed in isolated areas will be quite different from those required in suburban or inner urban areas of large cities. There will not be a ‘one size fits all’ approach to the process and content of urban planning for reconstruction. It is recommended that the Government should accelerate the damage assessment. This would determine the scale and extent of planning that is needed. It will also guide the differentiation of approaches to post-disaster urban planning efforts.

B. How Urban Development Planning Can Support Reconstruction

Although approaches will differ, they will all need to address the basic objectives of effective urban planning:

- Defining the types, locations, quantities, and intensities of land uses
- Ensuring the availability of land (land supply)
- Ensuring the serviceability of land for allocated uses (i.e. provision of infrastructure services); and
- Facilitating the connectivity between land uses (i.e. transport networks and services).

Urban planning is critical in effective reconstruction planning. It sets the framework within which affected populations can permanently re-establish their livelihoods. It also allows enterprises to securely resume or start new operations.

Successful international experience shows that effective post-disaster urban planning can:

- Provide a powerful instrument for incorporating disaster risk management into redevelopment efforts
- Provide a framework for coordinated, integrative efforts towards sustainable reconstruction by defining the framework within which infrastructure, transport, environmental management, and development occur
- Provide a framework for setting and adhering to reconstruction priorities
- Facilitate monitoring of performance and progress



- Provide a disciplined framework for reconstruction financing (capital investment budgeting, changes to fiscal revenue assignments, and fiscal transfers)
- Provide stakeholders with a common basis for responding to unforeseen needs and new constraints as the city, town, or village evolves through reconstruction.

C. Urbanization and Reconstruction Policy: Reducing Reconstruction Pressures

A prerequisite to post-disaster urban planning is ensuring that planning is directed to areas that need it most. Government could consider several policy options to better focus planning efforts.

Facilitate Voluntary Resettlement to Unaffected Areas. Reconstruction pressures could be reduced by giving residents of affected areas the choice of moving permanently to unaffected towns and cities, especially if a sponsoring family member had already migrated and successfully established prior to the earthquake. Compensation to affected family members could take the form of resettlement assistance instead of housing grants recently offered by Government for the rebuilding of homes.

Some central government assistance to local governments in receiving areas could be given to offset the costs of additional education and social service obligations. This policy could be structured to continue the intent of State Council's Directive on Counterpart Assistance. For households who do not have migrant members in unaffected areas, Government might consider a similar model but limited to resettlement in towns and cities within the original or adjacent prefecture-level City. This approach is consistent with longstanding Government policy promoting rural-urban migration to towns and small cities¹.

Abandonment of Unsustainable Settlements at High Risk. The State Council's Decree clearly recognizes that the Wenchuan Earthquake caused almost total devastation in some villages and towns. Unsustainable settlements at high risk may need to be abandoned. This is a very difficult policy decision, and one that should be considered with care. Experience shows that new settlements can lead to social problems and lack of accessibility to employment and means of livelihood. However, in some cases relocation may need to be considered to ensure the safety of remaining residents in dangerous zones. While the Decree states that these settlements will need to be reconstructed in other locations, Government should consider a strategy of consolidating villages and towns.

Rationalization and Consolidation of Strategic Towns and Cities. Some of the affected villages and towns are in regions that have been lagging economically for decades. The rationalization and consolidation of strategic towns would need to be coordinated with

¹ Experience in other countries indicates that, if given the option, many households will want to migrate out of affected areas. For example, in Marmara (Turkey), 18% of households in affected areas declared their intention to move to other towns and cities.



the resettlement of inhabitants from dangerous areas, and could focus on towns and cities that clearly have:

- The capacity to generate additional employment and non-wage economic opportunities for resettled households
- The fiscal and institutional capacities to expand current levels of health, education, and social services.

Selecting these towns and cities will be a difficult challenge, and will require accurate and current information to assess their absorption capacities within the context of regional economic development.

