



## General considerations for the Infrastructure Planning

### A. Introduction

- General considerations for the preparation of the Infrastructure Development Plan, including transport, communication, energy and water conservancy reconstruction are set out below. This note complements the more specific recommendations provided in the Urban Development Plan Good Practice Note.

### B. Urban and Rural Infrastructure Reconstruction Planning Policies

- Planning for and implementation of the reconstruction of infrastructure should be based on recognizing the rapidly changing socio-economic conditions in Sichuan:
  - Increasing urbanization and densification
  - Increasing income levels and higher social aspirations
  - Unpredictable extremes in climatic and geotechnical conditions.
- These changes are partially offset by improved technical knowledge and understanding of possible responses and outcomes. Natural disasters are occurring more frequently; hence reconstruction planning and programs should be firmly based on policies which have disaster response and mitigation at their core.
- The following factors are of prime importance for infrastructure reconstruction planning and decision making:
  - ***Socio cultural values of communities on their current location.*** It is important to considering the strong sense of place, sense of history and the community's emotional ties to their location. These are best measured intensely in the immediate aftermath and continuously thereafter through social assessment surveys.
  - ***Geophysical considerations*** including geo-hazard, geological and topographical features
  - ***Logistics and finance*** considering geographical aspects and cost implications of decisions
  - ***Timing*** and sequencing of decisions
  - ***Social and economic sustainability***, considering livelihoods and the abilities of and needs for economic regeneration.



### C. Lessons Learned from International Experience

A review of ten post-earthquake reconstruction cases and other scholarly papers and reports identified the following key issues for planning infrastructure reconstruction:

- Differentiate between urban and rural reconstruction policy.
- Consider aspects of 1) types of communities affected, 2) degree of self reliance within the affected communities, and 3) public's expectation of living standard.
- Speed is important.
- Carrying out damage assessment and planning requires many months or years – often the authorities underestimate how long it is likely to take – and a delay of this type has severe penalties in creating uncertainty, reducing the psychological momentum for the reconstruction and slowing down the all-important economic recovery.
- Early and highly publicized launch of reconstruction plan and visible signs are important to raise public awareness and avoid further uncertainty among the people.
- Repair and restitution of urban services should be the first priority. (i.e. roads, bridges, power supply lines, transformer station, pipes, cables, water supply, sewerage systems).
- The reconstruction phase gives an opportunity to implement a new urban design. However, complexity of land ownership and emotional ties need to be considered when implementing a new city design. Therefore, it is also as important to “recreate” familiar localities in the community.
- Relocation is very difficult and requires careful consideration of the public's willingness to move or stay. It is easier for an urban planner to create a completely new city, however, this may not be the most socially acceptable solution.
- Use existing master plans as far as possible as reconstruction provides a good opportunity to implement elements in existing master plans.
- Engage local stakeholders in the planning process in order to make the plan acceptable, implementable and sustainable.
- Disaster mitigation measures should be taken into account in reconstruction plan.
- Inflation can greatly influence the implementation of the reconstruction plan.
- A rent surge may occur in the areas around damaged cities; government needs to be aware of the social and economic impact of increasing rent prices.



## **Bhuj Earthquake, India**

In Bhuj, India, the Reconstruction Plan adopted the theme “Build Back Better.” The basic principals were as follows:

- To build the city back better, applying a policy of encouraging partial relocation and partial in situ reconstruction.
- To continue with the city’s existing infrastructure, repairing and revamping it after the earthquake so that it is better managed and responds better to future natural disasters. This approach would save the government the considerable expenditure of building new infrastructure in the aftermath of a future disaster.
- To improve building construction quality so that it incorporates earthquake-resistant technologies and adheres to regulatory norms.
- To assist people in the reconstruction process; help them to understand statutory requirements in planning, build consensus, and frame projects that respond to people’s concerns and needs.
- To make the planning process as participatory as possible, by encouraging public-private partnerships. Establish a process in which citizens can participate in decision making and voice their concerns. This will build public trust in the process to ensure implementation.

