



China Earthquake Administration
Department of Civil Affairs of Sichuan Province



International Labour Organization

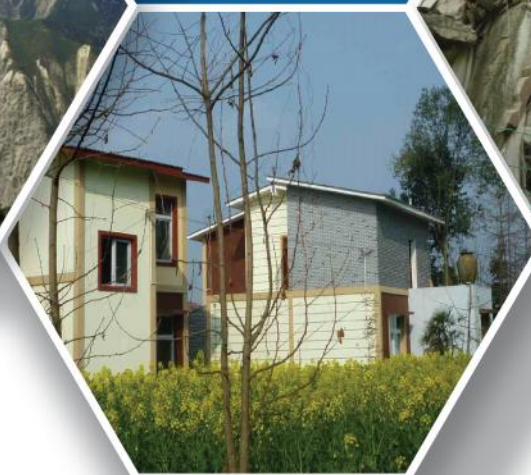


International Strategy for
Disaster Reduction



International Recovery Platform

Wenchuan Earthquake 2008: Recovery and Reconstruction in Sichuan Province



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WENCHUAN EARTHQUAKE 2008:
RECOVERY AND RECONSTRUCTION IN
SICHUAN PROVINCE

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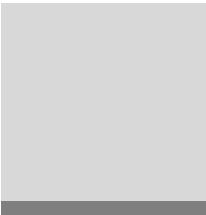
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ABBREVIATIONS

CEA:	China Earthquake Administration (中国地震局)
MoCA:	Ministry of Civil Affairs (民政部)
MoE:	Ministry of Education (教育部)
MoH:	Ministry of Health (卫生部)
MoHRSS:	Ministry of Human Resources and Social Security (人力资源和社会保障部)
MoHURD:	Ministry of Housing and Urban-Rural Development (住房和城乡建设部)
NDRC:	National Development and Reform Commission (国家发展改革委员会)
SPG:	Sichuan Provincial Government (四川省政府)
IRP:	International Recovery Platform (国际灾后重建交流平台)
ILO:	International Labor Organization (国际劳工组织)
UNDP:	United Nations Development Program (联合国开发计划署)
UNESCO:	United Nations Educational, Scientific and Cultural Organization (联合国教科文组织)
UNFPA:	United Nations Population Fund (联合国人口基金)
UNICEF:	United Nations Children's Fund (联合国儿童基金会)
UNISDR:	United Nations International Strategy on Disaster Reduction (联合国国际减灾战略)
WB:	World Bank (世界银行)
WHO:	World Health Organization (世界卫生组织)
BBB:	Build Back Better (建设的更好)
DRM:	Disaster Risk Management (灾害风险管理)
DRR:	Disaster Risk Reduction (减轻灾害风险)
GPE:	Good Practices and Experiences (好的实践和经验)
HFA:	Hyogo Framework for Action (兵庫行动纲领)
MDG:	Millennium Development Goals (千年发展目标)
PF:	People First (以人为本)
RAR:	Recovery (Restoration) and Reconstruction (恢复和重建)
SD:	Sustainable Development (可持续发展)
SOP:	The State Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction (国家汶川地震灾后重建总体规划)
TA:	Twin Assistance (对口支援)



INTRODUCTION

In the two years since the catastrophic Wenchuan Earthquake of 12 May 2008 devastated Sichuan Province in China, tremendous changes have taken place throughout the severely damaged region. Under the leadership of the Chinese Government, people from the affected areas and from other provinces have built hundreds of new villages and towns resistant to seismic shocks, and thousands of institutions have participated in increasing social and economic development.

Disasters are serious disruptions of the functioning of communities and societies involving widespread human, material, economic and environmental losses. These impacts often exceed the ability of the affected community or society to cope using its own resources. Assistance from across China and from around the world during the rescue and relief stage as well as the post disaster recovery and reconstruction process sparked an extraordinary recovery in rebuilding livelihoods and essential public services.

Recovery and reconstruction tasks have been extremely taxing for the people and government at all levels of Sichuan Province due to the tremendous damage and losses across extensive areas. The traditional methodology for post-disaster recovery around the world is to return to “the normal” as soon as possible after a disaster. However, a more holistic and sustainable approach of post disaster recovery requires taking the opportunity of a large recovery operation to build back better and to reduce disaster risks wherever possible. This includes re-identifying and prioritizing risks and reducing vulnerability in the planning and implementation of the recovery process, so that rehabilitation will improve quality of life for affected people and increase resilience against future disasters.

This review is a joint effort by the China Earthquake Administration (CEA), the Department of Civil Affairs of Sichuan Province, United Nations International Strategy for Disaster Reduction (UNISDR), International Labour Organization (ILO) and the International Recovery Platform (IRP) with objectives of 1) strengthening operational recovery procedures with regard to the integration of disaster risk reduction, and 2) defining lessons learned and good practices for integrating disaster mitigation in post disaster operations and 3) informing the transition from relief to recovery.

The report is specifically designed to review and document good practices and experiences of the Government and people of China in the recovery and reconstruction operations following the Wenchuan Earthquake. It also summarizes the cases with potential for application by governments and peoples in other disaster-prone regions.

This review report consists of three parts:

- Part I – Brief introduction and review of a) damage and losses from the earthquake; b) response actions led by the Chinese Government to address the emergency with participation and support of domestic and global efforts; c) the planning process of the post disaster recovery and reconstruction; and d) progress and achievements in Sichuan Province till August 2010.
- Part II – Review and documentation of good practices of the recovery and reconstruction operations in Sichuan Province. Five sectors are covered by the review, namely: a) reconstruction of rural and urban housing; b) rebuilding of schools and hospitals; c) public

utility recovery and reconstruction; d) employment and income generation; and e) environment and ecosystem restoration.

- Part III –Recommendations for governments, donors and agencies engaged in recovery.

It should be noted that the review only reflects a small part of the rich and diversified good practices and experiences in Sichuan. Reviews of other sectors not included in this report and in-depth sectoral analysis will require more time, efforts and inputs. Nevertheless, the good practices and experiences of the recovery and reconstruction efforts are worthy of summary and brief analysis in order to expand our collective understanding of and abilities in disaster risk reduction and recovery.



OVERALL REVIEW: PLANNING, PROGRESS AND ACHIEVEMENTS OF THE RECOVERY

1. The Wenchuan Earthquake

The Wenchuan Earthquake took place on 12 May 2008 along the Longmenshan Seismic Fault in northeastern part of Sichuan Province. It occurred about three months prior to the opening of the Beijing Olympic Games. The disaster destroyed and affected large parts of Sichuan Province and parts of Gansu and Shaanxi Provinces adjacent to Sichuan.

1.1. Affected areas prior to the disaster

Sichuan is a peaceful and prosperous province located in southwest China. It has a mild warm climate, fertile soil and mountainous boundaries, which has historically protected the region from wars and invasions. The region began to develop after the building of a water system at Dujiangyan by the local people led by Li Bin, who was the governor of Shu¹ during the Qin Dynasty about 2000 years ago. The Dujiangyan system diverts water from the Minjiang River to the Sichuan Plain, which aids agricultural production and increases local prosperity. The water system also protects the region from flooding.

Because of its relatively peaceful conditions and economic self-sufficiency, Sichuan has historically attracted large numbers of migrants from other parts of China fleeing conflict and wars or seeking new economic and development opportunities.

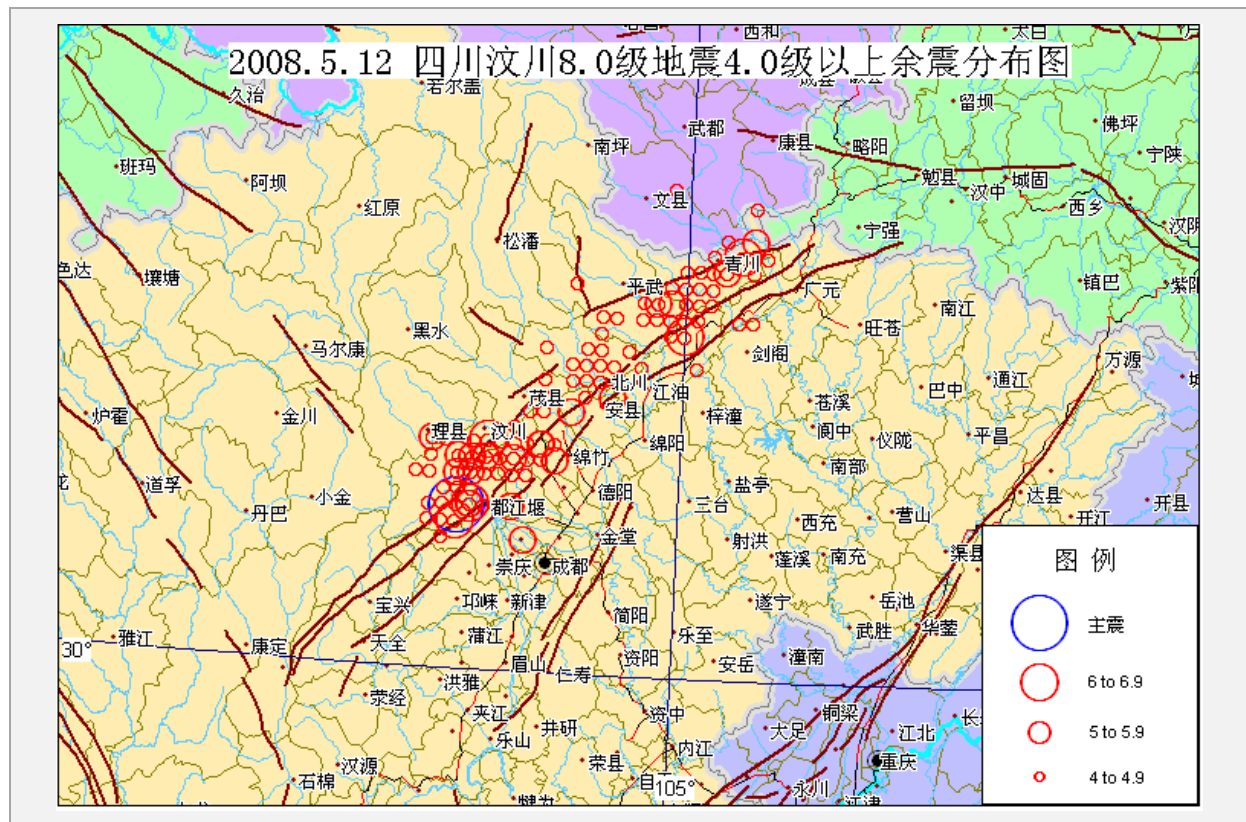
Sichuan ranks the fifth in land territory among provinces and autonomous regions in China, after Xinjiang, Tibet, Inner Mongolia and Qinghai. Its population is 87.5 million, making Sichuan one of the most densely populated provinces in China, even after the city of Chongqing was disconnected from Sichuan before construction of the Three Gorges Dam in 1997. Although it is landlocked, Sichuan is the most developed province in terms of GDP and economic capacity in Southwest China.

1.2. Damage and losses from the earthquake

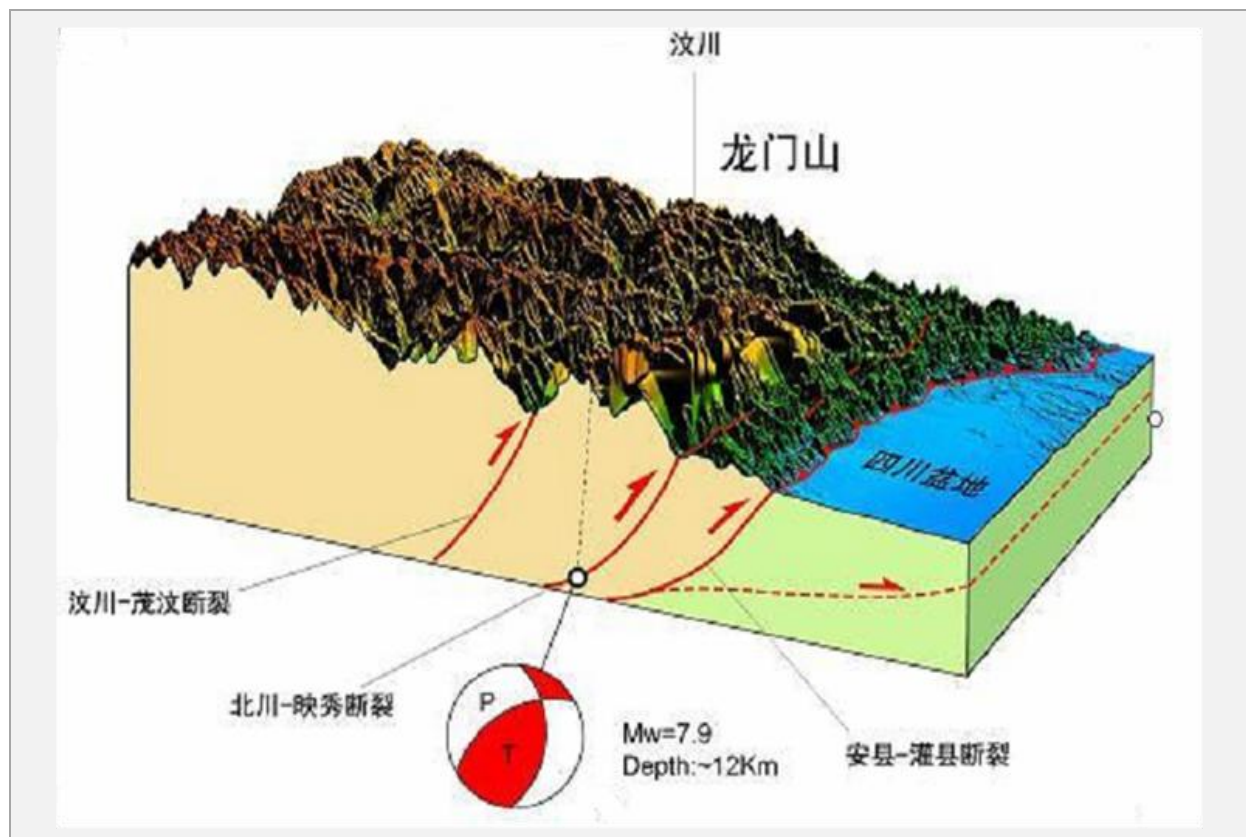
The Wenchuan Earthquake greatly impacted the region, especially the northeast part of Sichuan. The earthquake took place at 14:28 (Beijing Time) on 12 May 2008. The magnitude was 8.0 on the Richter scale with a maximum intensity of XI (11) degrees. The epicenter was at Yingxiu Township of Wenchuan County (refer to Map 1 and Map 2 below). The event is widely referred to in China as the 5.12 Wenchuan Earthquake

¹ *Shu* and *Chuan* are historical names for the Sichuan region.

Box 1. Geographic Distribution of the Main Shock and Aftershocks



Box 2. Longmenshan Seismic Fault (Blue part is the Sichuan Basin)



The earthquake affected a population of 46.25 million in Sichuan, Gansu and Shaanxi. According to the official statistics, the disaster killed 69,227 persons, and 17,923 persons were missing. The quake destroyed almost 6.5 million homes and forced about 15 million people to evacuate from their homes.

Many factories and businesses were either destroyed or closed due to the damage. Farmland, crops and agricultural facilities were destroyed in large numbers. Many office, school and hospital buildings collapsed or were damaged beyond repair. The total direct economic loss is estimated at RMB Yuan 845 billion.

Box 3. Breakdown of damage and loss of the earthquake

Item	Total*
Total affected area	500,000km ² , 417 counties, 4,667 towns, 48,810 villages
Severely affected area	130,000 km ² , 51 counties
Evacuated and temporarily resettled	15 million people
Injured	43 million people
Severely injured	Over 60,000 sent to hospitals
Rescued and saved	84,017 people
Received relief aid	8,810,000 people
Unemployed	372,000 people
Lost livelihoods	1,150,000 rural people lost farmlands and forests
Economic loss	RMB Yuan 845billion

Includes Sichuan, Gansu and Shaanxi Provinces

Reference: OCHA Situation Report No. 2 on the Wenchuan Earthquake, 14 May 2008

<http://www.un.org.cn/public/resource/ea380196e396b6f187aec8780181c60f.pdf>

1.3. Features of the earthquake-affected areas

In addition to the high magnitude and intensity of the earthquake, the disaster-affected areas in Sichuan share four features: a) high population density, b) large territories, c) fragile geologic features with large mountains (steep slopes and deep valleys) and rivers in between, and d) limited over land accessibility for relief operations. For comparison, the Wenchuan Earthquake shocked an area of 2,580 km² with XI (11) degree of intensity, while the 1976Tangshan Earthquake which killed 240,000 people shocked an area of only 47 km²with the same intensity. The features of the areas formed great difficulties not only for rescue and evacuation actions, but also later for the post disaster recovery operations

2. Response to the Earthquake

2.1. Rescue, search and first-aid

- **Local governments and people**

As elsewhere when disasters happen, the affected people initiate most of the response and relief actions themselves, not waiting for external intervention. In many earthquake-affected areas, if the local administrations, heads of institutes and people are well trained and prepared, they usually take prompt actions to evacuate the endangered people to designated assembly spots and to search for and rescue people trapped in rubble. In Sichuan there were major casualties and building collapses. The surviving government personnel immediately resumed leadership roles and organized the remaining forces to save lives and offer first aid.

In Beichuan, one of the most affected counties, the county government officials immediately organized an evacuation effort from damaged buildings to safer places. Despite sorrows and stress from the deaths and disappearances of their relatives and colleagues, they did not falter in leading the people in search and rescue operations. Such initiatives by local governments were essential in both the initial relief operations and in the long-term recovery process.

Reference:

Report by Jing Dazhong, Governor of Beichuan County, Sichuan(Chinese)
http://www.hubei.gov.cn/xwzx/zwkb/200806/t20080616_60818.htm

Sangzao Middle School is a good example of disaster preparedness and evacuation. When the earthquake started to shake Anxian County where the school is located, the teachers organized the students to evacuate classrooms and gather on the school play ground. The entire process was like the emergency response rehearsals done regularly in the school. No one was hurt by the damaged buildings. It stands out as an amazing example when many other schools suffered high casualties. This review will address the example of the school again in Part II to see how the school building was reconstructed and major risks were reduced following the disaster.

Reference:

Miracle of a Headmaster in Earthquake: No Students Hurt in Sangzao Middle School (Chinese)
<http://cpc.people.com.cn/GB/64093/64387/7291599.html>
http://v.youku.com/v_show/id_XODYONzEyMjQ=.html

- **The State administration**

Messages of the strong earthquake were transmitted quickly to the provincial and central governments. The Chinese President immediately gave instructions to aid the wounded and to rescue people in danger. The State Council immediately set up the Command Headquarters for Response to the Wenchuan Earthquake headed by the Premier. Later the Premier flew to Sichuan with top officials from relevant ministries the same day the earthquake occurred. In the evening the team of top state officials led by the Premier arrived at Dujiangyan, one of the most severely affected areas and closest to Chengdu, the provincial capital of Sichuan Province, to guide and lead the emergency response operations. The presence of the country's senior officials during the disaster signified to the public the scale of government attention and its dedication to relief and recovery.

- **The army and professional search and rescue forces**

The Armed Police in Sichuan immediately sent out the first rescue team with 200 soldiers to the affected areas, and they reached the epicenter in a town in Wenchuan County, after 21 hours of intensive marching. During the first day after the disaster, communication in the area was suspended and all traffic was cut off. By 17:00 of 13 May 2008, about 50,000 soldiers arrived in the affected areas to join 20,000 locally based soldiers, who had started search and rescue efforts.

When teams of army personnel and armed police were marching to the affected areas, fire brigades and rescue teams with professional staff and equipment from various provinces and municipalities were also dispatched to the affected areas by the central disaster response leadership. Among the most important of these response organizations is the China International Search and Rescue Team. The national mobilization for the disaster response involved 20 professional rescue and search teams, 146,000 army officers and soldiers, and 75,000 paramilitary personnel.

Reference:<http://news.mod.gov.cn/action/jy.htm> (Chinese)

- **National disaster management framework**

In China, when there is a disaster with national impact that has caused severe damage and loss, the State Council will establish a command headquarters for response and relief. The HQs are headed by a Vice Premier or the Premier with several working groups, such as search and rescue, relief and resettlement, health and disease control, disaster monitoring, etc. Each group is chaired by a leading Ministry with members of several relevant government institutes. This is similar to the Emergency Support Functions (ESF) used by FEMA United States. By immediately enacting the established protocols for disaster relief, the Chinese Government was able to respond rapidly and avoid the administrative delays of creating a new agency. The use of existing channels for immediate relief allowed for a coordinated and effective emergency response.

Earthquake response and preparedness is guided by the Law of the People's Republic of China on Protecting Against and Mitigating Earthquake Disasters, which was amended on 27 December 2008. Such means played an important role in response and relief operations in the Wenchuan Earthquake.

As one of the management actions in disaster reduction in China, disaster preparedness plans are developed for communities, regions and institutions. Drills, reviews and updates of the preparedness plans are part of the emergency response framework. Based on risk assessment, local authorities inform the public whether there is a need to develop a recovery plan in disaster prone regions and communities.

Reference:

Notification on Formation of the Working Teams of the Earthquake Response and Relief Command Headquarters of the State Council (Chinese) http://202.123.110.5/jrzg/2008-05/19/content_981852.htm

2.2. Helping disaster victims meet basic needs

The Chinese Government quickly mobilized national resources to meet the emergency needs of the affected people, including funds, relief materials and specialized manpower. Respective ministries with assigned tasks and duties took actions to support the local governments in the provision of food, tents, drinking water, medical materials and clothing.

• The Ministry of Civil Affairs (MoCA)

In consultation with the National Committee on Disaster Reduction, the Ministry of Civil Affairs enacted the first level national response to disasters, allocating 860 million RMB Yuan of the Central Emergency Fund, and shipped 60,600 tents and 50,000 cotton-quilts from different warehouses of disaster relief materials to the affected areas, less than two days after the earthquake.

Three actions were determined as the priorities by the Ministry: a) to treat the bodies of the dead respectfully, b) to ensure basic living standards of the victims, including if necessary organizing daily airlifts of necessities to them, and c) to begin planning for the reconstruction of the collapsed buildings. By July 2008, the Ministry had dispatched 1.5 million tents, 4.8 million blankets and 14 million sets of clothing to the affected areas.

Reference: <http://www.mca.gov.cn/> (Chinese)

• The Ministry of Health

Soon after learning of the disaster, MoH mobilized medical teams of 700 people, 10,350 units of blood and 20,000 bags of blood plasma, and 15 tons of other emergency medical instruments and medicines from Beijing and nearby regions. They were shipped to the impacted areas the next day. Additional teams with 1,000 medical staff and 504 medical vehicles were mobilized by the evening of 13 May 2008.

By 10:00 on 15 May 2008, the local emergency institutes under MoH had provided first-aid to 23,449 people on site, 64,040 wounded people received treatment in various hospitals in Sichuan, including 14,587 heavily wounded.

By 15 May 2008, MoH had mobilized from 18 provinces and municipalities 1,755 medical and health staff, which formed 190 medical teams, in addition to 1,200 medical staff organized by various provinces independently. The army, the armed police and the public security forces also sent 5,000 doctors and nurses to the affected areas. The arrival of medical staff initiated a massive life-saving operation and allowed for the large-scale treatment of the wounded.

At the same time, the Ministry dispatched professional epidemic prevention teams from China Disease Control (CDC) to guide the local epidemic prevention work. To reinforce the work, the Ministry also designated one province to support each affected county to help prevent any outbreak of epidemic diseases. In consultation with the National Development and Reform Commission (NDRC), three

shipments of medicines, medical instruments, vaccines and disinfection materials were collected from the national reserve for medical care and epidemic prevention in the disaster-affected areas.