D. Process Guidelines for Urban Planning and Implementation

Given the urgency of reconstruction, there is not enough time or resources to follow the current hierarchy of statutory urban plans in China. The major exceptions to current policy on land management, announced by the Ministry of Lands and Natural Resources on 11 June 2008, are a precedent for the kinds of exceptions to statutory urban planning practice that the Ministry of Housing and Urban and Rural Development should quickly formulate.

International experience indicates that what is needed in earthquake-affected areas is not new ‘master plans’ and ‘urban designs’ but rather **iterative** urban development strategies. These should be supported by economic and social development policies and priority action programs in key sectors. Government should consider a more adaptable approach to urban planning during reconstruction comprised of:

- Rapid declaration of a Strategic Vision for affected settlements.
- Preparation of Structure Plans that establish planning intentions, but without the degree of detail inherent in current Master Plans
- Preparation of Concept Plans for affected precincts and communities.

In Kobe, the government announced its Strategic Vision for the city three months after the earthquake, providing residents with a focus on the future and demonstrating governments’ readiness and resolve to re-build a better city. This Strategic Vision guided all subsequent planning and reconstruction efforts over a 10-year period. As State Council has articulated its overall vision for Wenchuan Earthquake Reconstruction, local governments in affected areas should articulate visions for their communities at the earliest possible time.



A Structure Plan sets out broad principles and policies for the development of a town or city². The plan is typically at the city or district level, and is a flexible outline of the planning intent for the area. The plan should include information on:

- Hazard areas and mitigation policies
- Environmental and heritage attributes
- Roads and public transport
- Broad land-use zoning and maximum densities.

A Structure Plan needs to be flexible. As reconstruction progresses, it needs to be regularly updated to reflect unforeseen outcomes of migration and economic trends, and changing fiscal capacities of local governments. The Structure Plan should form the basis for all infrastructure and transport planning and investment. The Plan should designate the priority areas for redevelopment.

An important first step in planning for Wenchuan Earthquake Reconstruction is to define the scope of detail appropriate to Structure Plans for the different types of affected cities and towns. Structure Plans need to be given the same statutory effect as current Master Plans. Structure Plans should be prepared and adopted within a maximum period of three to six months.

A Concept Plan would apply the principles and policies of the Structure Plan to define the specific planning requirements to the detailed planning and development of priority areas³. For Wenchuan Earthquake Reconstruction, the Concept Plan would become a broader, more strategic (but still statutory) replacement of the current Detailed Plan for Control mechanism. The Concept Plan needs to incorporate the geological risk assessment required by MLNR in its Land Policies of 11 June 2008.

Of critical importance in the preparation of both Structure and Concept Plans is the definition of measurable indicators and benchmarks. The indicators should be developed in close consultation with affected communities. These indicators will allow monitoring and evaluation as well as understanding of the progress achieved for government and residents. Indicators should be as specific as possible, e.g. extent of new residential areas developed with sufficient municipal infrastructure; accessibility improvements from road construction measured in travel-times to city or town centers.

The planning process should also allow for:

² Structure Plans were prepared and adopted within 4 months in Bam (Iran) and 7 months in Kobe (Japan) after their respective earthquakes.

³ Concept Plans could also become effective instruments for explicitly addressing the protection and restoration of cultural heritage sites. In Bam, at the request of the Government of Iran, UNESCO quickly and simultaneously included the “city of Bam and its cultural landscape” on its World Heritage List and on the World Heritage in Danger List; this provided impetus to a comprehensive reconstruction project, supported by UNESCO, for the 2500-year old Citadel and numerous other damaged heritage sites.



Relaxing of Planning Standards Based on Local Conditions. As with MLNR's Land Policies, Government should consider suspending some or all of the national planning standards for Wenchuan Earthquake Reconstruction – as long as all safety and security performance standards are met and certified by a competent provincial or national authority.

Ensuring Land Supply. MLNR's Wenchuan Land Policies proactively address a critical requirement for reconstruction planning: ensuring that sufficient land is made available in locations where and when it is most needed. International experience underlines the importance of having up-to-date information on all types of affected properties. Current, accurate, and codified cadastral information is required for land parcels to quickly and securely enter the reconstruction land market and re-developed⁴. Government should quickly assess the status of available land. As part of part of Reconstruction the government could initiate an initiative to update, regularize, store, and distribute cadastral information in secure, digital form.