## **Pakistan Earthquake**

In AJK Pakistan, response and reconstruction following the 2005 earthquake dealt with several key challenges. A major reason for the extensive damage to infrastructure – and consequently loss of life – was poor construction. The earthquake response – road clearance, removal of debris, rescue of survivors from collapsed buildings – was hampered by a number of additional factors. These factors included:

- No census data on buildings and people living in major cities
- A shortage of equipment to remove debris, or for road-clearing and establishing temporary bridges
- Lack of back-up systems for electricity supply, telecom and water supply and water purification units.
- Difficulties in ensuring the security of property of affected people.

The following were the Key Lessons in Pakistan:

- Accurate records of land ownership, infrastructure (roads, telecommunications, water supply systems, etc) need to be maintained so as to provide a baseline for damage assessment when disaster strikes.



- Measures should be implemented to minimize loss of communications in the event of a disaster, e.g.: telecommunications equipment and essential facilities should be housed in pre-fabricated accommodation or quake-proof buildings. Fixed line networks should be kept to a minimum with more use of GSM and Wireless Loop (WLL) technologies.
- Provisions should be made to ensure effective communication between affected areas and those coordinating the disaster response. Portable GSM setups should be maintained at national level for speedy deployment in disaster zones. Spare equipment such as switches, satellite phones and MW links should be readily available to support emergency rescue and relief efforts. In emergency conditions, detailed documentation and everyday Standard Operating Procedures (SOPs) should be relaxed to avoid unnecessary delays in relief operations.
- The permanent disaster management authority should have a dedicated disaster communication wing.
- A cadre of engineers and other technical personnel should be identified and trained in disaster response operations, e.g. road clearance, bridge reconstruction.
- Contingency plans should be made for restoration of infrastructure, communications and other services in the event of a disaster.

### **Tsunami in Aceh, Indonesia**

- In Aceh, pressure to rapidly reconstruct housing mainly through community-based methods achieved significant and fast core house completions. However, completion of the infrastructure services lagged behind housing. The challenge to make up the service deficits required unexpected additional resources, and caused delays in house occupancy and livelihood improvement.
- The lack of coordination between the infrastructure (specifically the major road network reconstruction) and the housing reconstruction led to some residents remaining in temporary housing for years. In other cases, newly built houses had to be destroyed as they had been built where the roads were eventually rebuilt.



## D. Recommendations

- Based on international experience, it is recommended that the following challenges should be reconciled in post-disaster reconstruction:
- **Speed:** The importance of moving people into permanent settlements as soon as possible, thereby reducing emotional and interim financial costs of support for homeless people and for temporary housing, has to be balanced with a concern about the speed of decisions for reconstruction. Reconciling the need to act quickly in reconstruction with allowing sufficient time for planning and consultation with those affected is a difficult task. An iterative process of assessment, which allows continuing discussion with affected populations, could provide a solution.
- **Opportunity to introduce improvements in infrastructure and civic amenities etc:** If proposed new housing developments lie outside existing city boundaries, additional costs would be incurred, in particular associated with infrastructure development. However the major opportunity to improve quality of life should be seized.
- **Generating private investment and economic activity:** Reconstruction plans can include provision for construction of facilities for small businesses, which are vital for livelihood regeneration
- **Human resource capacity and training needs.** There was a need for the availability of trained human and financial resources to implement urban planning standards and building codes. A major issue is the adequate availability of trained professional technical and managerial staff.
- **Retrofitting and Mitigation of Existing Facilities.** A key issue in relation to mitigation is the strengthening of existing buildings to withstand future earthquakes, cost being a major consideration. Willingness to pay was not necessarily linked to perceived risk and people need to be convinced of the merits of a disaster preparedness approach. Incentives for mitigation measures should be included in the reconstruction plan.