Reference: (MoH)<http://www.moh.gov.cn/publicfiles/business/htmlfiles/wsb/index.htm> (Chinese)

- **The Ministry of Housing and Urban-Rural Development (MoHURD)**

In charge of the urban and rural public utilities and housing, the Ministry established an emergency response office headed by the Minister. MoHURD immediately ordered an assessment of damage to public utilities, including water and gas supplies, in-city traffic systems, etc. The Ministry formed special teams for repair and restoration of the key services, especially drinking water supplies to civilians and rescue forces.

In catastrophic earthquakes, great numbers of houses can be either destroyed or severely damaged beyond repair. The Wenchuan Earthquake is not an exception. The earthquake covered a region about 300 kilometers long and 100 kilometers wide, where thousands of houses and buildings collapsed down within seconds.

Reconstruction of houses was a challenge for governments at the local and central level. On 20 May 2008, a week after the disaster, MoH URD organized meetings to discuss a program for provision of one million pre-fabricated houses (for duration of 2 – 3 years) for temporary settlements of the disaster victims. Related technical specifications and guidance for constructing the houses were issued the next day. The program became the prototype of the “Twin Assistance” method for the recovery operations. The pre-fabricated houses and tents sheltered the people recently made homeless. The shelters enabled them to stay in doors in relatively comfortable conditions during the extreme weather of summer and winter before moving to permanent new houses.

Reference: <http://www.mohurd.gov.cn/> (Chinese)

- **China Earthquake Administration (CEA)**

After the Wenchuan Earthquake, the CEA had to face questions and even accusations, and the management and staff of CEA worked diligently to closely observe the seismic situation. They collected and studied data and information from their observations and provided advice to the Central Government and local rescue and relief operation managers for emergency response.

Earthquake prediction is a global concern, but much remains to be understood about earthquakes. However, leading scientists in China and elsewhere have not stopped searching for ways to predict and forecast earthquakes. Both professionals and amateurs continue to research various techniques of earthquake prediction. Earthquake monitoring and prediction is one of the key tasks of CEA, but it is not a mandate for the institute since the applicable technologies are far from mature. The CEA established the Research Institute of Earthquake Predication and China Earthquake Networks Center to pursue this effort. Laboratories affiliated to other research and academic institutes are also working on the subject. China has built a network of observation stations along the main faults and zones of seismic movements across the country.

Reference: <http://www.cea.gov.cn/> (Chinese)

- **Other ministries**

Other ministries which contributed to response and relief include the Ministry of Foreign Affairs, the Ministry of Commerce, the Ministry of Communication and Transportation, the Publicity Office of the Party Central Committee, the Ministry of Public Security, the Ministry of Water Resources, the Ministry of Industry and Information, etc. They led coordination of international assistance, ensured safety and security at the disaster areas, informed people in China and the world about the situation. This report does not cover all their contributions.

2.3. External assistance for response and relief

The UN Secretary-General made a field visit to the area with the heads of various UN specialized agencies to discuss how international efforts could be most effective in supporting the Chinese Government in its response.

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) reported that nearly US\$230 million had been raised globally from governments, companies, foundations and individuals in response to the disaster. Four search and rescue teams from Russia, Japan, Italy and Germany joined the field operations. The United Nations immediately allocated US\$8 million from the Central Emergency Response Fund (CERF) to provide life-saving relief to the affected communities. Nearly 14,000 tents, 63,000 quilts, 634 metric tons of food, medical kits and nutritional supplies were delivered. In addition, UN agencies mobilized considerable resources through their local programs to assist affected people.

Reference: <http://www.un.org.cn/cms/p/whatwedo/63/570/content.html>

3. Planning of the Recovery and Reconstruction

The planning process for the post Wenchuan Earthquake recovery and reconstruction (RAR) was initiated by several ministries soon after the disaster occurred. Beginning the RAR planning during the response and relief process rather than at a later time allowed development and disaster management officials to understand the challenges and tasks of the recovery in the crucial first days when damage and losses are visible. Another advantage of early RAR planning is that it enables decision-makers to balance resource allocations to meet short-term emergency needs with mid-term recovery and long-term development needs. As disaster response and relief operations are often demanding and depressing, not all managers and planners are able to act with foresight or are willing to use time and staff to work on RAR planning while other needs remain unmet. By beginning the RAR process early, Chinese authorities were able to approach short-term recovery and long-term reconstruction from a development, rather than a purely humanitarian, point of view. This allowed the government to more fully utilize the available ministries, manpower, and expertise for development-based reconstruction.

3.1. Institutional arrangement for a coordinated recovery planning

The National Development and Reform Commission (NDRC) is the Planning Ministry of the Chinese Government for large development programs with national strategic importance. In spring 2008, NDRC began to prepare a state recovery plan following the ice and snow disaster that had brought widespread damage to the power supply systems in southern China. NDRC took the initiative to plan for post Wenchuan Earthquake recovery and reconstruction at an early stage when most responders were still busy with relief work.

The Government of China established a drafting group consisting of 40 ministries, provincial governments, and state specialized institutes (see Table 1.2 below) for the compilation of the recovery plan. The group is chaired by NDRC, and vice chaired by the Sichuan Provincial Government and the Ministry of Housing and Urban-Rural Development. The plan mainly covers Sichuan Province but also includes Gansu and Shaanxi provinces, which suffered less damage than Sichuan.

While the central authorities began to plan for large-scale reconstruction, the counties and cities affected by the disaster also started their recovery planning along with the line ministries in charge of specific sectors. The planning process required extensive detailed assessments of the loss and estimations of the needs and resources for the recovery, and subsequently led to the identification of principal recovery projects. The results of the assessments and needs estimations were submitted to the central government to enable NDRC to consolidate and balance the overall RAR demands with the available inputs and additional funds from all possible sources. Eventually, “The State Overall Planning (SOP) for Post-Wenchuan Earthquake Restoration and Reconstruction” was prepared, approved and made effective as of September 2008.

The connection between disaster relief and post disaster recovery is essential for ensuring long-term regional viability. The following management practices during the rescue and relief portion of a disaster response are also relevant contributions to recovery planning and implementation:

- strong national leadership and coordination,
- frontline management of local governments,
- good cooperation among line ministries and different sectors,
- meeting the basic needs of the disaster victims, and
- special attention for the most vulnerable groups of people.

The experiences of both Myanmar after Cyclone Nargis and China after the Wenchuan Earthquake demonstrated the linkage between well-designed relief and recovery and, long-term reconstruction. In each case, the ad hoc Tripartite Coordination Group (TCG) and Commanding Headquarters established by the national governments played a key role in coordinating national and local efforts in response to the catastrophic disasters. The multi-level leadership established during the relief stage continued to play a significant role in leading the recovery and reconstruction.

Reference:

Presentations by Department of Civil Affairs of Sichuan Province, China and Department of Response and Relief of Ministry of Social Welfare, Myanmar at International Forum on Disaster Risk Reduction with Shanghai Expo 2010

Box 4. The drafting group for the SOP document

Compiling Institutions:

Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction

Group Leader:

National Development and Reform Commission (NDRC)

Co-leaders:

The People's Government of Sichuan Province

Ministry of Housing and Urban-Rural Development (MOHURD)

Group Members:

The People's Government of Shaanxi Province

The People's Government of Gansu Province

Ministry of Education

Ministry of Science and Technology

Ministry of Industry and Information Technology

State Ethnic Affairs Commission

Ministry of Public Security

Ministry of Civil Affairs

Ministry of Finance

Ministry of Human Resources and Social Security

Ministry of Land and Resources

Ministry of Environmental Protection

Ministry of Transport

Ministry of Railways

Ministry of Water Resources

Ministry of Agriculture

Ministry of Commerce

Ministry of Culture

Ministry of Health

National Population and Family Planning Commission

People's Bank of China

State-owned Assets Supervision and Administration Commission
State Administration of Taxation
State Administration of Radio, Film and Television
General Administration of Press and Publication
General Administration of Sport
State Forestry Administration
National Tourism Administration
Chinese Academy of Sciences
Chinese Academy of Engineering
China Earthquake Administration
China Meteorological Administration
China Banking Regulatory Commission
China Securities Regulatory Commission
China Insurance Regulatory Commission
State Electricity Regulatory Commission
State Administration of Energy
State Administration of Cultural Heritage
State Food and Drug Administration
State Council Leading Group Office of Poverty Alleviation and Development
Supporting Institutions:
State Wenchuan Earthquake Expert Committee
State Bureau of Surveying and Mapping

3.2. Integration of disaster risk reduction into the recovery

We learned from these catastrophic disasters that disaster risks are associated with vulnerability and weak infrastructure. Unless disaster risks are reduced and resilience increased, damage and loss from such events will continue and even increase due to wealth accumulation, population increase and global climate change. The planners took into account disaster risk reduction as a significant part of the planning process. The SOP document set several principles to ensure this:

- Stick to the principle of people first, and give top priority to people's well-being by protecting their basic interests.
- Respect nature by conducting a scientific study to understand the resources and environmental carrying capacity, as well as the threats posed by disasters to the area.
- Place safety first and strictly enforce the requirements for seismic reinforcement, especially for public buildings designed for mass gatherings.
- Closely supervise and tightly control quality of reconstruction projects focusing on design, construction, and selection of building materials.
- Avoid zones of potential major hazards when selecting locations for urban-rural residential houses and reconstruction projects.

In doing the above, the China Earthquake Administration provided their input from studies on the seismological hazards and determined likely occurrence and damage in various areas as a way to support the recovery and reconstruction plan.

3.3. "Build Back Better" starts with forming recovery objectives

"Build Back Better" is an important principle for post disaster recovery and reconstruction. This principle mandates that outcomes from post disaster recovery and reconstruction should improve on pre-disaster conditions, and that quality of life in the region should be substantially improved, by reducing pre-

existing vulnerabilities. The principle should be implemented from the beginning of the RAR planning stage to more effectively define objectives of the recovery.

The objectives set up by the State Overall Planning (SOP) are essential for improving the well being of the earthquake-affected people. The objectives are also realistically achievable by government departments involved in the response efforts. In brief, the principal recovery objectives utilizing the Build Back Better modus operandi are:

- Housing must be available to each family.
- At least one member from each family should have a stable job, and their income should surpass the pre-disaster level, especially after substantial shocks to their non-liquid assets.
- Each person should have access to basic public services, including education, sanitation, medical treatment, etc.
- Infrastructure, such as transportation, communication, energy, water supply, etc. should be improved from pre-disaster conditions.
- Government non-governmental organizations should emphasize resuming normal economic activity, with a special effort to increase regional growth.
- Ecological and environmental concerns must be accounted for in the recovery process.
- The region should be more capable of disaster prevention and mitigation in future.

SOP, the guiding document for recovery and reconstruction following the Wenchuan Earthquake, has selected the following areas where detailed recovery and reconstruction tasks must be carried out, policies should be formed, and project designs and funding mechanisms must be developed:

- Urban and rural housing: dwelling houses, location selection for the reconstruction, connection with the existing housing policies, and community public services.
- Urban construction: public utilities, building codes and specifications, rebuilding at original sites or new sites, population size control, restoration or reconstruction of roads, bridges, public transportation, drinking water, energy supply system, sewage pipelines and plants, urban solid waste collection and disposal, zones for shelters and evacuation routes for future disasters, and protection of historical sites.
- Rural construction: agricultural production, developing production bases for growing typical and elite agro-products, restoring destroyed farmlands, greenhouses and other production facilities, mechanisms for collection, processing, storage and shipping of agro-products, agro production service systems, rural roads, water, electricity and fuel supply, treatment of sewage and garbage, and poverty reduction.
- Public services: schools, kindergartens and scientific research institutes, health care system for women and children, hospitals, family planning and disease control institutes, culture and sports facilities, radio, broadcast and television systems, publication companies, libraries, museums, cultural and natural heritage sites, employment, social security and related information system, service centers for the disabled and old people, community service systems, office and public buildings for government departments, judicial administrations, public security and firefighting, etc.
- Infrastructure: traffic, such as highways, railroads, airports and their service buildings, facilities and emergency response systems, public telecommunication systems, data and information banks, transmission and exchange platforms, postal systems, energy of power plants, coalmines,

hydropower stations, oil and gas pipelines, stations and refinery plants, water conservation facilities of irrigation, dykes, dams and reservoirs.

- Industrial reconstruction: restructuring the industry, energy conservation and emission reduction, developing new environment-friendly building materials, elimination of backward production capacity, support to small and medium sized enterprises with intensive labor employment or with minority nationalities, adjustment to the economic development parks, restoration of tourism, commerce and trade, shops, stores and markets, financial systems, cultural and entertainment business.
- Disaster prevention and mitigation: control of geological hazards with high risks, building of disaster monitoring and early-warning systems, increased capacity of disaster response and rescue, improvement of professional equipment and staff for search and rescue, disaster response commanding systems, disaster information systems and relief materials storage and distribution, updating disaster preparedness plans, increase of public awareness and increased public knowledge of disaster risks.
- Ecosystem and environment: restoration of nature, repair of functions of ecosystem through mainly natural self-recovery with less human intervention, water and land, protection of endangered plants and animals, recovery of natural reserves, environment protection by intensified monitoring of the pollution sources, cleaning debris and ruin sites before the reconstruction, treatment of wastes, and reclamation of arable lands.
- Spiritual homeland: reservation of the earthquake ruins for memorial sites, psychological rehabilitation services, and expression of thanks to domestic and foreign persons and agencies that contributed to the post earthquake recovery and reconstruction.

3.4. Prioritizing needs and enabling broad participation

Following a catastrophic event there are enormous needs from almost all sectors and groups for post disaster recovery and reconstruction. Many of these needs are fulfilled by people from nearby places. However, not all can be covered during the recovery and reconstruction stage. Some of them are long-term development needs that cannot be accommodated, and some have to be dealt by the less affected areas that have economic capabilities.

It is important for the government to prioritize those needs according to criteria determined in the recovery and reconstruction plan. Considerations in prioritization should be given to time sequence, basic survival needs, importance for general quality of life, priority in social and economic development, capacity to manage and to implement, sustainability of the recovery projects, disaster risk reduction, etc. When drafting SOP, the NDRC had prioritized the needs based on the best possible solutions that the country could offer and the best results that the government could achieve.

During the preparation of the recovery plan, the drafting group was not only staffed by NDRC officials, but also by officials from the local governments and line ministries. It also involved public participation for reviewing and commenting on the plan. To invite comments, the group uploaded the draft SOP online and opened channels for comments and suggestions before final approval.

In addition, the government in cooperation with international agencies hosted seminars to heed comments and experiences from agencies and countries that had planned and implemented recovery operations in recent years. The open process provided opportunities for China to learn practices, experiences and lessons from other countries for “Build Back Better”. It enabled the planning to avoid mistakes of others. UN agencies in China reviewed the plan and provided comments and recommendations.

3.5. Innovative policies and mechanisms to mobilize resources

Setting up achievable targets utilizing the available resources for the recovery, both in terms of financial and in human capacity, is one of the major challenges for planners of recovery. Disasters are serious disruptions that exceed the ability of the affected community to cope using its own resources. This means the local government and economy will be short of funds for recovery in the affected areas, and the shortfalls will have to be met from other outside sources.

In reality, the financial market is not short of funds seeking investment opportunities. In this regard, innovative and proactive actions can be developed to locate funds for recovery. SOP has achieved much in this respect: on one hand it looked at the existing resources that could be utilized, and on the other hand it sought to attract additional funding. In both ways innovative policies and incentive mechanisms must be developed to tap potential sources without compromising time and quality of the recovery, and especially the integration of disaster risk reduction. The methods pursued in implementing SOP are good examples of mobilizing recovery funds.

SOP has developed a number of policies and mechanisms for mobilizing inputs for RAR projects, such as fiscal policy, tax and fee incentives, loan policy, land policy, business policy, counterpart (twin) assistance, assistance to special sectors and groups, etc. These policies and mechanisms were designed to reduce financial constraints and to enhance financial channels to attract investments. This report will review some of them, and their contributions to the recovery in Part II.

It should be noted that **Twin Assistance (TA)** modality has played a unique role in mobilizing financial resources as well as technical support for the affected areas. TA is a mechanism to put one economically developed province responsible for the recovery of an affected county (see Table 1.3 below) by diverting 1% of the annual income of the former to fund the recovery projects of the latter for three years.

Box 5. The Twin Assistance Arrangement

	Donors	Recipients
		Sichuan Province:
1	Shandong Province	Beichuan County
2	Guangdong Province	Wenchuan County
3	Zhejiang Province	Qingchuan County
4	Jiangsu Province	Mianzhu City
5	Beijing Municipality	Shifang City
6	Shanghai Municipality	Dujiangyan City
7	Hebei Province	Pingwu County
8	Liaoning Province	Anxian County
9	Henan Province	Jiangyou City
10	Fujian Province	Pengzhou City
11	Shanxi Province	Maoxian
12	Hunan Province	Lixian County
13	Jilin Province	Heishui County
14	Anhui Province	Songpan County
15	Jiangxi Province	Xiaojin County
16	Hubei Province	Hanyuan County
17	Chongqing Municipality	Chongzhou City
18	Heilongjiang Province	Jiange County
		Gansu Province:
19	Shenzhen City (Guangdong)	Disaster stricken areas
		Shaanxi Province:

20	Tianjin Municipality	Disaster stricken areas
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As calculated, it will require about 1,000 billion RMB Yuan, equivalent to about US\$150 billion, to finance the recovery and reconstruction (RAR) projects under SOP. Funds for RAR are expected to come from the state and local government revenues, the private sector, social donations, micro-credit schemes, loans or investments from commercial banks and financial institutes in country or abroad, as well as development assistance of foreign countries or UN agencies.

It should be noted that the recovery program was decided and launched at the critical point of the 2008 world financial crisis, in which the Chinese Government invested 4,000 billion RMB Yuan in a stimulus package. The government strategically allocated a substantial part of the package into the recovery program following the Wenchuan Earthquake. This has financed large reconstruction operations for the earthquake-affected people and has also revitalized the national economy during global financial crisis.

Shanghai Office for Twin Assistance to Dujiangyan

Office overview:

34 officials form this small office. Xue Chao is the Commander Chief of the office, and also the Deputy Secretary-General of Shanghai Municipal Government. With them are their family members, 12,000 reconstruction managers and workers engaged in 112 projects funded by 8 billion Yuan RMB and supported by 19 million people in Shanghai.

Selection of the staff:

Most of the 34 officials are at division level with rich experience in coordinating and managing issues in a specific sector.

Working “methodology”:

“5+2” – No weekend, all are working days.

“716” – Working 16 hours each day in a full week.

“Night club” – Daytime for visiting projects, field investigation and guidance, and coordination, and evenings for internal meetings and discussions.

Objectives of the assistance:

Shanghai assistance to Dujiangyan focuses on 5 sectors:

- Education system
- Health system
- Urban water supply and sewage treatment
- Urban and rural dwelling houses
- Employment and new business development

3.6. UN support for the recovery planning

To support China’s efforts in the post Wenchuan Earthquake recovery and reconstruction, UN China launched an appeal for early recovery support in the amount of US\$33 million in July 2008. This is in response to the letter from the Ministry of Foreign Affairs to the UN Resident Coordinator to have the support of the international community in the Wenchuan Earthquake reconstruction. The appeal is in addition to UN’s early relief assistance to address the emergency needs after the disaster.

In coordination with Chinese and international inputs, the UN appeal mobilized assistance to support the following sectors:

- Livelihoods.
- Shelter.
- Water, hygiene and sanitation.
- Health, nutrition and HIV and AIDS.
- Education.
- Protection of vulnerable groups.
- Environment.
- Ethnic minorities.
- Coordination and communication.

Reference: UN China Appeal for Early Recovery Support – UN China, July 2008 http://content.undp.org/go/cms-service/stream/asset/?asset_id=1618830

3.7. Management to ensure effective implementation

A management system was developed to carry out recovery tasks in each sector set by SOP. Roles and responsibilities are clearly assigned to local governments and concerned ministries. At the state level there is a coordination committee chaired by the minister of NDRC with the affected provinces and key ministries as members. The SOP implementation office is seated in the Department of Western Region Development of NDRC, and a Deputy Secretary-General of NDRC is the director of the office. At the local levels, management offices to implement SOP and to coordinate various institutes were also formed.

In order to ensure full achievement of the recovery objectives, a mid-term evaluation and a final overall evaluation will be conducted to assess if the tasks have been completed and all objectives achieved. According to SOP, results of the recovery and reconstruction are to link with performance assessments of the management staff at different positions. In addition, funds, materials, and donations to assist the recovery program are subject to inspection, monitoring and audit throughout the process to ensure there is no misuse of funds or bribery.

3.8. Contribution of CEA to planning

In order to support the emergency response and recovery planning, as well as long-term learning, the China Earthquake Administration (CEA) organized a systematic field investigation to the affected areas soon after the earthquake, and the investigation lasted until the end of October 2008. The investigation program involved more than 1,000 scientists and researchers from CEA and other institutions and universities all over China.

The investigation provided a clear understanding of existing seismic hazards. Based on the investigation results, the local governments and residents took decisions on what seismic reinforcement actions the reconstruction projects will follow. This not only saves costs for the reconstruction, but also helps to reduce risks against future disasters. The results also directly contributed to the preparation of the planning for the recovery. The inputs of the investigation made to the RAR planning can be summarized in the following:

- Understanding the trends and dimensions of the aftershocks to the region.
- Provision of references to determine seismic reinforcement of the areas under earthquake threats, on which the recovery program has to be built.
- Insights about strengths and weakness of the existing earthquake response mechanisms and advice for improvement in the recovery process.

Discussion Points for this Section:

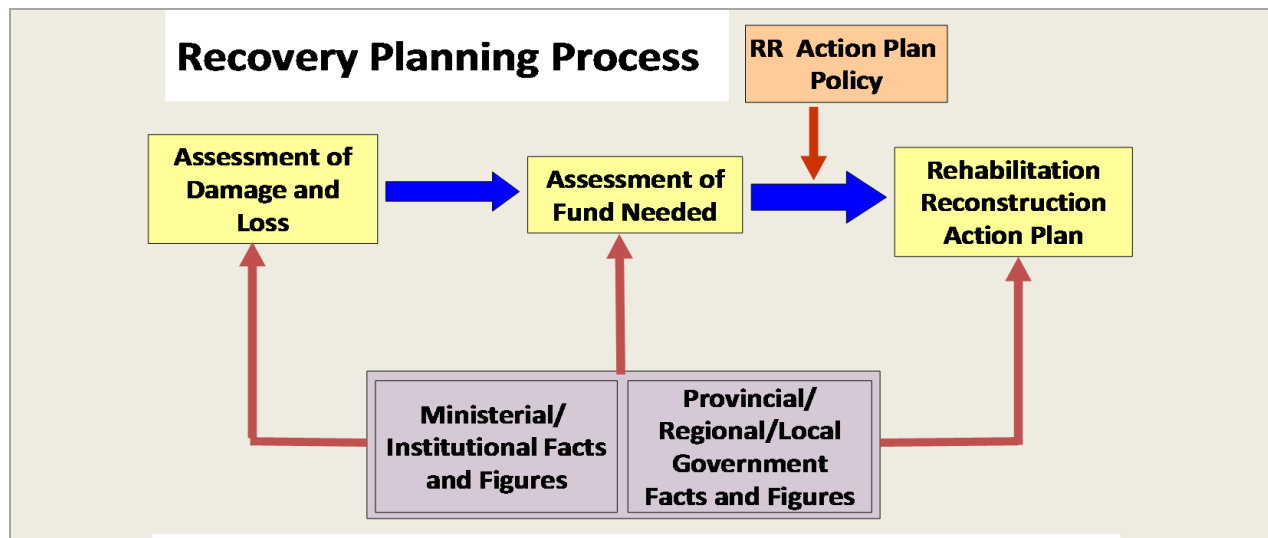
Planning a post-disaster recovery is the beginning of reconstruction and rehabilitation. It determines the extent of administrative areas to be covered, major sectors that require reconstruction and funding, recovery objectives to be achieved and program implementation strategies, possible financing and methods of assistance, coordination and implementation mechanisms, policies and documentations to guide the recovery operations, international assistance, etc.