Explicitly Incorporate Disaster Risk Management into Urban and Rural Planning. State Council's Decree effectively outlines requirements for incorporating hazard assessment into reconstruction planning. Structured technical assistance and rapid training may be needed, including by professionals from other countries who have incorporated risk management into reconstruction planning of their earthquake-stricken towns and cities⁵.

Active Community Engagement. International experience shows that effective outcomes of post-disaster urban planning depend almost as much on the planning process as on the content of the final plan. Its realization depends on the participation and commitment of all key stakeholders⁶. The participatory preparation of a post-disaster urban development plan can act as a very strong unifying force in affected communities. Consistent with State Council's Decree, local governments will need to carefully balance the need for speed and completeness with the very real and significant social benefits of active community engagement.

Ensuring Adequate Implementation Capacities. Urban plans will not be implemented without sufficient institutional and fiscal capacities at the local government and community levels. While State Council's Counterpart Assistance program is a very significant effort, its timeframe is currently three years. Government should consider structuring, as part of Reconstruction, a comprehensive, long-term program to strengthen

⁴ In Marmara (Turkey) a major program to update and upgrade cadastral information in affected areas was conducted with Bank assistance.

⁵ Also in Marmara, a targeted, national training program was delivered to local decision makers on the urban development process and risk management through urban planning and building regulation; training addressed the needs of practicing land use and urban development planners with special emphasis on the creation of hazard maps and their incorporation into special project zone plan documents.

⁶ In Kobe, government actively engaged affected communities and stakeholders through the formation of community development councils (Machizukuri) that had significant influence on outputs and outcomes of the urban and community planning process throughout the 10 years of reconstruction. Similar high levels of community engagement were also successfully structured in affected towns and cities of Gujarat.



local planning, monitoring, and reconstruction management capacities at the District, town, and village levels in affected areas.

E. Planning Guidelines

This section outlines planning guidelines that could be considered in Wenchuan Earthquake Reconstruction, based on the Bank's experience in reconstruction and urban/regional development.

Maximize Connectivity at the Regional Scale. The restoration of social and market supply linkages between affected settlements is key to the re-establishment of livelihoods and enterprises. In the case of areas affected by the Wenchuan Earthquake, experience suggests that a strategy of connecting towns and villages to nearby cities, and villages to nearby towns should guide priorities in the reconstruction and expansion of road networks. However, roads alone are not enough: attention also needs to be given to facilitating the re-establishment of public bus and truck transport services as soon as possible. These linkages will also serve to support more efficient logistics required to move materials and labor needed in reconstruction.

Site Selection for New Settlements. Generally recommended practice for the siting of new settlements is that they be located as close as possible to the original devastated village, town, or city because this facilitates access to rural landholdings, maintains market supply linkages, and retains residents' cultural ties to their original location. However, in the case of the Wenchuan Earthquake, many of the settlements that will need to be replaced are likely in isolated mountainous areas, or along narrow river valleys that are subject to continuing risk from landslides, mudflows, and floods. Agricultural landholdings may have been destroyed or severely damaged. In these cases, moving to another valley or mountain could be as socially and economically disruptive to households as moving to an entirely different but safer area, including to larger towns and cities. Given that virtually all collectively-owned land is already contracted out, residents of communities where agricultural land has been destroyed are likely to have little choice but to move to towns and cities. Aside from the geo-technical and engineering issues raised in the Decree, the reconstruction of devastated settlements without a viable agricultural land base needs to be considered in light of the prospects for sustaining livelihoods. ***While a new village or town site might meet engineering criteria, if livelihoods cannot be re-established and sustained, the viability of new settlements is difficult to achieve.***

Maximize Accessibility. The structure of labor and supply markets in affected areas will likely change as a result of the earthquake, in some cases quite considerably. In suburban villages and towns, non-farm workers will need to quickly re-establish employment or non-wage activities – perhaps with different enterprises. Supply chains are also likely to change. A critical role of urban/town planning is to maximize physical accessibility of workers to enterprises, and between enterprises.



Emergency Preparedness. An additional important consideration is planning for the mitigation of future disasters by ensuring emergency accessibility for rescue personnel and for rapid evacuation of affected areas, as in Kobe⁷ and Gujarat.

Consolidate Unused Land. There is considerable land, especially in suburban areas of towns and cities, that are largely unused. Some of that land is likely to be applied to temporary shelters. For reconstruction planning unused and temporarily-used sites need to be quickly identified and property rights consolidated to facilitate their entry into the stock of land available for new development.

New Uses for Lagging Industrial Precincts and Obsolete Infrastructure. The earthquake has reportedly damaged some areas in which old industrial and infrastructure facilities had persisted, despite restructuring efforts of Government. With proper site remediation, the redevelopment of what are likely comparatively large tracts of land could have significant impacts on the urban structure of towns and cities. Government should institute policies that provide for the rapid demolition and remediation of affected industrial sites to integrate these strategic land parcels into reconstruction planning.

...but Resist Enclave Development. The preceding guideline does not necessarily mean that communities should be completely relocated without consideration of the wider social networks in receiving locations. Experience shows that building enclaves for newcomers usually leads to social exclusion, weak integration of migrants into town and city life, and a wide range of social problems. Planners need to carefully locate and integrate relocation areas into the existing fabric of receiving towns and cities, and ensure their accessibility to places of employment and settlement-wide social and cultural facilities.

F. Recommendations

Prepare and announce an Urbanization (or Rural-Urban Migration) Policy for Wenchuan Earthquake Reconstruction. The Policy should at least define:

- The circumstances under which permanent urban hukou (or transfer of urban hukou to other municipalities) will be considered for affected households (e.g. dispersed households prior to the earthquake in which one or two main income earners are migrant workers outside of affected areas, and rural households in which landholdings have been destroyed or are at an unacceptable level of continued risk)
- The receiving locations for which urban hukou will be granted (e.g. coastal cities in which migrants were working; Counterpart Assistance jurisdictions; and towns/County-level Cities, or urban area of Prefecture-level Cities in which the household originates)

⁷ Kobe incorporated into its urban structure plan an emergency transportation network providing access and egress for rescue vehicles and evacuation of affected residents. It also incorporated an open space network and green buffers as mitigation measures in the new urban structure plan.



- The rights associated with the new urban hukou and the rights to collectively-owned land that residents would permanently exchange
- Compensation to households who choose to migrate.
- Compensation (if any) to receiving municipalities to partially offset increased social, education, and healthcare service costs. Government may consider making this Policy time bound.

Prepare and announce a Wenchuan Earthquake Urban and Rural Planning Policy.

Similar to the intent of MLNR's Wenchuan Land Policies, the Policy should define:

- Exceptions to the statutory Master Plan, Secondary Plan, and Detailed Plan for Control mechanisms for Wenchuan Reconstruction
- The key parameters, information, and level of detail that Structure and Concept Plans (or similar) will be required to contain
- Minimum levels of community participation and consultation in Plan preparation
- A streamlined approvals process for Structure and Concept Plans (or similar), including retroactive approvals
- The maximum time period allowed for the preparation of these Plans
- The statutory status of these Plans
- The statutory relationship of these Plans to sectoral infrastructure and transport plans and public investment programs
- Processes through which Structure Plans are to be prepared that cross municipal jurisdictions (e.g. District and adjoining CLC, CLC and Town).
- The Policy should also clearly stipulate which national planning standards are suspended or how they are relaxed for Wenchuan Earthquake Reconstruction, and for what period of time.