Preparation of “*The State Overall Planning (SOP) for Post-Wenchuan Earthquake Restoration and Reconstruction*” in China has set a precedent in Chinese history for dealing with catastrophic disasters. In fact, the recovery plan for Yushu Earthquake in 2010 followed many of the guidelines of the SOP preparation. In establishing not only a standard methodology for responding to disasters, but also a standard set of long-term recovery plans, the Government of China can apply tried and tested reconstruction techniques when responding to a variety of disaster situations across the country.

There are two practices about the planning process of the Wenchuan earthquake recovery we may learn:

- **Good recovery planning must be based on a systematic assessment of existing disaster risks and resilience of the affected areas.** As indicated in Section 3.8, CEA conducted a large-scale investigation program and contributed to the planning of SOP. More broadly there had been extensive assessments of the damage and loss by the local governments of the affected areas. It is important that local governments have proper training and abilities to conduct scientific damage assessments and analysis of geologic conditions. Therefore, a professional evaluation was also conducted by the National Expert Committee of the Wenchuan Earthquake led by the Ministry of Civil Affairs and several other ministries. The evaluation identified different types of disaster-affected areas, for which assistance for the recovery will be specified according to the risks. The approach also incorporated in the process figures and facts from locals and from respective ministries and institutions in the recovery planning (refer to Diagram 1.1 below).

Box 6. : Recovery Planning Process of West Sumatra Earthquake



- **Good recovery planning must find right strategy to address the challenges the disaster has created.** From the review we note that during the planning for the Wenchuan Earthquake recovery, the Twin Assistance strategy was developed. It identified and brought possible funding sources together with technical expertise from the economically developed provinces in the country to help the quake-affected areas.

Reference:汶川地震灾害范围评估结果 Results of the Evaluation on Coverage of the Wenchuan Earthquake (Chinese)
<http://www.mca.gov.cn/article/zwgk/fvfg/jzjj/200808/20080810019056.shtml>

4. Progress and Achievement in Sichuan Two Years after the Disaster

4.1 Tasks of the recovery and reconstruction completed

The process of the SOP implementation in Sichuan is smooth and advancing ahead of time as of August 2010. There are 29,704 post earthquake recovery and reconstruction projects for Sichuan Province listed in SOP, of which 95% are being implemented, and 74% have been completed as of March 2010.

The central government has called for shortening the three-year recovery period to two years to more rapidly deliver benefits to the affected people. The figures indicated below as reported by Sichuan Provincial Government on 7 March 2010 confirm that the target to shorten the time to complete the RAR tasks is likely to be achieved:

- The task of rebuilding 1,500,000 rural dwelling houses, which is a great concern of the whole society, had been almost completed.
- Regarding the urban dwelling houses for 259,000 families, 98% are being constructed, and 78% had been completed.
- Of 3,002 schools planned for reconstruction, 99.4% are being constructed, and 86.1% had been completed.
- Of 1,362 medical and health institutes (including hospitals) planned for reconstruction, 93.8% are under construction, and 78.6% had been completed.
- There are 38 towns/cities planned for reconstruction, of which 5 had been completed.

The economic recovery is promising. According to the Director of the Sichuan Statistics Bureau, who was endorsed by the State Statistics Bureau, GDP in 2009 for the province reached to 1,415 billion Yuan, an increase of 14.5% over that of 2008, the year when Wenchuan Earthquake took place, and the figure is higher than the national average. There were 31,473 newly started projects in Sichuan, each with an investment at or over 5 million Yuan in 2009, an increase of 80.6% above the previous year. The investment to the earthquake-affected areas had accounted for 55.8% of the total investment to Sichuan Province in 2009, which contributed to investment growth by 61.1% for the province.

Reference: 2009 年四川经济形势新闻发布会 Press Conference on Sichuan Economic Situation of Year 2009 (Chinese)
http://www.sc.gov.cn/hdjl/xwfbh/scjjxs/bqbd/201001/t20100122_897193.shtml

4.2 Special efforts to care for the most vulnerable groups

The provincial government has made special efforts to help the most vulnerable groups:

- 5,335 families whose children were students that died in the earthquake received one installment payment and social pension for the parents. This is in addition to the relief funds that the families received from the state.
- The Provincial People's Congress made a decision: families whose children died or were wounded in the earthquake can have another child. To date, 2,980 affected women have become pregnant. China otherwise enforces the national policy of "one child, one family".
- For 8,906 families that had lost their chief laborer/s or who are disabled because of the disaster, the government formulated short and long-term policies and mechanisms to help those families guarantee livelihoods.
- For over 600 families that have wounded students, the civil affairs departments of the government will provide special help and assistance in 8 categories, including relief, education aid, a social pension, etc. both to the students and their families.

- To secure basic living standards for 1,449 single elder persons, orphans, and single disabled persons after the earthquake, the government has taken various measures for their proper settlements, and special regulations were issued for taking care of these people.
- Resettlement for 200,000 rural people who lost their farmlands in the earthquake.
- Re-employment assistance was provided to 1,580,000 people. For instance, the government created more posts for the public benefits. It also reduced costs and fees for businesses if they recruit people who lost jobs in the disaster. These efforts helped 400,000 people to attain employment.
- To help rural families, who are extremely poor and considered ineligible to receive loans to reconstruct their houses, the government established a special loan guarantee fund, which has enabled 88,000 improvised rural households to build new houses.
- Actions were taken to provide psychological intervention for 260,000 people to relieve mental stress, and 1,100,000 people received psychological counseling.
- In the winters of 2008 and 2009, party and government at different levels organized extensive relief and aid activities as part of a campaign titled “Sending Winter Warmth”.

4.3 Status of funds allocation and spending

By the end of 2009, RMB Yuan 160 billion from the Central Government and 17 billion Yuan from the Sichuan Provincial Government had been allocated. In addition, there were total of 250 billion Yuan available from the “Twin Assistance”, social donations, contributions from Hong Kong, Macao and Taiwan, special party fees, and rehabilitation funds from the county and city governments of the affected areas. In terms of financial inputs for the recovery and reconstruction projects, 65.5% of the funds have been disbursed.

Discussion Points for the Section:

September 2010 represents the two-year anniversary of the official long-term reconstruction effort. A significant result of the reconstruction is the achievement of the basic objectives for housing, public services and employment. The recovery is an effort to build better communities with more resilience to disasters

Reference: Special Interview: Post Disaster Recovery and Reconstruction Shall Never Disappoint the People of the Country (Chinese) http://www.sc.gov.cn/jrsc/201003/t20100315_918816.shtml



SECTOR REVIEW: GOOD PRACTICES

Since the Wenchuan Earthquake took place two years ago, the people and institutions in Sichuan under the leadership of the Chinese Government and with support from other parts of China have made tremendous achievements in the recovery and reconstruction (RAR). Two thirds of the RAR projects have been completed and most of the remaining projects are in implementation. In the planning and implementation, principles of “People First”, “Disaster Risk Reduction” and “Build Back Better” have been integrated.

A mission of China Earthquake Administration and UNISDR, ILO and IRP went to Chengdu in March 2010, and they identified jointly five sectors or areas for the review and documentation of the good practices of the recovery, namely:

- Reconstruction of rural and urban housing
- Rebuilding schools and hospitals
- Public utility recovery and reconstruction
- Employment and income generation
- Environment and ecosystem restoration

The good practices and experiences from the Wenchuan Earthquake recovery operations can help improve disaster risk reduction actions through information exchange with countries prone to disasters. It is the intention of the review to respond to the call “Use knowledge, innovation and education to build a culture of safety and resilience at all levels” by Hyogo Framework for Action 2005 – 2015.

1. Reconstruction of Rural and Urban Dwelling Houses

Housing has gradually become a key concern of the people, especially in urban areas due to sharp rise in costs and rents, limited land for construction and large population migration following fast growth in urban areas, compounded by population aging. In post disaster recovery and reconstruction, dwelling houses for the disaster victims accounted for one of the major tasks.

1.1. Tasks and challenges

Soon after the relief stage started, the State Council decided to construct pre-fabricated houses for the homeless families for the transitional period prior to the construction of permanent houses. The temporary houses have basic facilities of water and electricity, and common kitchens and toilets for the disaster victims. People who lost houses and have no land to rebuild the houses due to the geological hazards will also rely on these temporary houses.

This resettlement plan can shelter people for 2-3 years in relatively good living conditions. In the villages, farmers stay in tents or receive a subsidy from the government if they prefer to use their leftover building materials from the rubble to build the temporary shelters. Yet, reconstruction of permanent dwelling houses for the urban and rural people emerged as the most challenging task of the recovery.

There are two major issues in the house reconstruction, which the local governments in Sichuan have to face:

Fund shortage: The governments at all levels have to provide enormous investments in rebuilding dwelling houses and relevant public facilities while other sectors, such as infrastructure and industry recovery, also require public funding in significant amounts. In China, provision of assistance for housing the victims who lost houses is a responsibility of the government.

Limitations of Land for reconstruction and relocation: Sichuan is one of the most densely populated provinces in China. Even deep in the mountains and valleys population density is very high, including large numbers of minorities. The limited land availability before the earthquake already constituted a major constraint for local economic and social development. These issues have become even more critical after the earthquake with landslides, mountain movements and changes of watercourses in many places. Due to these geological changes, there is a severe shortage of suitable land for reconstruction, especially in areas such as Beichuan County and Qingchuan County.

The local governments identified three major challenges to the reconstruction of the dwelling houses:

- The number of houses that need to be rebuilt is enormous. According to the State Overall Planning, there were 3,355,500 households in the rural areas, and 687,100 households in the urban areas that either need to strengthen or to rebuild their houses (refer Table 2.1 and Table 2.2 below).
- The funding requirement for the housing reconstruction is massive. Building each house in the rural areas will require 70,000 – 150,000 Yuan, and in the urban areas the cost will be even higher. Neither the households nor the government are able to cover the entire costs.
- The regulations regarding house ownership are complex. Because housing reform in China has changed significantly, and recent practices have followed market rules, eligibility for shelter support is very complicated. One popular saying: it took more time to investigate and design policies to meet complicated needs in the recovery than to actually build the houses.

Box 7. Rural Dwelling Houses for Recovery

Project	Unit	Total*	Sichuan
Strengthening	Household (10,000)	168.36	144.38
New construction	Household (10,000)	218.87	191.17
	Room (10,000)	656.61	573.51

* Includes Sichuan, Gansu and Shaanxi Provinces

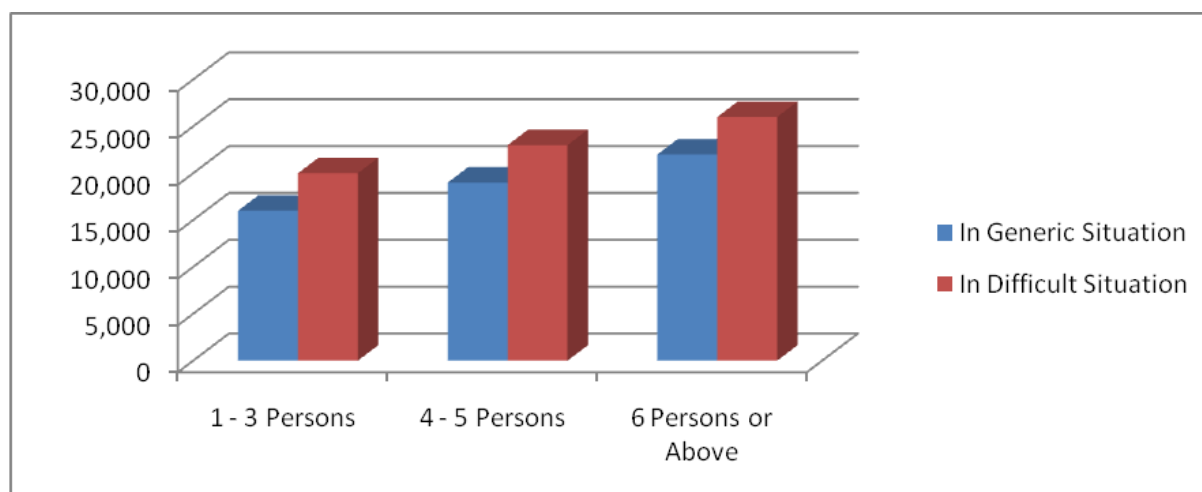
Box 8. Urban Dwelling Houses for Recovery

Project	Unit	Total*	Sichuan
Strengthening	Area (10,000 sq. m)	4712.99	4437.03
New construction	Suite (10,000)	72.03	68.71
	Area (10,000 sq. m)	5489.29	5290.97

* Includes Sichuan, Gansu and Shaanxi Provinces

The government provides financial assistance in many ways: in the rural areas, each family whose house was destroyed receives a subsidy of 20,000 RMB Yuan on average (see the Diagram below). Number of family members and economic conditions of the households are the major factors that determine the exact subsidy. In urban areas, each family whose house was destroyed is provided with an apartment of 70-90 square meters. The subsidy and size of houses to be provided vary from place to place according to local conditions.

Box 9. Government subsidy for rural house reconstruction (Unit: RMB Yuan)



Reference: Notification on Enforced Guidance on Rural Housing Reconstruction after the Wenchuan Earthquake, MoHURD (住房和城乡建设部关于加强汶川地震灾后农房重建指导工作的通知)

<http://www.scjst.gov.cn/webSite/main/pageDetail.aspx?fid=a4a1ebff-f73b-429e-9588-0a4b904bcaf3&fcol=160019>

Working Program on Rural Housing Reconstruction after 5.12 Wenchuan Earthquake, Sichuan Province (四川省“5.12”汶川地震灾后农房重建工作方案) <http://cl.jy.gov.cn/jybmwz/84444692036452352/20080816/192996.html>

Advice on Rural Housing Reconstruction after 5.12 Wenchuan Earthquake by Guangyuan City Government (广元市人民政府关于“5.12”地震灾后农房重建工作的意见) <http://www.cngy.gov.cn/Columns/20071220194235738/20071220194251811/20071220194508776/20080713093925798.shtml>

1.2. Good practices

In response to the challenges posed by the recovery process and to complete the tasks set out by government mandate, the governments at all levels and people have developed innovative policies and mechanisms, and have initiated many methods of adhering to “People First” and “Build Back Better” principles in the reconstruction.

1.2.1. Save lands for funds to rebuild houses

Dujiangyan is a city located in the west of the Chengdu Plain, the severely damaged area closest to Chengdu, the capital of Sichuan Province. The major challenge in the house reconstruction in the area is a fund shortage for the villagers, but the lands are still valuable. In order to save lands and to mobilize funds for rebuilding the houses, the villagers decided to merge the old small villages, where houses were originally scattered around, into new compact villages. This is a practice in Tianma Township of Dujiangyan. In doing this, the households first gave up their lands where the old houses stood, and then the village management collected the lands to trade them for funds for the reconstruction from commercial companies.

The local government provided designs of new houses free of charge. The new designs are earthquake resistant. The practice developed in Tianma Township became a widely replicated policy. The policy quickly solved the issue of land and funding shortages for rural house reconstruction.

Xiangrong Village of Tianma Township is an example, where most of the houses for the 225 families were scattered around in several small villages before the earthquake. In some villages, houses were on low ground and would be flooded when there was excessive rain. Those families had wanted to move out of these flood-prone areas even prior to the earthquake. They agreed to abandon the badly damaged houses and to move to a better place by merging the households.

During the reconstruction all trees had been preserved, but it was necessary to cut and clear grasses and bushes to clean the sites for building the new houses. Roads, electricity, and drinking water and

water discharge systems were constructed for each house. Even leisure instruments for body-building were installed in the village for keeping fit. As result of this practice two hectares of farmland had been reclaimed. Xiangrong became a model “Western Sichuan Forest Village” of the rural house reconstruction project.

Discussion:

Rural house reconstruction is not too difficult if villages rebuild their houses on the original sites where lands and means of production still exist and if they have funds. It constitutes a critical challenge if the communities have neither lands nor funds for the reconstruction.

Tianma Township, like many others, was in the critical condition of lacking sufficient lands and funds. But they found the solution of “save lands for funds” to address the challenge. In this case, the area is close to a big city, where urban development and expansion have pushed up the land cost. The lands spared by the village in merging scattered houses into a big residential quarter were used as collateral for funds.

In this practice, lands were sold from the original house sites, especially where the houses had collapsed or had been in poor conditions before the earthquake. The new policy has been readily accepted by the villagers.

A question remains regarding the impact of this practice. Though local areas like Tianma Township were able to sell their land in order to pay for reconstruction, the loss of farmland might have long-term ramifications for local food prices, food availability, and sustainable livelihoods. Where rural households own fallow or unproductive land, they can try to sell it at a fair price and use the money for reconstruction. However, where local people or entire villages depend on the agricultural productivity of their land, the “save lands for funds” model might have a long-term destabilizing effect, increasing dependency on imported food and decreasing local self-sufficiency.

Zhang Xin, Deputy Division Chief, Sichuan Construction Department:

Urban housing reconstruction in Sichuan is very complicated, and it touches on many fundamental issues – human rights, property rights, ownership of fixed assets, laws, public goods, etc. There is no case in our history to refer to. To ensure houses are built back better, 6 working teams were organized and stationed in major areas to supervise quality on behalf of the provincial government.

Reference: Ten Models in Dujiangyan to Promote Rural Housing Reconstruction (都江堰 “十大模式” 推动农房重建)
http://www.sc.gov.cn/zt_sczt/zhcjmhxy/cjy/zfcj/200912/t20091210_867656.shtml

1.2.2. Safer homes for all families

One of the main objectives of the national government following the Wenchuan Earthquake is to provide each family in the quake-affected areas access to safe housing. Because of the severity of the earthquake, millions of houses in Sichuan were destroyed or damaged so extensively that they were no longer safe. The house reconstruction task is immense. Further, economic reforms that shifted housing from total government control to market oriented practices in the urban areas of China in recent years further complicated the situation. A diverse array of factors complicated the housing recovery objectives in urban areas in Sichuan: many different types of houses were destroyed or damaged, uncertainty regarding ownership of some houses, regulations on qualifications to purchase houses, entitlements held by different groups for government subsidies or for special bank loans, regulations of payment installments and conditions, etc.

According to provincial officials in charge of the housing recovery, two years after the earthquake, by end of July 2010, most of 1.47 million households in the rural areas subsidized by the government had moved into the new permanent houses; and tens of thousands of apartments had been newly constructed, and major distribution of apartments will start in the coming autumn. Several practices in housing reconstruction should be noted:

Housing the quake-hit families within such a short time requires strong leadership. The governments, from the top to the bottom level of communities and villages played a strategic role in driving the process. The house reconstruction tasks had been divided and allocated to concerned persons and institutions at each level. Leadership in China is based on such government hierarchies. Other societies may look to leadership else where, such as in religious figures, tribal leaders, economic leaders, the army, civil society organizations, etc. The use of strong directives and individual initiative at many different levels benefitted the reconstruction process immensely.

Post-disaster reconstruction should upgrade local conditions. “Build back better and safer” is the central principle of the reconstruction. In order to achieve the target, all parties must apply sound, scientific design during the reconstruction. The government organized an all-professional force to complete the planning and layouts for 2,043 villages, 631 towns and 39 severely hit counties, cities and districts. This was done based on detailed investigation, expert review, and public comments. For example: during the review of the reconstruction plan of Sichuan, an international seminar was organized; design for the reconstruction plan of Dujiangyan City was put through an international bidding process; and the preparation for the plan to rebuild the new county town of Beichuan county was aided by experts.

Informing people to seek their consensus can smooth the recovery process. Two months after the disaster, most of the people whose houses had been destroyed had received temporary shelter. To obtain a thorough understanding of the housing needs, and so that households were aware of the policies, representatives visited and consulted with each household to hear their housing needs, and to see their living conditions and to know their difficulties. Information from the visits and consultations was forwarded on to the local leadership for the approval of house reconstruction plans. Then original dwellers signed agreements to abandon rights over destroyed houses and to buy new houses.

Mobilizing all resources to rebuild the houses. To outsiders it is an amazing fact that so many homes were reconstructed within less than two years after the earthquake. Many have asked how the local authorities managed to solve the funding issues while still maintaining quality of the reconstruction. As a unified policy, the government provides a subsidy to each household with 20,000 RMB Yuan, and the rest is covered through other means. The government provided other types of support mainly in three forms: a) tax and fee reduction/ exemption for lands used for house reconstruction, b) financial incentives of credit, loan and mortgage, and c) provision of key public services of water, electricity, sewage treatment, etc. In general, after recalculation of all costs for the house reconstruction, each family eventually would pay one third of the total house reconstruction costs on average.

Recovery is not just about money. Funding in post-disaster reconstruction is always limited, so governments rarely can commit to cover all expenses. But they can provide other forms of support. For example, in China land ownership belongs to the country. This allows the governments to have certain flexibility to reduce the “hidden” costs in land provision for house reconstruction. Support provided by Sichuan Provincial Government can be summarized as:

- Fund support - The central and local governments provide subsidies totaling about ¼ of the building cost, reduce or eliminate land and construction fees and taxes, provide concessional loans, establish guaranteed funding to borrowers who are not eligible to get loans, and for the extremely poor households, the government provides secured housing (保障房), free of charge.
- Technical support –Government agencies prepared technical specifications and standards to guide the rural house reconstruction. They provided over 300 types of house designs free of charge. In addition, construction departments at local levels dispatched technicians to villages to give technical guidance in house building and trained 90,000 rural masons.

- Support in supplying building materials – Because so many reconstruction projects started almost at the same time, the governments had to deal with a supply shortage and spike in the prices of building materials. To address the challenge, the government established special channels to secure the supply, and it also subsidized the transportation of building materials. In this way, the companies and the households purchased the building materials either locally when available or shipped long-distance with reasonable prices and a constant supply.

Three important principles regarding housing reconstruction should be summarized:

Information transparency and public supervision will win the support of the people. In the process of housing reconstruction, the governments insisted on principles of openness, equity and fairness and on transparent information in order to actively receive public supervision, which is an important measure in addition to internal monitoring. Information on policy design and implementation, programming and progress of the implementation, and funds allocation and utilization are released through open channels and can be accessed by all people. This ensured that people supervise government actions.

Housing reconstruction plans must avoid seismic faults and geological risks. Most of the house reconstruction has to be at the original sites hit by the Wenchuan Earthquake, although several major seismic faults exist throughout the region. In addition, the disaster created many new geological hazards that may lead to landslides or quake-lakes. The government organized field investigations on geological hazards in order to avoid places with high risks for house reconstruction. Avoiding such disaster risks completely is not realistic, so the governments designed control plans to stable and minimize the risks with special engineering practices.

Quality and safety are more important than speed and progress. House reconstruction projects are vast in number and scale. They are being implemented within a short and compressed time. The provincial government and respective agencies supervising the reconstruction attach great importance to the quality and safety of the reconstruction. In the two-year reconstruction, they have upheld this principle, in which they insisted that all post disaster recovery projects must be implemented according to the State Overall Planning for the Recovery and must respect the law for the whole process. Construction plans, building design layouts, bidding procedures, contract systems, construction permission approval, supervision mechanisms, and construction safety management must be strictly followed. At the time of this report, no serious quality problems have been discovered that would endanger the safety of residents.