Design and implement Local Capacity Building Program on Disaster-related Urban and Rural Planning. Incorporating disaster risk avoidance, mitigation and response measures into reconstruction planning is critical. These measures are not generally well known to professional planners in areas that have not experienced disasters similar to the Wenchuan Earthquake. Professional planners, engineers, transport planners and local authorities working on urban and rural planning in affected areas could benefit from rapid training on how to incorporate disaster risk management into development plans. Ongoing training to build local capacities in this field should continue. The most effective instructors or mentors in these measures are likely to be planners who have already gone through similar reconstruction planning processes in response to earthquakes and similar disasters in their own cities, including from outside of China.



ANNEX 1: SUMMARY DESCRIPTIONS OF INTERNATIONAL PRECEDENTS

GREAT HANSHIN-AWAJI EARTHQUAKE, KOBE, JAPAN			
CHARACTERISTICS			
Date: 1995 (17 Jan.)	Country: JAPAN	Location: Hyogo Prefecture	Magnitude: 7.3
CONTEXT			
Geographic: coastal, along northwest and north shores of Osaka Bay; urban area surrounded by low coastal mountains to west, north, and east		Settlement: predominantly Metropolitan Region (3.8 million residents in 1995)	
AFFECTS			
Deaths: 6,433	Missing: 3	Injured:	Homeless: 316,678 (at peak)
Buildings Destroyed: 249,180 homes totally or partially destroyed	Buildings Seriously Damaged: earthquake was followed by extensive fires	Transportation: collapse and major damage to elevated expressways and bridges; extensive damage to port facilities, railways, subways, and Shinkansen (bullet train) line	Infrastructure: electricity cut to 2.6 million homes; gas service lost to 845,000 homes; water supply cut to 1.27 million homes
KEY LESSONS FOR WENCHUAN (URBAN PLANNING)			
<ol style="list-style-type: none"> 1. Rapid and coordinated sequencing of principles, vision, and plans: Governor of Hyogo Prefecture publicly announced the basic principles for the reconstruction 3 days after the earthquake; public articulation of Strategic Vision 3 months after the earthquake; Issue of the City Reconstruction Plan for Priority Emergency Areas 3 months after EQ; Issue of the Reconstruction Master Plan 7 months after EQ; issue of the City Reconstruction Master Plan 8 months after EQ; issue of Hyogo Prefecture Housing Reconstruction Plan (3 year plan period) 8 months after EQ; and Hyogo Prefecture Infrastructure Reconstruction Plan (3 year plan period) 11 months after EQ 2. Establishment of coordination committee among affected cities and towns (5 months after EQ) 3. Extensive public consultation and participation in redevelopment planning (Machizukuri, or community development councils) 4. Extensive re-planning of affected areas: development projects decided after 2 months during which reconstruction was frozen by government; 124.6 ha. in Land Readjustment Projects; 25.9 ha. in Urban Redevelopment Projects (most of which had already been proposed before the EQ); and new District Plans (5 sites) covering 70.6 ha. 5. Incorporation into urban structure plan of emergency transportation network providing access and egress for rescue vehicles and evacuation 6. Incorporation of open space network and green buffers as mitigation measures in new urban plan. 			
WORLD BANK SUPPORT:			
	Project Name: n/a	Loan/Credit No.: n/a	IDA/IBRD: n/a



BAM EARTHQUAKE, IRAN

CHARACTERISTICS			
Date: 2003 (26 Dec)	Country: IRAN	Location: Bam District	Magnitude: 6.5
CONTEXT			
Geographic: generally flat highland in the Jaz-Murian Basin between Zagros and East Iran Mountains Ranges; highly active seismic area		Settlement: mixed urban/rural, with comparatively large anchor city: Bam District comprises Bam City (92,000 residents in 2003), two nearby towns and 900 surrounding villages; total pop. of 200,000; numerous and widespread date orchards scattered within Bam City itself, providing key local livelihood	
AFFECTS			
Deaths: 26,000	Missing:	Injured: 30,000	Homeless: 75,600
Buildings Destroyed: more than 85% of city (largely mud and dried brick construction) destroyed, including much of Bam's 2500-year old fortress (Arg-e Bam Citadel), a major religious and national heritage site, and among the largest earthen structures in the world	Buildings Seriously Damaged: 24,598 urban housing units severely damaged; 24,715 rural housing units severely damaged within 16 km. radius of Bam; 3,346 commercial units in City (shops and workshops) severely damaged; in addition to Arg-e Bam Citadel, 26 other cultural heritage sites experienced significant damage	Transportation: major damage to local airport, 190 km of highways, 20 km of city, town, and village roads	Infrastructure: extensive damage to water supply and drainage systems; severe damage to telecommunications lines (> 380 km), switching centers, and microwave station; "Qanats", the traditional underground irrigation systems, sustained severe damage, threatening sustainability of the date industry
KEY LESSONS FOR WENCHUAN (URBAN PLANNING)			
<ol style="list-style-type: none"> explicit strategy for community consultation articulated very soon after EQ; design to explicitly include implementation agencies, community leaders, NGOs, women, youth and children; very high level of community participation in rebuilding of housing and local infrastructure Structure Plan (2015) for the City of Bam approved by High Council of Urban Planning and Architecture at central Ministry of Housing and Urban Development (MHUD) 4 months after the EQ Structure Plan specifically addressed need to respect the traditional architecture and urban design of the City and villages, to protect buffer zones, to minimize resettlement, and to minimize expropriation through re-use of land; Structure Plan formed basis for subsequent more detailed planning of priority reconstruction areas housing reconstruction predominantly on existing sites (80% of urban housing was privately owned) to higher seismic standards using non-traditional technology pursuant to the Structure Plan, reconstruction plans were prepared for 11 areas in Bam City: each area had a <u>different</u> planner (reducing chances of scaleless uniformity); similarly, two commercial areas had different planning teams; all plans were reviewed by National Engineering Association of Iran and a newly-established 'Architectural Committee' at the national level reporting to MHUD in 2004, at request of Government of Iran, 'Bam and its Cultural Landscape' simultaneously included by UNESCO on its World Heritage List and on the World Heritage in Danger List; provided impetus to a comprehensive reconstruction project, supported by UNESCO, for the Citadel and numerous other damaged heritage sites. 			
WORLD BANK SUPPORT:	Project Name: Bam Earthquake Emergency Reconstruction Project (2004)	Project ID: P088060	IBRD: \$ 220 mn.



MARMARA EARTHQUAKE, TURKEY

CHARACTERISTICS			
Date: 1999 (17 Aug)	Country: TURKEY	Location: 7 provinces in Region	Magnitude: 7.4
CONTEXT			
Geographic: coastal, valley, and highland areas over a wide area between Istanbul and Ankara east of the Sea of Marmara		Settlement: Mix of urban and rural settlements with concentration in medium-size cities; areas of peak damage included cities and provinces Izmit, Iznik (Nicea), Gebze, Sakarya (Adapazari), Duzce	
AFFECTS			
Deaths: 17,000	Missing:	Injured:	Homeless: 600,000
Buildings Destroyed: 100,000, many built illegally in areas not zoned for residential development	Buildings Seriously Damaged: 213,843	Transportation: overpass on the motorway between Izmit and Ankara collapsed; extensive damage to city and village roads, and to connecting roads	Infrastructure: Extensive damage to municipal water supply, drainage, sewerage, local electric networks; main fiber optic cable was cut (the backbone of the telephone into the region); national electric power grid damaged causing a widespread power blackout
KEY LESSONS FOR WENCHUAN (URBAN PLANNING)			
<ol style="list-style-type: none"> 1. pilot projects implemented in six selected municipalities to assist local building and planning departments in preparing and implementing <u>risk-based municipal urban development plans</u>, incorporating approaches to disaster prevention, minimization, mitigation, and recovery 2. standardization of detailed municipal hazard and vulnerability assessments 3. targeted, national training program for local decision makers on the urban development process and risk management through urban planning and building regulation; training addressed the needs of practicing land use and urban development planners with special emphasis on the creation of hazard maps and their incorporation into master plan special project zone plan documents; training also addressed methods of public information and public participation in planning as means to support public safety interest in limiting illegal land use. 4. comprehensive cadastral renovation and land management program designed and implemented to: (i) supply current and reliable land information to cope with the post-earthquake situation, and update and improve obsolete registers and maps; (ii) facilitate land supply operations, with emphasis on housing schemes and the overall improvement of the land market 5. establishment and codification in laws and regulations of a hierarchy and standardization of national, regional, and municipal plan documents 6. establishment of clear criteria for site selection for new development areas: (i) proximity to existing infrastructure, social facilities, transportation and employment opportunities; (ii) appropriateness for the housing standard proposed: the type of housing to be built is appropriate for lower middle-class families; its future value will be limited by this typology, and it should therefore be located where potential urbanized land values match this economic potential in order to avoid future real estate market distortions; (iii) consideration of existing nearby housing capacity, existing and planned increases in the housing supply, such as cooperatives that are planned or under construction; (iv) consideration of existing structural and land-use plans: selection will address the context of pre-existing land use and environmental planning 			
WORLD BANK SUPPORT:		Project Name: Marmara Earthquake Emergency Reconstruction Project (approved 1999; closed 2006)	Project ID: P068368
		IBRD: \$ 505 mn. (\$ 294 mn. disbursed)	