Discussion:

A story about a case of poor house reconstruction quality was told during an interview with officials in charge of dwelling house reconstruction: One day local people reported that they saw a residential building collapse in Mianzhu City. They suspected it was a “bean-curd building” (a poor quality house). The office in charge immediately went to investigate the matter and noted that the local authorities had found some quality problems in the building through a regular quality check, and they had insisted on demolishing the building according to the standards. The story reflects how important quality control is to the people as well to the officials in the recovery, because poor quality buildings kill people during disasters. It is of paramount importance that such adherence to building codes and safety standards remains widespread and well understood among local authorities during a long-term recovery effort.

1.2.3. Rebuild the houses to be resistant to earthquake hazards

In No’ergai County, housing reconstruction had strictly followed the designs resistant to earthquake hazards. Before starting the program of housing reconstruction in the county, it was emphasized by

the province and prefecture governments that designs of the houses must meet the requirements of the seismic reinforcement and specifications.

Techniques for rural housing reconstruction were introduced to raise the safety conditions of the houses. Rims and posts to strengthen house structures were introduced though the use of steel bars increased the costs of construction. Building 100 traditional houses requires 10 tons of steel, but building only one new safer house of 100 square meters uses 1.2 tons of steel. The quantity of cement used also increased. "This is worth the cost," confirmed Wang Liang, Director of the Planning and Construction Bureau of the county. Under the house reconstruction program of the county, 2,908 rural households would rebuild their housing by the end of 2009.

In order to meet the seismic fortification standards of Magnitude 7.0 set for No'ergai, the Planning and Construction Bureau decided to do two things for the reconstruction: a) to use good building materials, and b) to use good construction methods. In addition, the county established supervising teams to check the quality of the houses throughout the reconstruction process and to ensure that the construction followed the designated design. In No'ergai County, advanced technical expertise was brought in to construct the houses and local people were hired to do manual work under the technical supervision that had been introduced.

Discussion:

In house reconstruction, disaster-affected people have to rebuild using a selection of house plans that minimize risk and they inevitably face an increase in costs. Governments and donors have to educate the people to understand disaster risk issues and help them reduce both the risks and the costs of rebuilding houses wherever possible. In balancing the two, education of risk awareness and enforcement of building codes are important, or households would naturally select low cost houses.

Summarizing the practices of the Cyclone Nargis recovery in Myanmar, UN-HABITAT, the UN specialized agency for population settlement, has provided the following definition in its guideline of "How to Build a Safer Shelter":

A well-built shelter (house) will better protect your family and your assets by following these suggestions:

1. Select a safe location and the right orientation
2. Ensure your shelter is well anchored on solid footing
3. A strong, well tightened frame can better resist storms
4. Apply braces to strengthen the frame against storms
5. Fix the cover materials well to the frame of the roof
6. Build walls, doors and windows that protect
7. Establish an evacuation plan and construct an attic
8. Extend the life of your shelter with regular maintenance

Residential houses are shelters to protect people and assets against major disasters. Though in most cases natural calamities are unavoidable, it is possible for affected people to learn about damage and loss caused by the past disasters. And following the lessons learned, they can rebuild their houses and communities in a safer way.

Reference: No'ergai County to Introduce Technologies for Rural Housing Reconstruction in the Affected Areas for Permanent Settlement (若尔盖县引进灾区农房重建技术建定居房)
<http://www.scjst.gov.cn/webSite/main/pageDetail.aspx?fid=e935c2f3-43cc-428f-a1cb-f2c9f5f7719d&fcol=260004>

Support to the Coordination of Early Recovery Shelter Interventions-Shelter Cluster Lead
http://www.fukuoka.unhabitat.org/projects/myanmar/detail02_en.html

1.2.4. Villagers and officials must understand quake resistant houses

In a report on the 2008 Great Wenchuan Earthquake by the UN Centre on Regional Development (UNCRD), it was stated that in December 2008, houses were being built of brick, and piles of bricks were seen in various places. In Yingxiu Township of Wenchuan County, two model districts had been set up in the town. Inhabitants had been allowed to choose a house from three types of houses according to the number of rooms, family members, etc. Each of these three types of houses was built of brick. The housing construction cost around 70,000 Yuan.

The collapse of houses was the major cause of human loss in the earthquake. Nevertheless, inhabitants did not have knowledge of the quake-resistance of the brick houses under construction, although they thought the quake-resistance of the houses had “improved compared to before.” In a village of Beichuan County, some people were building wooden houses, because wooden houses they had lived in before the quake were undamaged. The survey of local families indicated that they had preferred brick houses for modernity and ease of procurement, but eventually they chose traditional wooden houses, which are repairable, with a view to leave the new quake-resistant houses to their children.

The affected people have their own judgment and choice in the selection of earthquake resistant houses while outsiders must spread the knowledge of disaster prevention and reduction and the proven technologies of house building. Because post-disaster reconstruction can force resettlement and rebuilding in new and different ways, it is very important for governments to recognize the personal authority of the affected individuals. In order to ensure transparency and respect for the disaster survivors, governments must take into account the broad array of concerns and requirements that survivors may have in terms of where they live, how they live, what homes they live in, where they work, how they acquire food, and other considerations.

Discussion:

People usually have more considerations in house reconstruction in addition to disaster risk reduction, such as the assets of their children, convenience of location for work and living, staying with their neighbors as well as budget constraints. These concerns are not always shared with the designers and builders of the new houses. Cooperation among designers, builders, and homeowners to understand all the concerns of the residents is an essential part of the house recovery and reconstruction.

Reference: Report on the 2008 Great Sichuan Earthquake – UNCRD
http://www.preventionweb.net/files/13114_UNCRDSichuanReport200903EN.pdf

1.2.5. Assisting the poor to rebuild housing

Even with the subsidy from the government, loans under various concessional conditions and support by different favorable policies, some poor households are still unable to rebuild or repair their houses.

In order to effectively implement the house recovery program, the Sichuan Provincial Civil Affairs Department organized 4 investigation groups to go to 18 counties and townships. The purpose of the investigation was to understand the real cost of rebuilding rural dwelling houses and to help those families who are unable to rebuild their houses. From the field visits and on-spot calculations of the building costs, the groups noted it would require roughly 50,000 – 90,000 Yuan to build a rural house, which is about 700 Yuan per square meter. Yet each poor household may still be short 20,000 – 35,000 Yuan despite assistance from the government. In summary, the investigation identified three groups of people who have difficulties preventing them from rebuilding houses:

- Elderly people, whose incomes are low and have no savings, and therefore lack eligibility to borrow money. Reconstruction started for their houses, but was slow because funding sometimes ran short.
- People who live on the “Minimum Social Security Fund” (低保), a scheme to help people who have lost livelihoods or are disabled, and have no other source of income. These people had no personal funds at all to start their house reconstruction.
- Households whose main earners are dead, disabled or suffer from long-term illness. They lack eligibility to borrow money from banks and are often unable to acquire money from relatives.

Box 10. Typical Poor Households Unable to Rebuild Houses

Household Name	Annual Income	Difficulty in House Reconstruction
Zhang Youli with 3 family members	4,000 Yuan	Long-term illness and main laborer requires daily medicine. No funds to rebuild house, even with the government subsidy.
HuShengyu with 3 family members	4,000 Yuan	No funds to start the house rebuilding, has still not yet cleared debris of the old house.
ChaiZhixiao with 4 family members	6,000 Yuan	New house costs 80,000 Yuan: 23,000 subsidy, 20,000 bank loan, 20,000 self-mobilizing, still insufficient funds.

After visits to the households and studies of the causes of why they are unable to rebuild their houses, the provincial civil affairs department had a better understanding of the situation and developed the following measures to help the poor households to rebuild dwelling houses:

- To coordinate with financial departments to “soften” the criteria for lending and for the provision of small credits for the households who have difficulty in house reconstruction.
- To guide the local governments to issue policies for the establishment of a guarantee mechanism for those poor households that have no credit in borrowing loans. A provincial guarantee fund with 4 billion Yuan was eventually established to support the households.
- To coordinate with departments concerned so that the reconstruction subsidy fund of 35 billion RMB Yuan can be deposited in full as soon as possible. The fund will be to assist first of all those households mentioned above.
- To liaise with departments concerned to re-adjust the poverty alleviation fund for assisting extremely poor households to rebuild houses and also use other sources of funds or contributions for the extreme poor. Later, a special contribution from the Party was secured for doing this.
- To establish a one to one assistance mechanism: one government official to assist one poor household to rebuild houses.

Discussion:

One of the objectives of the recovery set by the Chinese Government is to ensure that all families have a house to live in within the quake-affected areas. This objective certainly covers the poor families. We have observed that disaster is one of the root causes of poverty. Building resilience to disasters is imperative to achieve the MDGs. Special measures taken by the Sichuan Provincial Government in achieving this objective should be noted. The Government’s efforts contributed to achievement of the MDGs.

Reference: UN Website on Millennium Development Goals (MDGs) <http://www.un.org/millenniumgoals/>

1.2.6. Transparency in rural house reconstruction (a case study)

Transparency in Rural House Reconstruction			
Disaster and Challenge to Recovery			
Disaster	Earthquake	Risk Type	Geological risk
Time	May 2008	Site	Mianzhu City
Damage & Losses and Challenge to Recovery	Millions of people were made homeless and displaced as a result of the earthquake. The government embarked on an ambitious reconstruction project to build about 5 million houses across the 3 provinces within 2 years. The loss per person due to the earthquake is calculated as equal to 15 years of their net income in rural areas. In the urban areas it is calculated as equal to 14.89 times average annual income.		
Good Practice & Experience, and How to Implement			
Sector	Rural housing	Theme	House reconstruction or repay reconstruction debt
Lead Agency	Red Cross Society of China (RCSC) and prefecture and county branches	Support Agency	IFRC
Inputs	CHF 69.7 million	No./People Benefited	Over 63,000 households with about 200,000 people
Good Practice & Experience and How to Implement	In all earthquake-affected areas, the government was in charge of land allocation, pre-selection and qualification of construction teams, materials supplier oversight and monitoring the quality of construction. Government management of the construction process and quality control greatly simplified the scope and technical aspects of the project. As such, RCSC and IFRC complemented the government reconstruction efforts. IFRC provided cash grants to 63,000 rural households that fulfilled the criteria. Each household received 3,000 or 10,000 Yuan to help them to reconstruct earthquake damaged homes or to meet housing related needs. IFRC developed a database to collect beneficiary information. Once the information is collected and verified, the posters announcing the project and the project selection criteria were posted in all project villages. Trainings commenced to explain the project procedures. In ensuring transparency, beneficiary name lists were posted publicly. After the posting and a period for revisions, the list was locked and funds were distributed. Considering the large scale of the project, a strength of the project was cash distributions transferred directly into the 63,000 homeowner's bank accounts. This is different from most earthquake reconstruction funds in China which flowed through government managed accounts. Another strength is the added transparency and error checking that was made feasible by developing the beneficiary database and because of its openness to the public.		
Achievements, Changes and Beneficiaries			
Status Before	In Sichuan, large-scale reconstruction of houses, schools, health facilities and other infrastructure projects took place across the province. In most rural townships in Mianzhu, many families continued to live in temporary shelters.		
Status After	The maximum amount of support each household received from IFRC is 10,000 Yuan and this is equivalent to about six years worth of pre-earthquake disposable income for the average farmer (per capita). These funds made a significant difference to a family's ability to pay down their debts, complete construction or buy essential furniture and household items.		
Compiler	Melisa Tan Reporting Delegate	Date	April 2010

Discussion:

"People First" is one of the fundamental principles advocated by the Chinese Government for the recovery. The principle ensures people are the primary concern when designing policies and making decisions. The interest and needs of the people are fully taken into consideration in planning the

recovery projects. To achieve this, people should be informed of the recovery objectives, and the participation of the people in decision making should be secured.

In the case of IFRC, the project has made the assistance to house reconstruction transparent by releasing all information to the villagers and by transmission of the funds directly to the households. Trust in people helps the villagers get closer to rebuilding their houses and their communities.

In the recovery operations in Myanmar following Cyclone Nargis, UN-HABITAT introduced the concept of “the People’s Process”. The process requires trust in people and recognition of the way people organized themselves in the recovery. In implementing the UN-HABITAT projects, the underlying emphasis was placed on the affected people at the center of the recovery process. This entails mobilizing the affected communities to take decisions on their recovery issues. Recovery means getting people back on their feet and enabling them to rebuild their lives. The UN agency listed 5 steps in the process to unlock the huge potential of people:

- Socialization, information, dissemination
- Community socialization, activity prioritization
- Feasibility and verification
- Disbursement and implementation
- Participatory monitoring and accountability

Reference: The People’s Process Concept of UN-HABITAT, Myanmar

http://www.themimu.info/SectorCluster/WASH/WASH/Web/Reference%20Documents%20and%20Technical%20Guidelines/WASH_UNHabitat_People_Process.pdf

2. Rebuilding Schools and Hospitals

Schools and hospitals are public service providers. In China, they are supervised respectively by the Ministry of Education (MoE) and the Ministry of Health (MoH). The service quality of education and health are associated with the basic interests of all people, which includes safe buildings and secured services for children and adults.

Similar to the destruction of houses, the Wenchuan Earthquake brought huge damages and losses to schools and hospitals in the affected areas in Sichuan. Most of the schools in the disaster stricken areas had to be closed as the school buildings were severely damaged or had collapsed. Hospitals, clinics and specialized health institutes were also destroyed in the shocks. Teaching and medical treatment had been suspended or moved to temporary shelters made of tents or pre-fabricated houses in the province.

The reconstruction of schools and hospitals must follow the building codes and local seismic reinforcement standards developed and approved by the government with support of the technical agencies. In addition to this, the local governments of the earthquake hit areas usually increased the reinforcement standards a level higher in order to make these public services safer.

Schools: Schools are inherently centers of education, but also places to house children and teach them disaster preparation. In recent years, concerns about school safety have been increasing from the public after cases where children were killed in fires, by crowded stampedes, by flooding and during the Wenchuan Earthquake. Safety of primary and middle schools is one of the key responsibilities for administration at all levels, given the fact that children in primary and middle schools are the most vulnerable people due to their age, awareness and ability to protect themselves against disasters. In response to the top leadership’s instruction, MoE started a national program in 2009 to upgrade building safety in primary and middle schools all over the country. The program is currently under implementation.

Hospitals: In the emergency stage after the Wenchuan Earthquake, the local hospitals and health workers played a vital role in saving lives, giving first aid to the wounded, and protecting survivors against diseases and epidemics. They did this side by side with the emergency medical teams from other provinces. One policy for rebuilding the collapsed health institutes was a request from the Central Government that the family planning, maternal and child health (MCH), and other medical services be housed together wherever possible in order to save lands and funds as well as for better management. Buildings that were used for township family planning services that served small populations were ordered to be reconstructed with township health centers under an overall arrangement, and not reconstructed separately.

According to the Twin Assistance arrangement for the health sector, the donor provinces are responsible for supporting the recovery of medical and health systems in the recipient counties and cities. The support includes sending management and technical experts to the rebuilt hospitals and health centers, and the provision of training and guidance to the medical staff there.

2.1. Tasks and challenges

Schools: The reconstruction of primary and middle schools in the earthquake-affected areas in Sichuan started earlier than the national program of upgrading school building safety, which is discussed later. According to the State Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction (SOP), there are 3,043 schools that need to be rebuilt in Sichuan Province. The figure includes secondary vocational schools.

Box 11. Education Services

Item	Total*	Sichuan
Elementary schools	3462	1973
Junior high schools	970	769
Senior high schools	153	112
Secondary vocational schools	217	189
Grand Total	4802	3043

* Include Sichuan, Gansu and Shaanxi Provinces

Hospitals: In order to better use the available resources for the reconstruction, coordinated planning and streamlined processes are required for restoration and reconstruction of the medical and health services, including hospitals and clinics. The recovery and reconstruction for the health sector also cover improvement of the capabilities of the medical and administration staff. The health sector in Sichuan will carry out the recovery and reconstruction tasks shown in Table 2.4 below:

Box 12. Health Services

Item	Total*	Sichuan
Hospitals	169	137
Disease prevention and control institutions	63	48
Maternal and child health institutions	52	39
Township health centers	1263	1021
Family planning service institutions	66	53
Grand Total (some institutes not included)	1613	1298

* Include Sichuan, Gansu and Shaanxi Provinces

Psychological recovery must be a part of whole post disaster recovery and reconstruction (RAR). Without alleviating stress caused by the disasters, the recovery operations could not be smooth and

the recovery period may have been extended. This could have led to failure in some of the RAR objectives. Psychological recovery is a newly introduced issue for health in recent years in China in response to disasters.

2.2. Good practices

2.2.1. Recovery: an opportunity for “Build Back Better”

“Build Back Better”(BBB) is one of the guiding principles of post earthquake recovery and reconstruction, which has some similarity to the “Scientific Outlook on Development”, one of the concepts set by the Chinese Government for the building of a harmonized society (创建和谐社会). The BBB principle is to best utilize resources and to seize the opportunity of post disaster recovery to build things safer and better. In education and health recovery, the authorities of the sectors in Sichuan managed to adjust and improve the public services in light of local disaster risks, including urban and rural geographic layout and population centers to better serve the people. Relevant agencies upgraded educational and health institutes both in hardware as well as software in the recovery operations.

In addition, BBB principle has guided standardized reconstruction with better quality of buildings as well as improved management of education and health services. In the process of restoration and reconstruction of the schools, hospitals and other public service facilities, the local governments requested that institutions should strictly abide by the compulsory building codes, and usually one lever higher, and keep a distance from sites threatening by disaster risks.

Discussion:

Can the schools and hospitals built in past years survive disasters? If they are not structurally damaged, will they immediately resume functions to serve as temporary shelters for evacuated people or to provide first aid and treat injuries in emergencies? These buildings have been designed to protect students, patients, and staff, and to serve as safe houses during disasters. They are structurally capable of surviving an intense earthquake and resuming medical functions rapidly.

These are the two sides of disaster, damage to life and property and the opportunity for recovery in a better way. The opportunity for Build Back Better is revealed in the wake of a major disaster, which allows for the authorities to examine where and how they should restructure population spread and layout, building design, and public services. Taking this opportunity during post disaster recovery will ensure that public services are reconstructed in better and safer conditions.

2.2.2. Efforts to improve both hardware and software

Restoration of public services is linked with serving the basic needs of people in the earthquake-affected areas. In reality it is relatively easy to attract both domestic and overseas donors to fund these services and to build better buildings and facilities. However, this upgrading must be accompanied by an improvement in the technical skills and management of the local staff, so that the people can be better served.

In the Twin Assistance programs, many donors, such as Shandong and Shanghai, have provided funds for building better quality schools and hospitals with higher building standards. They also determined that upgrading skills is a priority for the management and professional staff of the schools and hospitals in Beichuan County and Dujiangyan City. They do this either by dispatching outstanding staff to the newly built institutes to provide on-the-job guidance or by receiving teachers, doctors and managers in the donor provinces for training. By the time the new buildings were put in use, not only had the hardware of the institutes been upgraded, but also the services had been greatly improved.

Most training is short term, so that it does not disrupt the regular schedules of the donor schools and hospitals that send staff for training. The training enriched the staff from the donor provinces by

exposing them to challenging situations to gain new professional and social experiences. Disaster knowledge and preparedness drills have also been included in the regular curricula of schools to teach students about disaster preparation, raise awareness, and reduce vulnerability.

Shifang is the recipient city twinning with Beijing Municipality. There are 35 primary and middle schools of Shifang that have signed cooperation agreements with 25 primary and middle schools from Beijing to become partners in disaster risk reduction. The Beijing – Shifang Distance Education Training Network was opened for Shifang teachers to gain access to about 20 courses over an E-learning system established by the Beijing Educational Science Institute. Through the system more than one hundred education specialists will provide on-line lectures and coaching. In addition, Shifang students can join their classes together with their twin schools through the system. As planned, outstanding teachers from Beijing will come to Shifang to provide training to over 3,000 teachers and administrative staff, and 180 key teachers from Shifang City will go to Beijing for training in 2010.

Discussion:

In many recovery operations analyzed during the research phase of this report, donors would assist in physical reconstruction of school buildings and the provision of furniture, reading materials or teaching facilities, etc. However, the new hardware donated to the schools did not always lead to an improvement in the quality of teaching and or in student capabilities. The Twin Assistance provided by the donor provinces developed both physical infrastructure and human capital hand in hand, by furnishing new schools with advanced teaching methods and good management. Other disaster recovery operations studied have been plagued by a neglect of long-term human capital development, to the detriment of local schools and hospitals.

Thanks to the practice of linking “hardware” recovery with “software” upgrading by both parties engaged in the twin assistance, two years after people have seen a remarkable advancement in the schools and hospitals in the quake-affected areas. A popular saying among local people is that two years of reconstruction have enabled the institutes to march ahead twenty years.

Reference: 35 Schools of Shifang to Join Hands with 25 Schools of Beijing in Twins (什邡 35 所学校与 25 所学校牵手成为“姊妹校”) http://www.sc.gov.cn/zt_sczt/zhcjmhxy/cjy/kjcj/200912/t20091217_871603.shtml

Signing Ceremony of the Second Twin Assistance between Schools of Beijing and Shifang (北京-什邡第二批对口支援与合作学校举行签字仪式) http://www.sc.gov.cn/zt_sczt/zhcjmhxy/dkzy/sf/200912/t20091201_859811.shtml

2.2.3. National program to upgrade school building safety

Children are one of the most vulnerable groups to disasters. To protect school children and to draw lessons from the Wenchuan Earthquake, the Ministry of Education (MoE) initiated a national program to upgrade the safety of primary and middle school buildings all over the country. The three-year program started in 2009. The aim of the program is to make schools the safest places in China. The program has several key elements:

- To screen and assess the quality of all school buildings across the country to understand the qualities of buildings resistant to local disaster risks and to input the data and information of the assessment into a database.
- To understand disaster risks in the regions where the schools are located, such as determining whether local disaster risks come from floods, landslides, earthquakes, or rainstorms threatening the safety of the school buildings.
- To determine whether to repair, strengthen or reconstruct school buildings that have not reached official standards based on the intensity of the identified disaster risks in the region where the schools are located.

- To allocate funds and to start the construction work to upgrade the primary and middle school buildings that are at risk.

In implementing this national program, MoE established a leading group to guide and supervise the process, while local education agencies designated staff to manage the program activities. By the time of the review, the program had completed assessment of all the school buildings. Most of the construction work is being carried out during the summer vacation so as not to conflict with the routine school curriculums.

Discussion:

Identification of risks in existing schools or schools being rebuilt or retrofitted is considered one of the first steps in education recovery. China, like other countries that have experienced major disasters, has accelerated efforts to rebuild or retrofit school buildings. International organizations also supported the process. The publication of “Guidance on Specifications of Building Safer School Buildings” prepared by INEE and GFDRR was translated in Chinese and distributed in China after the Wenchuan Earthquake with support of UNICEF.

The national program initiated by China has targeted primary and middle school students, the most vulnerable groups in disasters. The program deserves further study and a more detailed summary of practices.

References: Building Safety Program for the Primary and Middle Schools of the Country (全国中小学校舍安全工程)
<http://www.moe.edu.cn/edoas/website18/zhuanti/200910xiaonanban/>

Brief on the Program by Chief Supervisor of the Office in Charge of Building Safety Program for Primary and Middle Schools of the Country (全国中小学校舍安全工程领导小组办公室负责人解读校舍安全工程)
<http://www.moe.edu.cn/edoas/website18/34/info1242372227396734.htm>

2.2.4. Policies and practices to ensure education recovery

In order to speed up the recovery in the education sector in Sichuan in accordance with the guideline “adhere to scientific reconstruction and revive Sichuan education”, the Education Department of Sichuan Province has put forward 5 policies in the recovery, namely:

- Prioritize recovery planning and implementation
- Prioritize solutions related to issues in the reconstruction
- Prioritize allocation of funds to the recovery
- Prioritize review and approval of the recovery projects
- Prioritize provision of land and building materials for the reconstruction

According to statistics up to 15 July 2010, of 3,002 reconstruction projects listed in SOP for recovery, 2,999 had started, or more than 99% of the total; and 2,633 had been completed, or 87.7% of the total. The provincial government plans to move all students from the pre-fabricated houses to permanent buildings by the autumn semester in 2010. It is a primary goal to achieve this recovery target by the end of 2010.

During the recovery process, the education sector in Sichuan implemented the following policies and measures to reduce disaster risks:

- Place safety above all other priorities of school reconstruction. Site selections for the rebuilt schools must be based on safety assessments and closely follow the nationally-set seismic reinforcement standards and construction procedures to protect the lives of students and teachers.
- Strictly observe the building codes set by national and local governments. Institutions involved in the reconstruction must emphasize improvement of school resilience to disasters

and make sure that the rebuilt schools will be the safest, most consolidated and reliable projects possible.

- Tighten the quality control of the reconstruction projects. Departments of education, planning and construction must define their roles and coordination mechanisms in supervising: a) project design and approval; b) quality of building materials; c) project implementation and monitoring; and d) project completion acceptance inspection.
- Close monitoring and supervision. The education department of the province established 11 working teams headed by leading officials of the department to cover all cities and prefectures in the province and to focus their supervision on the observation of building codes, project quality and implementation progress.
- Re-visit the reconstructed schools. After the completion of the school buildings, the department revisited the projects and organized working meetings with representatives from the host institutes, construction companies and educational agencies of the local governments to inspect the quality of the projects one by one to identify problems and determine solutions.
- Designate rebuilt schools as shelters for public use in emergencies. According to the recovery requirements, the rebuilt schools will be used as shelters for people in disasters, and therefore must be able to accommodate people during emergencies.

The Education Department of Sichuan Province has also taken other measures to ensure the full recovery of the education sector. They established long-term cooperation mechanisms using the twin assistance model, to implement activities of regular exchange of teachers, headmasters and education officials to promote higher educational quality in the quake-hit areas.

The department broadly introduced physiological health recovery in the schools in the quake-affected areas in Sichuan. This effort included plans for physiological recovery, and the departments involved compiled booklets on the subject for free distribution to primary and middle school students. In order to achieve this, the department requested a ratio of 1,500 students to one physiological health teacher in schools. In addition, each primary school must have 9 teaching hours and each middle school must have 10 teaching hours per semester on physiological health.

The department in charge of education has also mandated that emergency drills be conducted in all schools. The drills must be practiced at least once every year and must be well planned in advance and combined with disaster preparation lessons and evacuation skills for response during emergencies.

2.2.5. Rebuild better health services

Funded by the Canadian Government, the Ministry of Health (MoH) started two recovery projects in the health sector in China in cooperation with the World Health Organization (WHO):

- Restoration of communicable disease surveillance systems in the affected counties by strengthening laboratory capacity, providing both equipment as well as technical training in emergency management and epidemiology, health information management and reporting, drinking water quality assurance, and lab quality control and management.
- Technical training on design and planning for safe hospital standards, earthquake resistance and disaster mitigation for over 400 health and hospital staff and personnel responsible for the reconstruction of medical and health facilities, using international standards and best practices.

In another project, WHO provided technical advice to the central government on health sector reconstruction, which is in line with WHO's Hospitals Safe from Disasters Campaign. This included a

technical assessment of health sector reconstruction needs in quake-affected areas, and recommendations on health sector reconstruction and recovery (provided jointly with the World Bank). WHO also translated materials on safe hospitals.

Discussion:

Hospitals are institutions for public service and for protecting people against two types of disasters: epidemics and natural hazards. Health services also play the main role in prevention and response to possible outbreaks of epidemics during the recovery and development process. Hospitals and clinics should be rebuilt to be safer and to provide reliable services during disasters.

Reference: WHO Response to the May 2008 Wenchuan Earthquake

2.2.6. Pilot psychological intervention in post-disaster recovery

The global experience in emergencies showed that psychosocial support is critical for the long-term recovery of communities and people who have survived disaster. In China, psychological recovery has been identified as a priority for protecting and improving people's mental health and psychosocial well-being following emergencies and disasters.

In 2009, through assistance from the Government of Finland and in line with the SOP for Post-Wenchuan Earthquake Recovery, UNFPA, in close partnerships with MoH, Peking University Institute of Mental Health, All China Women's Federation and China National Aging Committee, worked for the provision of psychosocial support to the Wenchuan Earthquake survivors with a focus on the most vulnerable groups, including elderly groups, women and youths in Sichuan Province. This pilot project tried to formulate an inter-agency psychosocial support network through local community mobilization. The six project sites are: Beichuan, Anxian, Shifang, Qingchuan, Mianzhu and Dujiangyan of Sichuan Province.

The project has been designed to combine capacity building with psychosocial support provisions at the community level. The actions are based on the following baseline assessment results:

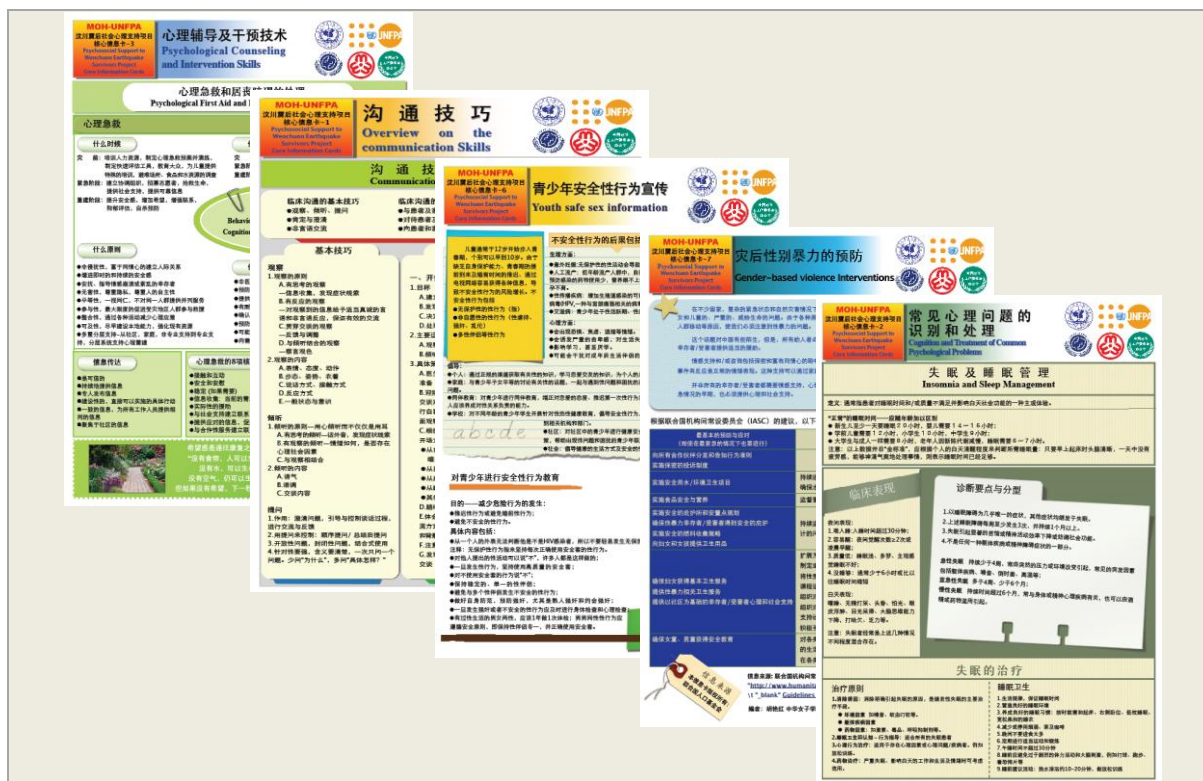
- The community victims, with a primary focus on women, the elderly, and community health service providers, faced heavy psychological stress after the earthquake due to housing collapses, property loss, and anguish at the loss of family members.
- Interviewed targets developed significant symptoms of depression (25.7%) and post-traumatic stress disorder (27.3%), and 18.4% showed a inclination toward suicide.
- Almost none of the community health workers were trained on basic psychosocial crisis intervention, and they had no experience with post-traumatic stress disorder.
- Community leaders played an important function in the reconstruction, though their own psychological problems may have been ignored. Most of them not only serve as officials working at the grass roots level, but also as victims of the earthquake.

The major activity has been to provide core training that covers: 1) communication skills targeting youth, women and elderly; 2) cognition and treatment of common psychological problems; 3) psychological counseling and intervention skills; 4) post-disaster public health education; 5) self-protection for post disasters responders; 6) responsible and safe sexual behavior for young people; and 7) interventions to prevent gender based violence.

The psychological intervention for the community and village leaders was provided by experts. The intervention included self-protection knowledge dissemination, psychiatric interviews, physical examinations using group interventions, and individual intervention approaches.

The project has developed Core Information Cards to introduce a set of psychosocial support systems for the Wenchuan Earthquake survivors. The project also developed a participatory training module for community based service providers working for health and non-health sectors.

Box 13. Core Information Cards for psychosocial interventions



As calculated, a total of 534 persons received training, including 338 from community health services, and 146 from township and village leadership, women's federations, elderly associations, civil affairs, and reconstruction aid staff. In Beichuan County, one of the areas hardest hit by the earthquake, many people experienced severe psychological stress. Women in the area had especially suffered from a multitude of pressures, such as work load, depression, economic burdens, and the balance of family and work. A "Spirit Home" for women was created, aimed at providing psychosocial support to local women, such as consultation with experts on reproductive health, women's rights protections, family and re-marriage, and practical skills like sewing. All these activities have made them aspire to a better life in future, and try to heal the pain.

The community training and intervention model for psychosocial support has been shared at some national and provincial meetings and gatherings, which encouraged officials from other government agencies and international organizations to use it in other disaster-affected areas.

The Ministry of Health (MoH) disseminated the Core Information Cards (CIC) at the national level. This model was also used in a UNDP pilot program to scale up the psychosocial support interventions in the quake-affected areas.

Discussion:

Psychosocial support has been for the first time largely introduced in post disaster recovery in China to alleviate pressures and stress developed in the aftermath of the Wenchuan Earthquake. Other

Yang Dejia, Deputy Director of Mianyang Civil Affairs Bureau:

In order to help relieve mental stress accumulated in the recovery operations by the officials, Mianyang City Government organized two retreats for 220 grass-root level leaders to Jinggangshan for study and relaxation.

countries, such as Myanmar, also began to introduce the health treatment approach and related techniques in its cyclone affected areas.

Reference: UNFPA 2009 Annual Progress Summary- Protection and Assistance to Vulnerable Population Affected by Earthquake in China

2.2.7. Link the health sector recovery with the sector reform

A study on the health sector recovery after the Wenchuan Earthquake concluded that the disaster provided an opportunity for health sector reform in China:

First, it is better that reconstruction address the immediate key issues faced by the health sector such as health financing to reduce out-of-pocket expenditures of the affected population, provide better health insurance coverage and benefits, and improve accessibility for the poor and other vulnerable population subgroups.

Second, the future health care system should be designed to be prepared for and responsive to all major hazards. As mentioned in the Overall Reconstruction and Disaster Risk Reduction notes, the building standards and codes for earthquake-prone zones are critical. Hospitals and other health facilities need to be constructed to higher standards to ensure their integrity and functionality when another earthquake hits.

Third, the existing health care system in the affected areas may need to be rationalized and streamlined to meet the changed needs. To this end, duplications in the public health care system may be reduced.

Discussion:

China is undergoing a major reform in the health sector led by the central government. The post-Wenchuan Earthquake recovery for the health sector is being carried out at the same time as the national health reform. The lessons are used for improvement of the emergency response system.

Reference: Knowledge Notes – Disaster Risk Management in East Asia and the Pacific (Working Paper Series No. 8), the World Bank

2.2.8. New Sangzao Middle School (a case study)

New Sangzao Middle School			
Disaster and Challenge to Recovery			
Disaster	Earthquake	Risk Type	Geological risk
Time	May 2008	Site	Anxian County
Damage & Losses and Challenge to Recovery	Sangzao Middle School is located in Sangzao Township, Anxian County. It has 2,500 students and 110 faculty members. The school became well known overnight due to the fact that it had zero casualties and injuries in the Wenchuan Earthquake. Part of the reason was that the school was well prepared against disasters: the school had spent extra funds to strengthen the school buildings years ago. The school was severely damaged in the earthquake, however, and was rebuilt at a new site.		
Good Practice and How to Implement			
Sector	Education	Theme	School Recovery
Lead Agency	Sangzao Middle School	Support Agency	Liaoning Province
Inputs	RMB Yuan 30 million	No./People Benefited	2,500 students and 110 faculty members.
Good Practice & Experience and How to Implement	The companies from Liaoning had made a priority of rebuilding a safer campus for teachers and students of Sangzao Middle School. They strictly observed all building standards and requirements. Any construction process which failed to reach the quality standards was not permitted to continue. During construction, to ensure that only good quality building materials were used, the construction company collected samples of the materials for testing, scrutinized the quality certificates of the products, and re-conducted quality testing of the building materials to be used for the construction.		

New Sangzao Middle School

	The school authorities recommended to the construction companies improvements for the design of the school building where needed for the safety of students, based on their professional experience.		
Achievements, Changes and Beneficiaries			
Status Before	Some old school buildings were severely damaged by the strong earthquake, and the students were studying in the pre-fabricated houses.		
Status After	All students and teachers said farewell to the pre-fabricated temporary school and moved to the newly built school by 17 January 2010.		
Compiler	IRP Mission	Date	July 2010

Discussion:

Reconstructed schools that have met the building codes are not the end of the story for post disaster recovery. All buildings have a designated safe lifetime. During this period, the buildings require maintenance and regular monitoring of the building conditions. This will ensure the safe functioning of the buildings and protection for the students.

In making such work a routine responsibility and task, school authorities must designate staff, enact monitoring processes according to the set intervals and earmark budget for repairs and maintenance to make sure the safety standards of the building do not decline.

Reference: Project Construction Brief – Sangzao Primary Middle School, Anxian County, 18 December 2009

Ye Zhiping, Headmaster of Sangzao Middle School:
We care for the lives of our students. Lessons on disaster risk reduction should not remain in books. I dreamed all my life to have a safe and beautiful school, and now here it is. The school leadership continued to attach great importance to the safety and risk reduction during the recovery, we recommended to the designers:
Widen staircases and corridors from 1.5 to 2.6 meters not only for evacuation, but also for daily use, because children are physically active.
Wooden doors for classrooms instead of iron and steel doors for easy dismantling in emergencies.
Floors should not be covered with marble or tiles, which are slippery, and may cause people to slip and fall in emergencies.
Large glass windows and hangings on walls should be removed.
Classrooms should be constructed with reasonable open space and not cramped by too many students and tables and chairs.

3. Public Utility Recovery and Reconstruction

During the Wenchuan Earthquake, local public utilities were extensively paralyzed and facilities were destroyed in large numbers. Power supply, water supply, telecommunication, fuel, transportation, and other support systems for towns and communities were priorities for the recovery, because they form the basis for the restoration of normal life, study, business, production and social activities. Without these utilities, disaster victims have to rely on handouts of daily necessities, which in many disaster stricken areas is an extra burden for governments and relief organizations.

3.1. Tasks and challenges

Rural areas: Public utility recovery practice was rather weak prior to the earthquake. The limited lifelines in villages were also damaged badly and needed to be rebuilt or restored. It was not a simple reconstruction, but a project to build the utilities in parallel with the recovery plans of villages. Public utilities also needed to be rebuilt more resistant to disasters. In many villages, the recovery of public

utilities was combined with a national program of New Socialist Village Building, for which the funding had been reserved prior to the disaster.

The Central Government mandated the use of best technologies, local building materials and a local labor force to rebuild highways, village roads, water and electricity supplies, and rural energy, garbage and sewage water treatment facilities, by taking local conditions into consideration. It should be pointed out that a large portion of the rural areas within the disaster zone, though highly populated, had limited infrastructure and public utilities prior to the quake.

Box 14. Infrastructure in Rural Areas

Item	Total *	Sichuan
Centralized water supply facilities (safe drinking water)	4,586	3,357
Decentralized water supply facilities (safe drinking water)	300,151	270,931
Drinking water supply for No. of people	8,607,000	7,213,000
Rural roads (km)	39,948	29,345
Bus stations in counties	49	39
Bus stations in townships	363	342
Village biogas digesters	430,010	419,400
Garbage collection, transfer and treatment facilities	15,759	11,891

* Include Sichuan, Gansu and Shaanxi Provinces

Urban areas: Compared to the rural areas, urban people depend on public utilities to a much higher extent due to the greater number of residents and communities in cities, as well as their increased social and economic activities. The government requested that public utility recovery in the towns and cities consider factors such as spatial location, population size against environmental support capacity, future economic and social development, improvement of the environment and strengthening resilience against disasters.

As discussed earlier in the report, many towns were badly damaged, and some towns were completely destroyed. SOP required that reconstruction on original town sites mainly repair existing systems and facilities and restore their functions at higher capacity, and that reconstruction on new sites consider political and social organization of the cities and towns in the region and support regional economic development.

The recovery and reconstruction of public utilities for the new sites have to be designed, in a better, more efficient and resilient form. Large tracts of land and huge funds are also required to build the new systems. Regardless of where reconstruction takes place, on new sites or on the original sites, the twinned provinces will provide technical and financial inputs.

Box 15. Municipal Public Utilities

Sub-sector	Project	Total*		Sichuan	
		Restoration	New construction	Restoration	New construction
Transportation	Road (km)	2,548	1,509	2,301	1,332
	Bridge	728	123	635	58
	Bus terminal	450	207	419	130
Water supply	Water plant	451	15	442	12
	Pipe net (km)	4,153	2,363	4,055	2,085
Gas and heating supply	Gas station	203	15	203	10
	Gas supply network (km)	2,052	791	2,049	590

Sub-sector	Project	Total*		Sichuan	
	Heating-electricity plant	3	4	-	-
	Heating supply network (km)	6	41	-	-
Sewage Disposal	Treatment plant	331	27	328	21
	Pipe net (km)	800	7,256	765	6,350
Garbage disposal	Treatment plant	47	8	39	1
	Transfer station	665	87	565	9

* Include Sichuan, Gansu and Shaanxi Provinces

Disaster management: Disaster management has two targets during the post disaster recovery and reconstruction: one is to advocate for reducing disaster risks in the process of recovery; another is to establish or improve disaster management capabilities at all levels and in all fields, such as disaster monitoring and early warning systems, risk evaluation, awareness building, drills, research, institutional arrangements, legislation, etc.

Disaster risk reduction (DRR) has been advocated as the main strategy in disaster mitigation since the second world conference on disaster reduction in Japan in 2005. Some people argue that investments in DRR are not concrete as compared to investments in economic growth. A representative from the Philippines responded to such remarks at the international forum on DRR at the Shanghai Expo 2010 by stating that disaster risk reduction is always warranted, and is always a worthwhile investment. Catastrophic disasters reveal weaknesses in disaster resilience, which have provided opportunities for the recovery operations to address. SOP has identified a series of tasks in this field listed in Box 16:

Box 16. Disaster Prevention and Mitigation

Item	Task
Monitoring and early-warning systems	Establish 10,301 inspection spots for geological hazards, 324 inspection spots for earthquakes and 264 meteorological observation stations and meteorological early-warning information release sites
Rescue and relief	Set up commanding platforms of emergency response and disaster relief at the province, city and county levels and 121 reserve storehouses of disaster relief materials
Comprehensive disaster reduction	Establish 3 provincial disaster mitigation centers, 105 publicity and education bases for comprehensive disaster reduction, and 129 rural and urban shelter sites
Geological hazard control & treatment	Control and treat 8,693 major potential geological hazard spots, with 4,694 to be removed or avoided

Challenges to the recovery of power supplies: Damage to power supplies in Sichuan Province was destructive after the earthquake. As estimated by CEA together with the state and local power grid authorities: 171 state owned power transformer substations stopped working, and among them 17 were completely destroyed; of 2,769 power transmission lines above 10,000 KV, 162 lines were completely destroyed, and all of them required reconstruction or repair. The damage caused by the failure of the power supply in the province had affected 4,050,700 households.

Challenge to the water supply: Most of the people living in towns and cities rely on centralized water supply systems. Without water, life and work in urban areas could be paralyzed in a day or two. In rural areas, people may have both centralized as well as decentralized water supply systems, such wells and water tanks, or they may directly fetch water from rivers, streams or lakes. The Wenchuan Earthquake seriously damaged the water supply systems both in rural as well as in urban areas, and

some water sources were polluted or simply destroyed. Recovery of the water supply systems is one of the priorities for the governments at all levels.

3.2. Good practices

3.2.1. Restoration of power supplies to power the recovery

Under the Twin Assistance (TA), the State Power Grid is to support six counties to restore and reconstruct the power supply systems in Sichuan. These counties are Wenchuan, Lixian, Maoxiao, Xiaojin, Songpan and Beichuan; all of them have been affected severely by the earthquake. The power supply systems and the related facilities in these counties were seriously damaged.

All the power supply restoration works have been completed for the above indicated counties through an investment over 600 million Yuan. According to the TA program, power supply companies from six provinces and cities affiliated to the Central China Power Grid have covered the six affected counties and assisted them in carrying out the recovery tasks. By 8 August 2008, the power supply resumed on an emergency basis, and by 10 July 2009 all the reconstruction tasks for the power supply were completed. The recovery of the power supply systems benefited 87,160 households in 570 administrative villages. The recovered electricity supplies will power the local economic recovery and the reconstruction operations.

Discussion:

Basic public utilities are key elements to life and work in our society and in individual communities, but are also of strategic importance to the recovery and reconstruction process. Electricity, water supply, fuel and gas supplies, coal and petrol, transportation, and telecommunication are indispensable for daily life. The rapid restoration and reconstruction of these facilities in an improved form are long-term priorities of the governments in the disaster-affected areas.

Based on the previous experiences of UNISDR campaigns on safer schools and hospitals, the UN institute for the coordination of international disaster risk reduction efforts started a new campaign targeting cities. Margareta Wahlström, Special Representative of the UN Secretary-General for Disaster Risk Reduction has called on mayors and local governments to join in the Making Cities Resilient Campaign 2010-2011.

City mayors are at the closest institutional level to citizens and are elected leaders, and they are expected to respond to the needs and safety of their constituencies. Their participation and leadership are vital in building safer communities and cities. The Special Representative has also called on civil society, planners and urban professionals from different sectors, national authorities and community groups to help develop innovative solutions and to engage with the local governments to reduce risk and to encourage good governance by working together.

The UNISDR and ILO missions led by IRP for the review of post-Wenchuan Earthquake reconstruction in Sichuan Province are very much in support of the campaign. The mission had observed that officials from the quake-affected areas were doing the utmost in reducing disaster risks while reconstructing safer and better communities, towns and cities. Also, at the international forum on disaster risk reduction during Shanghai Expo 2010, more city representatives from around the world committed or are ready to participate in the campaign.