GUJARAT EARTHQUAKE, INDIA

CHARACTERISTICS			
Date: 2001 (26 Jan)	Country: INDIA	Location: Gujarat State (12 of 22 districts); Kutch district particularly hard hit (70% of buildings destroyed)	Magnitude: 6.9; hundreds of aftershocks of 3.0 and over
CONTEXT			
Geographic: coastal (including salt flats, estuaries, intertidal zones, and alluvial deposits – all subject to intense liquefaction during earthquakes) and inland area; generally rolling topography (no mountains); 250 km from Ahmedabad		Settlement: urban/rural mix; 1300 villages and 14 towns; small cities; Ahmedabad also affected	
AFFECTS			
Deaths: 13,805 Buildings Destroyed: 234,00 homes destroyed; thousands of shops and workshops destroyed or severely damaged	Missing: Buildings Seriously Damaged: 970,000 homes seriously damaged; 2,000 health facilities, 12,000 schools; numerous civil administration buildings; extensive damage to cultural heritage (especially in Kachchh and Rajkot districts)	Injured: 167,000 Transportation: extensive damage to urban and village roads, and connecting roads; damage to ports facilities and railroads	Homeless: Infrastructure: extensive damage to municipal infrastructure (water, drainage), power, telecomm, earthen dams providing drinking water and irrigation;
KEY LESSONS FOR WENCHUAN (URBAN PLANNING)			
<ol style="list-style-type: none"> 1. very large program designed and implemented on disaster management with focus on hazard mitigation and risk transfer, especially: (a) digital hazard maps for earthquake, flood, drought and cyclone; (b) inventories of hazardous buildings in major urban areas and strategies for retrofitting privately-owned buildings (with special emphasis on multi-story apartment blocks, business establishments, industrial plants) and publicly-owned lifelines (e.g., power stations, water reservoirs); (c) regulatory studies on strengthening building codes and institutionalizing their improved enforcement; and (d) procedures for community-based disaster management planning (process and plans), for the taluka (subdistrict), the district and the state level; and (e) risk transfer and insurance. 2. immediate formation of Gujarat State Disaster Management Authority to implement reconstruction and rehabilitation program 3. regulatory reforms to building codes and land use planning and development control laws and regulations, formulation of a state-wide Disaster Management Act 4. relocation of entire villages sustaining more than 70% building damage to new locations 5. major, structured program of community engagement in both cities and towns, throughout the reconstruction program (Communication and Transparency Strategy) 			
WORLD BANK SUPPORT:	Project Name: Gujarat Emergency Earthquake Reconstruction Project	Project ID: INPE74018	IDA: \$ 442.8 mn.