Reference: National Power Grid Completed Tasks to Assist the Local Power Grid in Sichuan in Recovery and Reconstruction
(国家电网完成支援四川地方电网恢复重建工作)
<http://www.sasac.gov.cn/n1180/n1226/n2410/n314349/6455625.html>

Making Cities Resilient – 2010-2011 World Disaster Reduction Campaign,
UNISDR <http://www.unisdr.org/english/campaigns/campaign2010-2011/>

3.2.2. Bring safe water to thirsty people (a case study)

Bring Safe Water to Thirsty People			
Disaster and Challenge to Recovery			
Disaster	Earthquake	Risk Type	Geological risk
Time	May 2008	Site	Qingchuan County
Damage & Losses and Challenge to Recovery	The earthquake severely damaged or destroyed the wells and old water systems in the county. People living in remote villages had great difficulties fetching water from far distances, and the water quality was not safe.		
Good Practice & Experience, and How to Implement			
Sector	Rural infrastructure	Theme	Safe drinking water
Lead Agency	Bureau of Water Resources	Support Agency	UNICEF
Inputs	RMB Yuan 1 million	No./People Benefited	3063
Good Practice & Experience and How to Implement	Construction of a new water treatment unit and a new water distribution network at each village in the remote mountain areas of the county. Water pipelines were laid to send mountain spring water to schools and households after going through a sedimentation and disinfection process. Old rusted metal pipes were replaced with new polyethylene pipes, making the water safer than before the earthquake.		
Achievements, Changes and Beneficiaries			
Status Before	The earthquake destroyed the houses of villagers in the project areas, as well as their water supply networks. It paralyzed the water supply systems across Qingchuan County, affecting some 250,000 people.		
Status After	As of March 2009, four villages in the county with a total of 3,063 people had access to safe piped water. Clean water is now pumped to the villages, and is accessible from faucets in village courtyards. The UNICEF project will eventually complete permanent water supply systems in the other six villages of the county. According to Mr. He Guoquan, Principal of Le'an Primary School, "Almost all of our students board in school as their homes are very far away. Without water, it is impossible for us to address the needs of 260 students and 24 teachers who need to drink, eat, and bathe at school."		
Compiler	XuXin, UNICEF	Date	2009

Reference:Sichuan Earthquake: One Year Report – UNICEF (May 2009)

3.2.3. Integrated approach to reduce disaster risks in villages

The State Council Leading Group Office of Poverty Alleviation and Development working with UNDP initiated a program of Early Recovery and Disaster Risk Management in 19 villages in Sichuan, Gansu and Shaanxi provinces after the Wenchuan Earthquake. Eight collaborating partners worked together, including the Ministry of Civil Affairs, the Ministry of Housing and Urban-Rural Development, the Ministry of Science and Technology, the Ministry of Environmental Protection, the All China Women's Federation, the China Law Society and other international agencies, non-governmental organizations and business sectors.

As of April 2009, over USD2.8 million had been input on the overall recovery, community-based capacity building and disaster risk reduction in the pilot villages, covering community restoration, livelihoods and employment recovery, environment improvement and the use of clean energy. Preliminary statistics show over 25,000 people directly benefited from the Program, including 15,000 women and children, as identified by an interim review of the project.

The Expert Panel consisted of experts from Beijing Normal University and Texas A&M University who made in-depth interviews with participants from collaborating partners and conducted field surveys at the villages, using physical indicators, social indicators, economic indicators and institutional indicators. Results show that the Program has delivered significant outputs:

- **Houses reconstructed and reinforced satisfactorily**

Residents are satisfied with the speed and quality of house reconstruction and reinforcement. 89% of respondents expressed satisfaction with the overall reconstruction progress. No respondents worried about aftershocks. 98% of respondents were satisfied with reconstruction quality. These statistics are remarkable, and more study must be done to understand how local citizens were so satisfied and how this can be replicated in other disaster recovery projects around the world.

- **Livelihoods recovered to pre-earthquake level**

Livelihoods were basically recovered after the earthquake. Up to the survey, 97.5% of respondents could dine at home, 98.8% had sufficient food supply, and households had meat at a slightly higher frequency than the pre-earthquake level. Notably, more than half of households had access to piped water, up 20 percentage points than pre-earthquake levels. Latrines became safer; toilet safety especially was increased from pre-earthquake level. Access to bathing or showering also improved compared with pre-earthquake conditions.

- **Communication becomes better than pre-earthquake level**

95.0% of residents had access to TVs at their current habitats, 15.0% higher than the pre-earthquake level. Access to daily newspapers, access to past newspapers and unavailability of newspapers remained the same as before the earthquake. Households without access to radio represented 40.0% of the population, lower than the pre-earthquake level. Households using cell phones had increased 13.8% from the pre-earthquake rate. Households using a fixed-line telephone for communication rose slightly, yet were still 16.3% below the pre-earthquake level.

- **Residents have a stronger sense of safety, but confidence must be strengthened**

After the earthquake, people felt safer in their houses. Residents who felt safe or very safe in their houses climbed from 80.0% to 89.8%; residents who felt unsafe or very unsafe dropped from 15.0% to 3.8%. These changes demonstrate efficient reconstruction and reinforcement of houses after the earthquake. Social security improved after the earthquake. 3.8% of residents felt poor or very poor social security before the earthquake. Now no residents complain about unsafe or very unsafe social security.

In general, successful implementation of the program provided the following implications: 1) multi-sector cooperation helps building a sharing platform and promotes scientific development of post-earthquake recovery as well as rural disaster reduction and emergency management systems; 2) this innovative mechanism facilitates multi-layer communication and information flow; 3) accurate strategic orientation and emphasized model building effectively boost policy optimization; 4) team building centered on “people values” guarantees efficient multi-sector collaboration; and 5) adequate mobilization of community people and emphasis on participation are an effective approach to enhance grassroots governance.

Discussion:

There has long been a wish to introduce an integrated approach of post disaster recovery and disaster risk reduction (DRR) in rural areas of China ever since 1991. In that year a strong flood along the Huaihe River in the eastern region of China occurred. In response to that disaster, the Chinese Government made the first appeal for international assistance to the flood affected people since 1949. The wish was not only to rebuild houses, but also to take a village as a whole for recovery and reconstruction planning and operations to cover dwelling houses, social services, public utilities, livelihoods, income generation, etc. And disaster reduction would be integrated into the process. The program has had a high success rate.

People realized after frequent disasters and response and recovery operations that the vulnerability of people and disaster risks may not only exist in poor housing, but it may extend from housing to economic capability, weak public services, isolation to external assistance and knowledge, little awareness of risks and poor disaster management. Without reducing these risks and building community resilience as called for by the Hyogo Framework for Action (HFA), efforts in disaster response recovery may gradually become repeat actions, and the MDG to halve the global population in poverty will not be achieved.

A lesson learnt from Aceh, the area hit worst by a strong earthquake and tsunami in 2004, is that disaster risk reduction can be achieved, often without significant cost implications, if disaster risk reduction strategies are considered an integral part of the reconstruction process. Appropriate specialist technical expertise should be sought and relevant national and international standards and best practice guidelines adhered to. In addition to 'building back better' there is an opportunity to influence local building practices and planning processes so that they support safer construction in the long-term.

Another practice of the program is close collaboration in the post disaster recovery operations among government institutions involved, especially at the planning and implementation stages of the recovery. Different government departments are working together in Sichuan to plan and to develop unified objectives, actions and working procedures to deal with the recovery, an integrated approach of DRR. Collaboration and cooperation is a pre-requisite in disaster risk management, which can lessen administrative red tape and reduce constraints on resources for reconstruction projects.

However, the collaboration is likely to decrease when the recovery operations come to a completion. Having this concern in mind, the government institutions in charge of disaster reduction issues must use the post disaster recovery process to ensure that disaster risk reduction be integrated into the regular work of each department and Ministry, and that inter-sector consultations continue.

Reference: Interim Review Report on UNDP project Early Recovery and Disaster Risk Management Program, December 2009
Lessons from Aceh - Key Considerations in Post-Disaster Reconstruction, Jo De Silva

3.2.4. Disaster risk awareness raising starts with children

The education sector of Sichuan Province was severely hit by the Wenchuan Earthquake. Since the quake, the Chinese Government has made significant efforts to resume or reconstruct the affected schools to minimize the disruption of studies by the disaster and to reduce children's vulnerabilities.

In cooperation with the Ministry of Education, UNESCO started a project of Building Capacity for Reconstruction of the Education Sector in Sichuan with funds from the Government of Saudi Arabia. The project is to integrate Disaster Risk Reduction (DRR) into teacher education and school education. The key aim is to use education to improve the capacity of schools and school systems to reduce disaster risks. Two teacher education institutes, three primary and two secondary schools in Sichuan were identified as the pilot sites in the project activities.

- Translation and distribution of the Guidebook for Planning Education in Emergencies and Reconstruction. This guidebook is addressed primarily to education officials and professionals at all levels and provides guidance on education in emergencies and reconstruction prepared specifically from this perspective. 1,000 copies of the Guidebook in Chinese will be produced for dissemination nationwide.
- A situation analysis with aims at documenting ongoing status and efforts towards school safety, emergency preparedness and DRR in education settings was conducted in January 2010. The main findings show that both central and local governments in charge of the education sector have attached great importance to and issued relevant policies and guidelines on the subject. It was found, however, that much attention is given to safety management, while a lack of systematic training on DRR remains. Such training is designed improve awareness and knowledge for controlling or minimizing the risks of emergencies and disasters.
- An education expert team has been set up in Beijing Normal University for the purpose of adapting and developing two sets of DRR education teaching support materials to be pilot tested in Sichuan. It is expected the materials will be available by end of April 2010.
- A provincial training of trainers (ToT) and a national capacity development training workshop will be carried out in Chengdu and Beijing respectively in April 2010. The ToT will train 45 master trainers on DRR who will then organize short courses for 2,000 education personnel and teachers. The national training aims at familiarizing education policy-makers, planners and administrators with international norms and standards in disaster preparedness and response, and emergency management in education.

Discussion:

Children are vulnerable to disasters, because their capability for self-protection and for response to emergencies is very weak. That is why government agencies have attached great importance to the education recovery. Children are capable of learning quickly and absorbing new materials easily. Safety culture and risk awareness should start from childhood, and should include learning disaster preparedness at home and at school.

Reference: Project Progress Briefing - Building Capacity for Reconstruction of Education Sector in Sichuan, UNESCO

3.2.5. Beichuan County reconstructed at a safer site

Among all counties affected during the Wenchuan Earthquake in Sichuan, Beichuan was perhaps the most severely hit county in terms of casualties and destroyed houses. When programming the recovery plan, the county simply could not find a piece of suitable land in the original county territory, where 98.8% of the land is mountainous terrain. Eventually, the Chinese Government decided to rebuild the county town in another county, Anxian. After relocating the county town for Beichuan to Anxian, several townships and villages of Anxian were transferred to Beichuan.

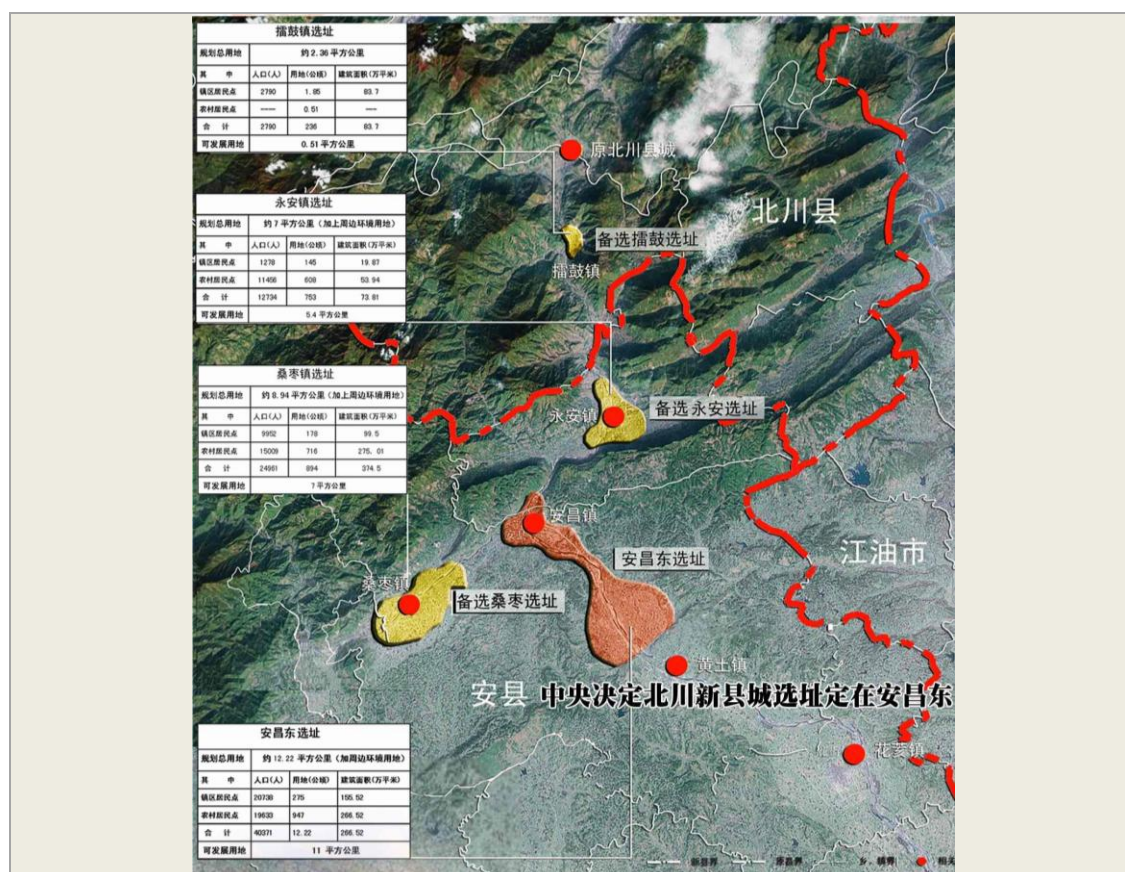
Beichuan is the only Qiang Nationality Autonomous County in China. The county was established in mid 2003 with a territory of 2,869 square meters. It has a population of 160,156 and 45,883 households, and among them 90,808 people are of Qiang Nationality (statistics by the end of 2006).

Soon after the approval of the recovery plan for Beichuan County by the State Council, Shandong, the twin province with Beichuan, mobilized 40,000 technicians and construction staff to start the reconstruction. With great efforts during the two years since the quake, several thousands of buildings were built. Roads, water, electricity and other public utilities were also constructed. By September 2010, the first group of residents will settle down in this newly built county town. Schools, kindergartens, shops, clinics and other social services will be ready for use. The new county town

being constructed showcases two practices worth elaborating on in reducing disaster risks and building resilience:

- **Selection of the site for the town - avoiding fault lines** –Three sites were recommended for the county town of Beichuan. According to the investigation, the old county town at Qushan Township could not be used as there is a major earthquake fault across the area and the old site is too small and is covered with debris and damaged buildings. Another site not far from Qushan within the county also sits on a fault. It was finally decided that the new county town would be rebuilt two kilometers away from Anchang Township in Anxian County, which is closer to the plain where Qiang Nationalities have activities. The new site is named Yongchang and is a safer for a large settlement, free from underlying fault lines.

Box 17. Sites suggested for selection for Beichuan County



- **Provision of secure livelihoods for resettled people**— Building a new town for displaced people to move in is the first part of the solution. To ensure people can remain in the town long-term, solutions are needed to find secure livelihoods for the Qiang people. In most cases, the resettlement process removes rural people from their lands, and their source of income, especially if they grow crops or raise animals. Resettlement, especially to smaller plots or areas without arable land, requires evaluating the long-term economic value of the lost farmland, and finding ways to mitigate this loss. Therefore, in designing the new town, experts and officials took into consideration job opportunities for the resettled people. They constructed an industrial park, and about a dozen factories and companies have signed letters of intent to be based in the park. This will help provide approximately 10,000 local jobs. The new county town is also building two streets in the cultural style of the Qiang Nationality. The buildings along the streets will house shops, small businesses, and community services on the ground floor. It is estimated that these shops and businesses will create 20,000 jobs. Both programs represent an effort to include sustainable employment within the local economy, which is an important foundation for building resilience against disasters.

Discussion:

Resettlement of a large population at a new site is a very tough decision both for local residents and for governments. Two major actions have been taken by the central and local governments in selection of the new site for Beichuan County. The actions will ensure that the new site for Beichuan Qiang people is much safer and reduces earthquake risks, and the settlers' livelihoods will be secured through economic development schemes.

Participants of Group Three to the forum of DRR at the Shanghai Expo 2010 made recommendations that re-settlement programs should include not only shelter issue but also livelihoods rehabilitation and community services, including retraining, skill up-grading and credit availability for industry and employment. The case of the relocation of Beichuan County to a new site fulfills these recommendations. These guidelines have been reconfirmed by the resettlement processes of Jina village and Shiyi village rebuilt at their original sites and Xiaoba Township reconstructed at a new site. In reconstructing these communities, housing is not the only target. Livelihoods and community services were both included as fundamental for the new settlements.

Information on public facility recovery of Mianyang City, a severely affected area in Sichuan

Rebuilt schools, hospitals& social welfare facilities

Target to rebuild **schools**: 751

- Started: 744 (99.07% of the total)

- Completed: 592 (78.83% of the total)

Target to rebuild **hospitals**: 381

- Started: 353 (92.65% of the total)

- Completed: 296 (77.69% of the total)

Target to rebuild **social welfare facilities**: 218

- Started: 218 (100% of the total)

- Completed: 181 (83.03% of the total)

Public utility recovery and reconstruction

Target to recover **water projects**: 796

- Started: 583 (73.24% of the total)

- Completed: 301 (37.81% of the total)

Target to recover **transportation projects**: 1,175

- Started: 1,175 (100% of the total)

- Completed: 1,060 (90.21% of the total)

Reference: 安昌河畔崛起北川新县城 New County Town of Beichuan Standing at Anchang River Bank (Chinese)
http://news.china.com.cn/rollnews/2010-05/10/content_2027690.htm

4. Employment and Income Generation

The earthquake caused huge casualties in the province and deprived large populations of livelihoods. According to the statistics from the Ministry of Human Resources and Social Security (MoHRSS), after the earthquake 1,522,000 people in Sichuan Province became unemployed, of which 372,000 urban people lost jobs and 1,150,000 rural people lost their source of income. At the same time, societal costs for medical treatment and social pensions increased sharply.

4.1. Tasks and challenges

A secure job with minimum wage income is sufficient to maintain the basic daily needs of one family. Though the government relief programs after the Wenchuan Earthquake are extensive and have met the basic daily needs of the disaster victims, the recovery and long-term development will have to be built on secure employment and stable income-generating activities. According to the government objectives for the recovery, each earthquake-affected family must have income sources and the chief laborer of the family must have a secure job. If these objectives are not achieved, social stability in the disaster-affected areas will deteriorate and the relief program will overload the government budget. There have been many such cases of prolonged relief operations after other disasters.

According to SOP, the local governments will have to find solutions to assist about one million rural and urban people to find a job and to secure sources of income. This includes supporting individual job searching and talent hunting by businesses and public institutes, as well as the creation of various

income generating activities by the people themselves under support of their local governments. One of the top challenges for the local administration is helping people find employment after the initial recovery operations.

In order to promote employment in the earthquake-affected areas, the Ministry of Human Resources and Social Security issued a policy paper soon after the disaster to assist the people to find jobs. The paper formulated three policies to subsidize the employment promotions. The three policies included a vocational training subsidy, a travel cost subsidy for people who found jobs outside the affected areas, and a pension subsidy, all to encourage the affected people and employers to increase employment.

In addition to the challenge of employment, the local governments also have to restore normal functions for their public services. To achieve this, the human resources and social security departments in the affected areas will restore daily services, such as vocational training for the unemployed, exporting labors to other provinces or abroad, arbitration of labor disputes, labor disability issues, on-the-job injury identification, and restoration of data and information systems for public access to employment opportunities and social security provisions. This task is in addition to the recovery and reconstruction of the institutions providing such services that had been destroyed in the earthquake.

Reconstruction of the institutions and restoration of their services of social security, employment and income generating activities have been specifically listed in SOP as part of the overall recovery program(refer to Table 2.9 below):

Box 18. Employment and Social Security

Item	Total*	Sichuan
County-level comprehensive service institutions on employment and social security	51	39
Grass-roots labor security working platforms	1,855	1,507
County/township social welfare institutions	1,855	1,350
County/township comprehensive service facilities for the handicapped	157	138

* Include Sichuan, Gansu and Shaanxi Provinces

4.2. Good practices

Since the earthquake, labor and social security authorities at provincial and county levels in Sichuan have implemented the following practices and policies to promote employment, rebuild livelihoods and provide sufficient manpower to the reconstruction projects:

- Restoring and providing emergency employment services and assistance to people who lost jobs in the disaster
- Assisting vulnerable groups by creating public posts in the reconstruction operations and by introducing “cash for work” programs
- Encouraging businesses, including private employers, to hire unemployed people by providing wage subsidies and favorable policies
- Encouraging self-employment through small businesses by providing financial support and favorable business policies
- Organizing no-fee vocational training services for local job seekers

4.2.1. Twin Assistance to support employment

In assisting employment and income generation for the disaster victims, donor provinces of the Twin Assistance (TA) program played an important role in helping solve unemployment issues. One of the major solutions they pursued was to mainly recruit local people in the TA-funded reconstruction projects. For example, as of August 2009, Heilongjiang Province, twinned with Jiange County, was employing 4,500 local people. According to the Labor and Social Security Bureau of Shanxi, in 2009 the province provided 4,000 jobs to people in Maoxian, the recipient county twinning with Shanxi, recruited 1,500 local people directly, and guided 6,000 people to find jobs.

Zhang LiLi, Director of Shanghai Women Association at the Forum on DRR:

In response to the Catastrophic Wenchuan Earthquake, we helped to train 400 women in Dujiangyan to start family-based business. We also organized 500 Shanghai households to pair with 500 households in Dujiangyan, to implement "Hand in Hand" Action to extend our love and care.

In another case, the donor province Hunan organized a job fair to invite businesses in Hunan to bring more than 1,000 jobs to recruit people from Lixian, the recipient county. Organizing job fairs specifically open to the people who lost jobs in the earthquake-affected areas is popular under the TA programs. In February 2010, the Human Resources and Social Security Department of Jiangsu Province organized a job fair in Mianzhu, its recipient city in Sichuan. They brought in 58 enterprises to offer 18,000 posts, each post with a salary per month no less than 1,500 Yuan. The province also contributed IT facilities worth of one million Yuan to Mianzhu and planned to use the county as a labor-force base for Jiangsu.

Another significant consideration when initiating a Twin Assistance program is ensuring high standards of reconstruction and recovery in all provinces. Though each Twin Assistance province must be able to operate using its existing organizational infrastructure, the central government must be able to guarantee that each twinned province provides an appropriate quantity of aid and the highest possible quality in training and construction.

Discussion:

Disasters displace people, destroy farmlands and disrupt industry and business, therefore unemployment is a common problem after disasters. Reconstruction can be a powerful solution to this problem, with projects active in many different sectors and with significant funding pouring in. Such projects bring job opportunities to the local labor market. Housing reconstruction, infrastructure recovery, and the restoration of public services, all require a significant labor force.

According to an estimate by ILO, reconstruction of rural dwelling houses in Sichuan alone requires at least 14 million people over three years. Housing reconstruction alone is a huge potential labor market. However, the need for labor requirement does not necessarily mean widespread employment. To bridge potential market gaps, the labor force, employers, and the government must play their roles accordingly.

Reference: Social Mobilization in Heilongjiang Province to Participate in Recovery and Reconstruction in the Disaster-affected Areas (黑龙江省广泛动员社会力量参与灾区恢复重建) http://xbkfs.ndrc.gov.cn/zhcj/t20090819_297127.htm

Shanxi Province in 2009 to Provide 4000 Jobs to Disaster-affected Areas in Maoxian County (2009年山西省将为茂县灾区提供4000个岗位) http://www.sxgov.cn/comment/comment_content/2009-05/12/content_85760.htm

Twin Assistance of Hunan in All Aspects (湖南省对口支援全方位开展) http://xbkfs.ndrc.gov.cn/jrxx/t20090610_285160.htm

Jiangsu Province Began New Cooperation for Long-term Benefits (江苏援建开启长效合作新征程) http://www.sc.gov.cn/jrsc/201003/t20100307_915366.shtml

4.2.2. Pioneer farmers” to lead income generation

In Qingchuan County, one of the most severely affected counties in the north of Sichuan, there was another good practice initiated by Zhejiang, the county’s Twin Assistance province. The TA province initiated training projects for 18,650 potential “pioneer farmers” within three years with 16.4 million RMB Yuan. These farmers are generally rural technicians or rural entrepreneurs and innovators. The training projects are linked with the agricultural program of “one township, one elite agro-product” supported by Zhejiang.

The objective of the program is agriculture-sector recovery in Qingchuan and income generation for the local farmers. According to the conditions of the affected areas, the program encouraged the development of vegetables, mushrooms, tea, walnuts, and oil olive, as well as aqua-culture products and animal husbandry as priorities for the local people. It specifically encouraged products with robust markets. The program of “one township, one elite agro-product” covers all 40 townships in the county. In 2009 alone, 10 million Yuan was invested for the training organized by Qingchuan Vocational Middle School, Guangyuan Agricultural Extension School and other 4 schools. The training courses covered agro-techniques for growing and producing mushrooms, and highland corn, and training for farmers ready to seek jobs in other places. However, though each township produces one elite agro-product, it is important that economic foundations of the townships do not depend entirely on international food market prices of one good. Therefore, it is strongly suggested that this scheme be coupled with mechanisms to guarantee the long-term availability of all necessary foodstuffs at locally acceptable prices.

Reference: Zhejiang Started a Training Program for 10,000 People from Qingchuan Rural Areas as Twin Assistance (浙江对口支援青川农村万人培训项目启动) http://xbkfs.ndrc.gov.cn/zhcj/t20090805_294977.htm

Zhejiang Twin Assistance Develop a Program of “One Township, One Elite Agro-Product” (浙江省对口支援发展“一乡一品”特色农业) http://xbkfs.ndrc.gov.cn/zhcj/t20090820_297352.htm

4.2.3. Needs A + Needs B = Job Opportunities

In cooperation with the Ministry of Human Resources and Social Security (MoHRSS) and ILO, a project funded by DFID was implemented in Sichuan titled “Livelihood Recovery in Sichuan Province: (Re) starting Business through Emergency Start and Improve Your Business (E-SIYB). The project was launched in July 2008 to help economic recovery in the six counties of Mianyang, Deyang, and Chengdu in Sichuan Province.

The project was designed to contribute to livelihood recovery by re-establishing destroyed small businesses, setting up new ones for those who lost their jobs and highlighting employment opportunities in the reconstruction operations. The immediate objective of the project was to support the employment program of the Chinese Government for there-establishment of small businesses in the affected areas in the aftermath of the Wenchuan Earthquake.

The project’s ultimate beneficiaries included three groups: (1) entrepreneurs that used to have small enterprises before the earthquake, (2) workers who used to be employed in enterprises but were unemployed due to the closing down of the enterprises, and (3) farmers who had lost their livelihoods and productive assets and wished to start a small business.

The E-SIYB project introduced an integrated approach: business start-up and restart-up skill training, micro grants or credits, and short-term vocational skill training to support local people. It especially focused on farmers who lost their means of production, disabled people, and unemployed workers, and encouraged creating job opportunities and generating income through starting or restarting individual or group-based businesses.

The most important aspect of the project was to encourage local vulnerable groups, such as women and disabled people, to identify local business opportunities based on the natural resources and human talents available in their communities and to start up group businesses with business start-up training, financial support, short-term skill training and business operation services from the project. For example, 21 group businesses in the rural areas started after the training, and the vocational skill training and grants have created 2,237 new jobs in the earthquake-affected areas.

The project covers the areas where many small businesses were destroyed and large numbers of people lost livelihoods. The local governments and the project authorities noted there was an urgent need for jobs among the disaster victims to support themselves and their families, so as not to rely solely on government relief. The project also noted the huge need for laborers as large recovery and reconstruction projects were being planned or implemented with immense financial inputs from various sources. But these projects were short on skilled workers. The projects came to assist the local men and women to seize the opportunities for livelihood recovery, and directly supported increasing employment and income generation for the jobless people, especially young and middle-aged people.

Initially, the project planners were concerned that a lack of information would hinder labor markets from functioning properly. Therefore the most important part of the project was that it joined together the need for laborers and the need for employment. The project also provided small credits for people to start businesses and specially designed workshops to enable people to access, understand and start businesses. By the end of the project, 2,418 small business owners were trained and 14,107 jobs were created. Every 8 people out of 10 who received training have started business and created 5-7 jobs. Female participation in the training was 54%.

The project bridged the two different needs and eventually helped the earthquake-affected people to find jobs. Employment has enabled them to live independently and stop relying on relief aid, and has been essential for the development of the region and the success of local businesses and joint TA projects.

Discussion:

ILO's project also considered ways to assist vulnerable groups, women, poor households and households whose main laborer was killed in the earthquake. Small grants are a popular way to assist people. However, the methods for providing the grants proved problematic. ILO initiated a creative practice by assisting the individuals to form cooperative groups. Money is provided to each individual of a co-op and together the group utilizes its funds for investment in their agreed-upon business projects.

Such practices have avoided the risk that funds will be insufficient to start a business and have also avoided the provision of large funds to a select few entrepreneurs while neglecting the majority of people, as has occurred before. There was an example in Xiang'e Township of Dujiangyan where 42 women completed E-SIYB training, and they established a "kiwi fruit growing cooperative", which attracted 233 people and 1,000 mu (15 mu = 1 hectare) of land for a scaled plantation to grow and sell fruit products.

Reference: Livelihood Recovery through (Re) starting Businesses: Report on implementation of livelihood Recovery in Sichuan Province – MoHRSS, ILO and DFID (2010)

4.2.4. Conserving Qiang culture and traditions to revitalize tourism

In the Wenchuan Earthquake, the local minority Qiang people experienced heavy casualties and property loss. Cultural tourism, their main source of income, subsequently suffered greatly as the region became hazardous and inaccessible.

Jina Qiang Zhai (Zhai is Chinese for *village*) is one of many villages where the Qiang minority culture has been well preserved and promoted by the recovery. The design for the village and houses maintained Qiang architectural styles. The Qiang sacrificial platform for religious and ancestral ceremonies was also rebuilt. The recovery project did not simply restore the old houses, but constructed safer houses in Qiang cultural styles. Water and drainage systems have also been installed in houses for use by resident families and by tourists. Rooms in the houses were designed and built specifically for shops and hostels. Experts were invited to train Qiang women to improve the quality of Qiang traditional embroidery, a popular souvenir for tourists.

In another village called “Shiyi” with 92 households and 328 people, Qiang culture and traditions have also been promoted, but in a different way. The village is located at a high altitude in a mountainous region. The native Qiang people rely on fruit growing and tourism for income. Before the earthquake, average per capita annual income was 5,000 Yuan. Per capita annual income has since increased to about 10,000 Yuan. The villages generate income by entertaining tourists, meeting guests at the village entrance with a Qiang ceremony, cooking traditional Qiang food, and holding folk performances.

Two practices used by Shiyi Village in its reconstruction process were unique and highly beneficial: 1) the villagers established a company to scale up the tourism business and they even made advertisements to attract potential tourists; and 2) they improved the village environment during the recovery process by installing a sewage treatment facility to maintain village hygiene and to protect the environment and ecosystem, with assistance from local environmental authorities and UNDP. Mr. Chen, the village leader, is confident that more tourists will come and more income will be generated following the recovery and when the village becomes more widely publicized as a tourist destination.

Discussion:

Maintaining minority culture and traditions benefits local livelihood recovery and helps generate income in many villages in the quake-hit areas in Sichuan. It is a common practice in many Asian countries. In recovery operations following the Yogyakarta and Central Java earthquakes in Indonesia in 2006 as reported by IRP, the local people revived small industry, such as silver crafts, rebuilt temples and houses using traditional architecture, and conserved their folk heritage. Such activities not only preserved the physical structures emphasizing local culture and traditions, but also promoted employment and income for the local people.

4.2.5. Create your own business (a case study)

Create Your Own Business – Making Environment-Friendly Bricks			
Disaster and Challenge to Recovery			
Disaster	Earthquake	Risk Type	Geological risk
Time	May 2008	Site	Mianzhu City
Damage & Losses and Challenge to Recovery	The earthquake destroyed the mine owned by Liu Jun, a local person from the Zundao Township of Mianzhu, one of the earthquake-affected areas. He lost his source of income and thus his ability to support his family.		
Good Practice & Experience, and How to Implement			
Sector	Employment	Theme	Secured livelihood
Lead Agency	Liu Jun, small business man	Support Agency	Dongfang Vocational School
Inputs		No./People Benefited	8
Good Practice & Experience	Liu Jun noted there was a training workshop at Dongfang Vocational School in May 2009. The workshop was on Emergency Start and Improve Your Business (E-SIYB) organized by the local government and assisted by ILO. He and his friends, Yan		

and How to Implement	Jiangping and Luo Yuan jointed. There he learned the concept of “challenge is opportunity”. Following this concept, he listed all the challenges they met after the earthquake with other participants, who were in the same situation and looking for jobs. Then he found a need for large quantities of bricks by many recovery projects. Everyday there were many trucks to ship in bricks from outside. So he decided to setup a business to make bricks with his friends. They also learned in the training course to conduct a market investigation and project feasibility study, in which they found that bricks could be produced in an environmentally friendly manner, producing no air pollution nor polluting soil, and that such bricks may have a good market. So they jointly established a small business to produce bricks using local sands and pebbles.		
Achievements, Changes and Beneficiaries			
Status Before	The people had lost their businesses, and therefore their sources of income. They had to live on the government relief scheme. Also, the local reconstruction projects were short of building materials.		
Status After	Thanks to the project, the people built up their business to produce environment-friendly bricks. Because of their good selling strategy, purchase orders are continuously coming. The new business gave them of jobs and hopes for life. They also hired five local people, which helped create employment opportunities.		
Compiler	E-SIYB Project	Date	October 2009

Discussion:

Assistance to employment can be direct or indirect. Training and assisting people to find jobs is indirect support. There are two interesting sayings on this topic: “Give a man a fish and he will eat for a day; teach a man to fish and he will eat for a lifetime,” and “blood donation or blood generation”. The above case provided by E-SIYB Project about Liu Jun and his friends reflects the latter ideal. Blood donations may save lives, but it is more important to rebuild the ability to generate blood to ensure long-term recovery.

Mr. Liu’s case also represents another lesson in disaster risk reduction. The government and construction companies should advocate the use of low carbon technology and products for post-disaster recovery. Greenhouse gasses from daily human activities contribute to global warming and climate change. In reconstruction and recovery operations after disasters and in routine development, people should be encouraged to reduce greenhouse gas emissions wherever possible.

Reference: Livelihood Recovery through (Re)starting Businesses: Report on implementation of livelihood Recovery in Sichuan Province – MoHRSS, ILO and DFID (2010)

4.2.6. NGOs to support income-generating activities

Both directly and in creative partnerships with a number of other NGOs, the Red Cross Society of China (RCSC) has established a range of projects to help local communities in the disaster-affected areas find new methods of income generation. These range from a project set up by the Red Cross-linked Jet Li One Foundation to help ethnic minority women create and market their embroidery work, to a project with a charity that supports local people breeding rabbits.

IFRC’s integrated programming in Mianzhu City also incorporated livelihoods support in the months after reconstruction was completed and people moved in to their new homes. The livelihoods support focused on vulnerable populations to start or restart livelihood activities that were disrupted by the earthquake.

NGOs are important partners along with the government and the business sector in an overall post-disaster recovery and reconstruction process. NGOs are especially helpful in creating income-generating activities. NGO involvement in the recovery operations supplements the actions of other stakeholders, such as governments, the private sector and international donors, and NGOs strengthen the effectiveness of other partners.

Reference: Sichuan Earthquake: Facts and Figures, One year commemoration, 7 May 2009
http://www.sinoptic.ch/sichuan/pdf/ifrc/2009/20090507_IFRC_faits.chiffres-en.pdf

4.2.7. Re-settled people need employment and basic services

Xiaoba Township in Anxian County was one of the areas severely affected by the catastrophic earthquake on 12 May 2008. More than 200 people were killed in the earthquake in the whole township and most of the houses in the town were destroyed. The town was totally reconstructed at its current site about 10 kilometers away from the original site.

The new town plans to provide space for 1100 households, including 700 households from the original site, and 400 others who lost lands or their sources of income, or whose lands were taken by the local government for reconstruction projects. As compensation, they are provided houses and assistance in finding jobs. The reconstruction of Xiaoba Town consists of 14 projects from 235 million Yuan of funding, assisted by Liaoning, the Twin Assistance Province with Anxian County.

Many new homes are designed to house and provide income for traditional Chinese families. For example, one review team visited a house and met a young man named Mr. Yan. He was there to help his parents look after their shop. According to Yan, the shop is merely enough to support his family of 7 people, a typical Chinese family representing three generations. As the shop is very close to a school, business should be good during the school season. The living quarters are on the second and third floors, and the ground floor is used for the small shop of 20 square meters, which sells snack food and daily utensils. Yan has his own job as well but often helps his parents look after the shop.

The house is equipped with electricity, tap water and natural gas. More than 20 residential buildings along the streets of the town were built to allow residents, who are all new settlers in the town, to run small businesses in order to secure their livelihoods. They open restaurants, grocery stores, barber shops and repair shops. These businesses are necessary for community residents, and also promote employment and allow people to make a living at the new site.

Not far from Yan's shop, is a Child Friendly Space (CFS), a type of daytime nursery jointly supported by the China National Working Committee on Children and Women and UNICEF. The nursery serves the community residents. Five children were playing with toys in the house, which provided a neat and joyful space. A woman named Su was on duty. She said the CFS receives local kids free of charge during daytime. She is the volunteer in the nursery. The service is free, and the management is professional. All kids that are left for care in the nursery have to be registered at the time of their arrival and departure, and must be screened for symptoms of sickness.

According to UNICEF, working together with the China National Working Committee on Children and Women, 40 Child Friendly Spaces (CFS) were established in Sichuan to look after children in new communities, which also provided psychosocial support to children and their families. CFS are places where children can attend group activities such as singing, dancing, painting and playing games. These activities can help children get along with each other and feel they are safe and not alone. According to the registration data by the end of 2008, the facilities had provided psychosocial services to 42,000 children in the earthquake-affected areas in Sichuan.

In the new Xiaoba Town, they also built a community hospital clinic, an independent two story building with fairly good medical services: an out-patient department able to attend to one hundred people per day, an in-patient department with 25 beds, a registration room, a pharmacy, labs for

common tests, and other facilities. Community-based medical services are part of the basic needs of a new settlement.

Discussion:

Critical issues related to the resettlement of disaster victims extend beyond housing and public utilities to include livelihoods and basic public services within communities. The first two concerns are usually fully or partially covered by public funding. However, to ensure sustainable development during a post-disaster recovery, only those who are employed, safe, and can access services of education, medical care, and markets within the community will be able to settle down securely.

5. Environment and Ecosystem Restoration

Disasters can be highly destructive to the environment and ecosystems that local settlements depend on. Floods, droughts, cyclones and earthquakes can all significantly impact the health of ecosystems and the availability of natural resources. Topical research indicates that natural hazards are not inherently destructive to human settlements, but become highly damaging when settlements are too vulnerable. A lack of knowledge, preparation, and mitigation techniques is the fundamental reason that natural hazards become human disasters.

The extensive negative effects of a disaster like the Wenchuan Earthquake can be considerably minimized if people live in safer areas and if they build resilience to disaster risks and sound disaster management systems.

Another important principle is that industrial and post-industrial societies are not structured to harmonize with nature and the environment, which compounds potential disaster risks. Exploitation of natural resources and ecosystem services is often a negative side effect of economic growth and material development. Such economic development increases potential disaster risks by limiting the ability of the environment to recover and of humans to benefit from environmental resources.

Research on the above topic suggests that many forms of environmental damage, including broader issues of climate change and localized ecosystem degradation, can increase the effects of natural hazards. Limiting the local and global environmental impact of a community may help limit the destructiveness of future natural disasters.

The Wenchuan Earthquake brought extensive damage to people and infrastructure in large areas in Sichuan. The damage to the environment and ecosystems is also profound. The earthquake reshaped mountains and rivers with landslides and avalanche lakes. New disaster risks formed. The earthquake also destroyed vegetation and killed or endangered the wild animals. In addition, it damaged chemical plants and other man made facilities causing the release of hazardous substances into the soil, water and air, which polluted the environment and are harmful to people's health.

5.1. Tasks and challenges

Damage to the environment and ecosystems in the affected areas by the Wenchuan Earthquake can be categorized into several aspects: (1) the release and spill of toxic and hazardous substances from collapsed chemical plants and cracked radiation instruments threatening lives in the areas, (2) landslides or earth movements that destroyed farmlands and agricultural facilities, in addition to the creation of secondary disaster risks, such as newly formed unstable mountains, earthquake lakes, etc. and (3) destroyed forests and the death or endangerment of many wild animals.

In accordance with the assessment of the damage and losses from the Wenchuan Earthquake, the Chinese Government has decided to undertake the following tasks in restoring the environment and ecosystems:

Box 19. Ecological and Environment Restoration

Sub-sector	Action
Restoration of forest & grass vegetation	Restore 485,300 ha. of ecological public forest and replant trees on 124,700 ha. to be converted from farmland to forest land
Seedling production base	Restore 12,600 ha. of seedling production bases, and 431,000 square meters of nurseries and greenhouses
Nature reserve	Restore 49 national and provincial nature reserves, 120,000 ha. of habitats for giant pandas and other rare wildlife, and 160,000 square meters of living and working facilities in the reserves
Scenic spot	Restore 9 national scenic spots and 30 provincial ones
Forest parks	Restore 17 national forest parks and 18 provincial ones
Forest fire prevention and monitoring	Restore 350 fire watching towers, 152 telecommunication base stations and mid-stations, 50,000 square meters of specialized barracks and materials warehouses
Forest infrastructure	Restore 8,202 km forest roads, 2,512 km water supply pipelines, 3,643 km power supply lines, and 2,829 km telecommunication lines
Grassland recovery	Restore 155,300 ha. of grassland
Water and soil conservation	Repair and control 2,073 square meter areas under water and soil erosion
Drinking water source protection	Construct 323 facilities of pollution control and prevention for drinking water sources
Remediation of soil contamination	Treatment and control of 22 spots with high risks and with severely polluted soil
Safety assurance of nuclear and radiation	Set up radioactive waste storerooms, environmental monitoring networks of radiation, risk monitoring and early-warning, etc.
Environmental monitoring	Restore and reconstruct environmental monitoring facilities and equipment.

NOTE: All tables in Part II of the report are produced based on data and information in SOP, but simplified to specify the situation of Sichuan Province wherever possible.)

Environmental and ecosystem restoration is time and resource-intensive. Proper location-specific restoration strategies must be developed and rigorously implemented. Furthermore, environment and ecosystem services may be damaged or degraded due to poorly planned or executed recovery projects, which adds extra urgency to the development of sound projects.

Due to extensive and severe damage to the ecosystems in Sichuan Province by the strongest earthquake in China in the past thirty years, repairing and restoring environmental functions. It is not only for money saving, but also for reducing human's access and intervention over the ecosystems.

5.2. Good practices

5.2.1. 5.2.1: Environment-friendly reconstruction

There are thousands of recovery and reconstruction projects in the earthquake-affected areas of Sichuan. Environment-friendly building materials should be extensively utilized for reconstruction as called for by the government and practiced by the Twin Assistance (TA) provinces.

The Shifang Social Welfare Centre is the first project started and funded by Beijing Municipality under the TA program. The centre consists of services for the care of the disabled and single old people, for social relief and welfare, and for orphanages. The first phase of the centre has 86 energy saving houses, and environment-friendly building materials were extensively used in its construction. In addition solar heaters, energy-saving lights, and facilities to process garbage and waste were installed. The donors, designers and builders demonstrated new reconstruction concepts of "green" environmental protection and recycling.

Discussion:

Utilizing environment friendly building materials in the recovery and reconstruction projects is relevant to climate change, and it contributes to the reduction of greenhouse gas (GHG) emissions. Though such practices may not directly link to reducing disaster risks, they do help to reduce environmental impacts at a global scale. The accumulation of GHG released by human activities during the past two hundred years has contributed to global warming and climate change. With this understanding, the forum on disaster risk reduction at the Shanghai Expo 2010 recommended using recovery and reconstruction as an opportunity to build back not only better and safer, but also greener.

One of the visible changes in climate we noted is an increase in extreme weather events, which come at unusual times and consistently have greater intensity than has been previously observed. This means risk reduction must be done incrementally as risk develops into potential disasters bit by bit. As is said in China, “the last straw overloaded to kill a camel is not the heaviest straw.”

We also note that some human activities, such as de-forestation, over grazing on grassland, and reduced water discharge channels and retention areas have intensified the force of disasters. Such detrimental activities can be observed in the recovery and reconstruction operations elsewhere.

Meteorological observations from Mumbai, one of the largest cities in India, recorded that the city had experienced both a rise in the number of flooding days owing to heavy rainfall as well as in the intensity of the precipitation. According to Mumbai officials at a forum at Shanghai Expo 2010, the ratio of >75 mm rainfall days to flooding days increased from 1:7 to 1.5:1 during the last sixty years. This would be evidence that global climate change and extreme weather events are overloading the existing capacity of the city drainage system. Mumbai was originally built on 7 islands and many parts of the city are just 5 meters above the low tide sea level. The increase of rainfall and intensity no doubt constitute risks to the city’s development.

The municipal government has taken actions to reduce the risks, such as immediate response measures to enlarge the capacity of the drainage system and recovery measures to remove buildings vulnerable to floods, as well as long-term measures to justify and regulate urban development structures and strengthen the disaster management system of the city. The combined actions in Mumbai to address disaster risks are recommended highly to other municipal authorities. The use of multiple disaster mitigation efforts in concert has been essential in reducing severe flooding in Mumbai.

Reference: Emphasis on Importance of People First, and Energy Saving and Environment Protection in Beijing Twin Assistance (北京市在对口支援中突出民生优先注重节能环保) http://xbkfs.ndrc.gov.cn/zhcj/t20090818_296773.htm

5.2.2. Restoration of ecosystems for the Giant Panda

A year after the earthquake, a new eco-friendly village for 350 disaster-affected households began to be constructed at Wolong Township of Wenchuan County. Wolong is an area inhabited by famous Giant Pandas and is about 8 km away from the epicenter of the Wenchuan Earthquake. In the quake, 98% of the houses were either severely damaged or collapsed, other basic facilities were also destroyed, and all people in the area were affected. The direct economic loss has reached 450million Yuan. According to the recovery plan, the new village will accommodate those families as a collective resettlement to save land for buffer zones for the giant panda. Each household will pay 20,000 Yuan to own a new house of 120-160 square meters. The reconstructed village will follow the principles of ecosystem protection and tourism development, and will avoid geological disaster risks.

The inhabited lands for giant pandas were severely damaged during the earthquake. In September 2009, the provincial government planned to restore 10,700 ha. of the inhabited land for wild animals. According to the restoration needs, Sichuan planned to invest 600 million Yuan for the restoration of

the inhabited land, of which a budget of about 500 million Yuan had been approved and 141 million had been deposited into the account.

The earthquake has led to severe damage to 60,000 ha. of the inhabited lands and 2,000 ha. of the surrounding areas for giant pandas. The province planned to increase 40,000 ha. of the inhabited land and to open “the mating channels” for wild Giant Pandas living in different regions. This is an increase of 2.3% of the inhabited land for the animals compared to the figure prior to the earthquake. In addition to this, the provincial government will also strengthen monitoring of the ecosystem of the inhabited land in relation to the recovery program in order to reduce any possible negative impact on the living conditions of the wild animals. According to the statistics, there are 1,206 wild giant pandas living on a total area of 1,770,000 ha. of lands in Sichuan Province.

Discussion:

Some human activities in post disaster recovery may have a negative impact on the environment and ecosystem, including projects implemented at the expense of forests and vegetation. Human activities can either reduce risks to the environment and ecosystem recovery or intensify the risks.

Many countries that have experienced disasters in recent years have verified this understanding. The Myanmar representative at the workshop on recovery and reconstruction at Shanghai Expo in July 2010 reported that actions were being taken by the country to revitalize mangrove forests along the coast line as a disaster risk reduction measure in the recovery following Cyclone Nargis. The trees can protect people and property in coastal regions against cyclones. To protect the ecosystem, the country made available stoves that consume less fuel and paddy husk stoves to substitute for firewood. Haitian officials also expressed at the workshop the need to protect the environment through reforestation and building up eco-friendly communities in Port of Prince, where a severe earthquake killed 140,000 people.

Reference: Stories of Recovery and Reconstruction in Wolong Township of Wenchuan County, the Home for Giant Pandas (熊猫之乡汶川卧龙镇恢复重建见闻) <http://www.eedu.org.cn/news/region/xinan/sc/200904/35040.html>

Heal Wounds by Earthquake and Plan Recovery of 100,000 Ha. Land for Giant Panda in Sichuan (四川计划修复 10 万公顷熊猫栖息地 弥合地震创伤) <http://www.eedu.org.cn/news/region/xinan/sc/200909/40250.html>

5.2.3. Rapid assessment of chemical contamination (a case study)

Rapid Assessment of Chemical Contamination after the Wenchuan Earthquake			
Disaster and Challenge to Recovery			
Disaster	Earthquake	Risk Type	Chemical risk
Time	May 2008	Site	The earthquake-affected areas in Sichuan
Damage & Losses and Challenge to Recovery	After the earthquake, many plants and institutes with chemicals, hazardous materials, or waste were severely damaged or destroyed. Without rapid identification and assessment of the impact on the environment, risks threaten human and environmental health.		
Good Practice & Experience, and How to Implement			
Sector	Environment	Theme	Environmental Protection
Lead Agency	Environmental Protection Bureau	Support Agency	World Bank
Inputs	US\$ 1.5 million from GEF	No./People Benefited	
Good Practice & Experience and How to Implement	The project made initial efforts to assess risks associated with chemical waste, with a particular focus on chemical and waste storage facilities that may have been damaged in the earthquake. Intensive sampling and monitoring were undertaken with the assistance of portable equipment procured for the project. The rapid assessment proposed measures to mitigate the identified risks. It aims to ensure that there was no major secondary environmental accident in Sichuan after the Wenchuan Earthquake. The GEF		

	project was concluded successfully in October 2009.		
Achievements, Changes and Beneficiaries			
Status Before	Many industrial sites were destroyed in the earthquake, some of which contained hazardous chemical wastes that increased the likelihood of environment contamination. People living around the sites were exposed to these risks. An abandoned production facility of Sichuan Hongda Prosperous Chemical Industry Co. Ltd. at Shifang City is one of them. The plant had been completely destroyed and was identified as a high-risk pollution source.		
Status After	The project succeeded in screening 346 sites with potential chemical contamination risks and identifying 58 priority pollution sources for follow-up mitigation actions. Relevant information was disclosed through the Internet and other information platforms.		
Compiler	World Bank website	Date	December 2009

Discussion:

Earthquakes can change whole landscapes, which can form new geological risks that lead to secondary disasters. Secondary disasters can also happen from leakage and spills of chemical materials from the destroyed facilities and factories, some of which are very destructive. These chemicals can potentially pollute the air, soil and water, and the general environment of an area. It is necessary to inspect, identify and treat the chemicals that are harmful to the human beings and ecosystems. If chemicals are identified but present no immediate threats, professional institutions still should monitor for potential the risks.

Reference: From Rubble to Knowledge: Lessons-Learned from the Wenchuan Earthquake
<http://go.worldbank.org/VRED8Z4DB0>

5.2.4. Learn and share experiences to heal nature

Catastrophic disasters are rare events that do not happen all the time. Therefore, knowledge and experience to address such situations is often lacking in developing countries. Governments began to become aware that such knowledge might exist in other countries that can be accessed directly or through international organizations. In the environment sector after the Wenchuan Earthquake, the Ministry of Environment Protection (MEP) approached UNEP for help to understand how to respond to the situation.

An exchange of information on learning and sharing experiences and practices in managing disaster situations was organized by UNEP in cooperation with MEP to address the environmental issues and challenges from the disaster. UNEP and MEP:

- Organized symposiums and seminars to invite resource experts to share international experiences in post disaster management about how to cope with similar events. In June and July 2008, two international workshops were organized.
- Sent experts to evaluate the situation in the field to identify direct and indirect threats to environment and lives after the quake. A mission was fielded in July 2008, which consisted of 60 members; many of them were senior international and multi-disciplinary experts. One of the most challenging issues identified by the mission was the management of the vast quantities of building rubble generated by the quake, much of which may have been contaminated with hazardous materials such as asbestos, hydrocarbons and toxic chemicals.
- UNEP experts also conducted a series of field training sessions to share practical knowledge, including information on international standards, procedures, and laboratory protocols.

- It was a two-way learning experience both by the nationals as well as internationals. As expressed by UNEP experts, they also learned from the Chinese experts best practices in post disaster recovery: centralized camp management, planning of guidelines for reconstruction, and pace of the reconstruction. What they learned can also be disseminated to other countries and regions.

Xue Chao, Chief Commander of Shanghai Office for Twin Assistance to Dujiangyan:

It would be much desirable to hear from officials and people of the quake-hit areas in Sichuan about their views and comments on good practice and experience in the reconstruction.

Discussion:

Disasters cause human casualties and property loss immediately. They also bring secondary risks and further disasters if proper response actions are not taken. From the above cases from the Wenchuan Earthquake, we learned that secondary risks have already formed, which threaten lives, the environment and ecosystems. In the recovery process, action to minimize these risks must be taken to avoid future disasters.

Landslides on Quzhou Mountain that happened in the south of Gansu Province in early August 2010 further confirmed the above understanding. One of the causes of the slide was the effects of the Wenchuan Earthquake two years ago on the mountains there. Heavy rains before the slide are considered the immediate triggers of the disaster. Unfortunately, the risks that developed two years ago had not been identified, nor were they monitored for the development of potential risks. Many buildings were constructed in the valley below during the recovery process after the Wenchuan Earthquake, surrounded by high but fragile mountain slopes.

The importance of learning and sharing experiences and practices in post disaster recovery and disaster risk reduction has been realized by more and more communities, cities and countries. The international forum on DRR at the Shanghai Expo drew great interest and participation in the UNISDR campaign “Making Cities Resilient” 2010-2011. Representatives from the city of Port of Prince, Haiti, expressed a desire to capitalize on examples of other cities, the Kobe Phoenix Plan, problems encountered by New Orleans, and the success of the Sichuan recovery. It remains to be seen whether these lessons have been applied throughout China, and whether building standards are exceeded in the rest of the country. The answers to these questions will become apparent when other natural hazards cause emergency situations in China. Regions that have applied disaster risk reduction techniques should suffer substantially less damage after a disaster.

Reference: UNEP in China – Building Back Better http://www.unep.org/conflictsanddisasters/http://postconflict.unep.ch/publications/UNEP_in_China.pdf

Quzhou Discover 18 Places with Geological Hazards Threatening 28,585 People
<http://msn.y.net.com/view.jsp?oid=68361823>

6. Additional Good Practices

6.1. Sichuan supports Yushu with good recovery practices

Two years of the reconstruction operations have greatly benefitted the Sichuan people in their recovery from the disaster and for the long-term development of the province. During the relief and recovery phases, the province received millions and millions of Yuan support in cash and materials from people in China and all over the world, and volunteers came to offer all types of services and warmed the hearts of the quake-affected people. The people of Sichuan greatly appreciated this help, and they wish to reward the kindness and support they received during the most difficult time.

When Yushu Prefecture in Qinghai Province was hit by a strong earthquake on 14 April 2010, Sichuan took immediate actions to provide support to help the region. In fact, it was the first province to send relief materials and rescue teams to the affected areas in Yushu. As briefed by Sichuan civil affairs officials, they have done the followings:

Soon after the earthquake, the Chairman of the Sichuan Provincial People's Congress called Qinghai (where Yushu is located) provincial leadership to express sympathy to the affected people and offered assistance.

- Based on their experiences in rescue and relief operations following the Wenchuan Earthquake, the Prefectures of Aba, Guangyuan and Mianyang, which are the nearby regions of Sichuan Province to Yushu, dispatched professional staff and relief materials to the affected areas. Sichuan Electricity Company sent 16 emergency response vehicles with staff and repair instruments. Mianyang sent a rescue team of 12 experienced firefighters and medical teams of 32 staff with first-aid instruments and medicines. Civil affairs agencies in Sichuan mobilized food, tents, clothing, and other relief materials and shipped them to Yushu without delay.
- Meanwhile, the province began to receive wounded people evacuated from Yushu and gave them medical treatment. More than 400 injured people from the region received medical aid in Sichuan. By 28 May 2010, 66 recovered people from Yushu had been released from the hospital and returned home.
- In the following weeks, the whole province organized charity campaigns to mobilize donations to the Yushu people. 350 volunteers were assembled by the Provincial Youth League to set up 18 service stations along the highways to Yushu to assist rescue teams and transport relief materials as well as people evacuated from Yushu quake-affected areas. In addition 450 university students were mobilized to give trauma stress relief, interpretation and other aid to the injured persons from Yushu. The region is mainly inhabited by Tibetan people.
- In order to assist the recovery of the education sector, Sichuan Province offered to receive students from Yushu to board and study in the newly rebuilt schools in Sichuan. For example, Juyuan Middle School in Dujiangyan City received about 500 students from Yushu Nationality Middle School on 28 June 2010. The latter was destroyed and is to be reconstructed. Dujiangyan planned to receive 1,600 students from Yushu for boarding study, a way to support Yushu for the reconstruction.
- Sichuan also received officials in charge of planning and decision making from Yushu and Qinghai and taught them how to plan post disaster recovery and reconstruction. Two high level study groups from Qinghai Province headed by the provincial governor, chief party secretary and chairperson of Yushu Disaster Recovery Leading Group visited Sichuan in May 2010. During the study conferences, experiences and practices in reconstruction operations from the Wenchuan Earthquake were introduced by the provincial and local officials of Sichuan Province.

Discussion:

Sichuan has just experienced a recovery process and has offered assistance to newly impacted places and regions. They have done this not only in cash and materials, but also using their knowledge and experiences developed in their recovery and reconstruction operations. Catastrophic disasters do not occur all the time. Knowledge and information on disaster recovery is not always documented and readily available. Sometimes such experiences are forgotten.

It is strongly recommended that countries share knowledge and experiences of their recovery operations with others who need this type of assistance. For example, the lessons of the Sichuan

recovery and the key recommendations for incorporating risk reduction into the general reconstruction should be replicated during normal operations throughout China.

Reference: Mianyang Urgently Assists Yushu in Response to the Earthquake (Chinese)
http://sichuan.scol.com.cn/myxw/content/2010-04/15/content_661498.htm?node=959

6.2. Shanghai Twin Assistance for Dujiangyan recovery

Shanghai Municipality is one of the biggest cities in China and in the world. It is also one of the most developed areas in the country. The municipality is part of the Twin Assistance program with Dujiangyan City of Sichuan. As mentioned earlier, the famous 2000 year-old water system of Dujiangyan still plays a vital role in local economic development and flood risk reduction.

Shanghai assistance to Dujiangyan covers 5 key recovery areas. These objectives are closely related to the livelihoods of the Dujiangyan people. The 5 areas are: education systems, health systems, urban water supply and sewage treatment, urban and rural dwelling houses, and employment and new business development. The assistance aims to provide support in the recovery of two basic city functions: public services and local development.

In support of the recovery of basic city functions, Shanghai has reconstructed 22 schools, 21 hospitals (6 at the city level and 15 at the township level), 565,000 square meters of residential houses, 1 water supply plant and 8 sewage plants, which can meet 80% of the drinking water demand and sewage treatment and discharge.

On 26 December 2009, Shanghai handed over the “keys” of 14 medical services and hospitals to Dujiangyan at once. When these facilities were delivered to the local health sector, the professional services were put in use immediately. During the recovery of the health sector, Shanghai had dispatched 7 groups of 1,074 clinical staff, which included 150 leading experts participating in the medical recovery in Dujiangyan. The staff has been on normal shifts at the hospitals to receive patients. More important and strategic is that they have been assigned with tasks to improve the local management of the medical services. In addition to this, 552 key professionals from the local health sector went to Shanghai for on-the-job training under the guidance of Shanghai experts. They participated in lectures, attended the wards, and joined surgery operations. Shanghai assistance to the recovery is not just to handover the “keys” to the projects, but to ensure the continual functioning of the projects.

Two years ago Shanghai determined to use its twin assistance to empower the local development as one of its major objectives and to orient the disaster recovery for development. Following field investigations by experts from both Shanghai and Dujiangyan over 6 months, they finally decided to develop two major programs: a) develop 100,000 mu of land (15 Mu = 1 hectare) for intensive agriculture, and b) build 100,000 square meters of space for business development and employment. When exploring which projects would be developed for the recovery, the experts sought to tap the local resources and expertise in agricultural production and avoid repetition with others. They finally selected the “Two 100,000s”, because on one hand the projects are closely related to livelihoods of the local people, especially the farmers, and on the other hand, the projects will eventually bring extensive development to the local economy after the recovery operations end.

When the review mission was about to finalize the report, news came that Shanghai is to complete all of its twin assistance tasks by end of August 2010. This means the two-year National Twin Assistance Program in post disaster recovery and reconstruction following the Wenchuan Earthquake will soon come to an end (Note: SOP was approved and implemented in September 2008).

In order to ensure all assisted projects continue to operate smoothly and effectively when the twin assistance project is completed, Shanghai decided to increase its subsidy to cover the operating costs for some public utilities from 1 year to 2 – 3 years. For example, Dujiangyan West Region Water Plant is a reconstructed public utility with a water supply capacity of 200,000 tons/day. At the moment, the

demand is only half. Obviously without subsidies for operating costs, part of the facilities will remain shut, and the machines could rust or suffer damage. To avoid such cases, 320million Yuan from Shanghai twin assistance has been reserved as maintenance and operation funds for use by relevant departments in the local government.

Discussion:

Twin Assistance perhaps is a unique modality in mobilizing resources and technical expertise in a country for recovery projects. It is especially pertinent in a country where economic capabilities vary from one place to another. The well-off provinces and cities spare part of their revenue to assist less capable places when faced with heavy losses in disasters.

What we can learn from the practice is that good management in planning and implementing large scale twin assistance projects is essential to serve the basic needs of the disaster-affected people and to build back better during the recovery and reconstruction.

Reference: Record of Shanghai Twin Assistance to Dujiangyan for Post Disaster Recovery 上海对口支援都江堰市灾后恢复重建纪实 <http://zhcj.newssc.org/system/2009/12/14/012480438.shtml>



SUMMARY OF GOOD PRACTICES WITH RECOMMENDATIONS

A. Experiences and Recommendations for Planning

Experience 1– *Planning for recovery and reconstruction starts early.* The Chinese Government started the recovery planning when the search and rescue activities were close to completion. The advantage of the early planning allowed development planners and disaster managers to 1) address the challenges of the recovery together; 2) assess the recovery needs when the extent of damage and loss was visible; and 3) help balance resource allocations for short-term relief with mid-term recovery and long-term development.

Recommendation 1: Early planning of post disaster recovery and reconstruction is recommended for governments in the disaster-affected areas.

Experience 2– *A designated government institute to lead the recovery planning.* In China, the National Development and Reform Commission is the Planning Ministry for large development programs of national strategic importance. The Ministry took the lead in compiling the recovery plan with other institutes.

Recommendation 2: A lead government institution needs to be designated to carry out tasks of planning and implementation of the recovery operations.

Experience 3 – *“Build Back Better” starts with objective formulation for the recovery.* This is a newly introduced principle for reconstruction. It calls for better outcomes from the reconstruction operations than the status prior to the disaster. Application of the guiding principle should start right at the formulation of the recovery objectives. China has similar strategy, such as “Build Better Homes”. More extensively used in the recovery is the principle of “People First”, which emphasizes that people’s basic interests must be fully taken into account and secured.

Recommendation 3: A simple and rushed recovery is not recommended. Decision makers should pursue a better recovery that protects against future disasters, which is in the interests of the affected people.

Experience 4– *Prioritize the needs of post disaster recovery and reconstruction.* There are different needs from almost all sectors and communities in the area for recovery and reconstruction following a catastrophic disaster. It would not be realistic for governments to cover all of them. Prioritizing the most pressing objectives will ensure that assistance reaches the most badly damaged regions and the neediest people.

Recommendation 4: In post disaster recovery planning, prioritizing needs is an essential action to secure that resources reach the most essential sectors and the most affected people and communities.

Experience 5– *Enabling broad participation and transparency in the planning process.* It is important to have broad participation in planning the recovery. The multi-stakeholder group chaired by NDRC made the draft plan available to the public and international community for comments and suggestions before approval.

Recommendation 5: Broad participation and transparency is recommended for governments to ensure the neediest people receive aid and to avoid corruption and funneling excessive assistance to less pressing constituent requests.

Experience 6 – *Policy innovation to mobilize resources for recovery.* It is a common practice to adopt innovative policies and measures for mobilizing funds for the recovery projects. For the Wenchuan Earthquake, the government developed fiscal policy, tax policy, land use policies, etc. These policies and measures played an important role in attracting investments from various sources.

Recommendation 6: In developing policies and measures to mobilize funds, government institutes and donors will analyze potential funding sources and new innovative policies relative to the projects, areas and sectors that they are interested in contributing to.

Experience 7– *Twin Assistance (TA).* TA was a unique model for mobilizing resources and technical expertise for the recovery. TA has played two functions in bridging the gap between better-off areas and disaster-affected areas: 1) it provided resources which the central government could not fully cover, and 2) it created an opportunity for better-off areas to transfer financial and technical resources to earthquake-affected areas.

Recommendation 7: Economically better developed areas within a country should assist disaster-affected areas in the recovery process, which also aids national economic integration.

Experience 8– *UN support in a recovery can be counted on.* Recovery relies principally on national efforts, but international support is also available. In the planning of the post Wenchuan Earthquake recovery, UN agencies made timely contributions of knowledge and experience from other post-disaster reconstruction projects.

Recommendation 8: UN assistance in various can be requested in the wake of a disaster. UN agencies can especially contribute extensive knowledge and experience regarding previous disaster and reconstruction situations around the world.

Experience 9 – *Specialized institutes are indispensable in recovery planning.* Post disaster recovery requires combined efforts. The China Earthquake Administration contributed to the recovery plan by estimating the likely trend of aftershocks, advising on seismic fortification levels for various areas, and advising on how to improve earthquake response mechanisms.

Recommendation 9: Specialized institutes on disaster management are part of the recovery planning forces, and their technical knowledge should be utilized.

Experience 10 – *Special efforts to care the most vulnerable groups.* The Provincial Government of Sichuan made special efforts to help solve the difficulties of the most vulnerable groups. This alleviated pressures on family members and ensured social stability. The government initiated various financial and policy supports for those people and families facing critical problems after the earthquake.

Recommendation 10: Even when relief stage is over, governments should not lessen their efforts to help the most vulnerable people and families recover.

B. Good Practices & Recommendations for Recovery

1. Reconstruction of Rural and Urban Housing

Save lands for funds to rebuild houses

Rebuilding large tracts of residential space requires immense funds. The Xiangrong practice in Dujiangyan, called the “Western Sichuan Forest Village Model”, is to sell land and use the funds for housing reconstruction. This village is close to the capital of Sichuan Province and land is valuable. In doing this, two issues should be noted: a) with extra funds, the houses can be rebuilt better and with

improved facilities; and b) this must be conducted on a voluntary basis, as land is the most important asset of rural households.

Recommendation: This model can be replicated in other post-disaster situations when rural and peri-urban households require cash and possess excess lands. However, governments and homeowners must ensure that the rebuilt houses and facilities are most resistant to disasters.

1.1. Each family should have a safer house.

A significant objective of the national government following the Wenchuan Earthquake was that each family in the quake-affected areas should have a safer house. To achieve this objective, the local governments initiated several practices in building the houses resistant to disasters:

- Strong leadership to drive the house reconstruction.
- House reconstruction should upgrade local conditions.
- Informing people to seek their understanding and support.
- Mobilizing all resources to rebuild the houses.

Recommendation: Governments should take the primary responsibility to assist quake-affected families to rebuild their houses safer to prevent future disasters. Practical and innovative approaches must be taken in this process to ensure that the rapid reconstruction maintains high quality standards.

1.2. Rebuild the houses resistant to earthquake hazards.

The reconstruction of houses after disasters must observe the principles of “People First” and “Disaster Risk Reduction”. The No’ergai house reconstruction project strictly followed the seismic fortification standards and building codes from design to physical construction, through selecting the building team and choosing the safest building materials.

Recommendation: People involved in building construction must strictly observe building standards in relation to local disaster risks in their area. Such standards may prolong the construction and require more funds, but the benefits of safer houses to protect people from future potential disasters are paramount.

1.3. Villagers and officials know quake resistant houses.

Yingxiu is a town at the epicenter of the Wenchuan Earthquake. Before the local resident selected new home designs for reconstruction, model houses were built and people were informed about the improved houses and their prices. Yet many people have their own considerations and requirements for a home. Officials must advocate for safer houses and also understand the myriad details that families care about in home reconstruction.

Recommendation: Officials in charge of house reconstruction must educate the people about houses resistant to disaster risks and also understand people’s requirements.

1.4. Assisting the poor to rebuild housing.

To effectively implement the house recovery program, the Sichuan Provincial Civil Affairs Department organized investigations to understand the cost of rebuilding houses and to help poor families get funds. They developed the following measures to help the poor in house recovery:

- Coordinate with financial departments to “soften” the criteria for lending and for the provision of small credits for the poor households.
- Guide local governments to issue policies for the establishment of a guarantee mechanism for poor households to get loans.

- Coordinate with departments to provide reconstruction subsidies first of all to the poorest households.
- Liaise with concerned departments to re-adjust the poverty alleviation fund for assisting extremely poor households.
- Establish a “one to one” mechanism: one government official helps one poor household.

Recommendation: Government institutes are advised to take special measures to assist the poor households to rebuild their safer houses.

1.5. Transparency in rural house reconstruction.

The IFRC case in Mianzhou City shows that assistance for house reconstruction was provided in a transparent manner. The beneficiary selection criteria were posted in all project villages and trainings were organized to explain the procedures. Another unique part of the project is that the funds were transferred directly into the beneficiaries’ accounts.

Recommendation: Providing assistance in a transparent way can reduce potential friction or disagreements about funds and housing reconstruction. Local leadership should ensure transparency in assisting people with funds and other reconstruction and financial benefits.

2. Rebuilding Schools and Hospitals

2.1. Recovery, an opportunity for “Build Back Better”.

“Build Back Better” is one of the guiding principles for the post disaster reconstruction. The principle is to request local governments to seize the opportunity to adjust and improve public services for a better recovery. The local official building standards must correlate to local seismic reinforcement needs. In the post-Wenchuan experience, the local governments raised the standard one level higher to achieve safer and more reliable buildings for public services.

Recommendation: In the reconstruction of schools, hospitals and other public buildings, governments in charge must take measures to ensure that public services are more resistant to disasters.

2.2. Improve hardware and software.

It is relatively easy to mobilize funds for rebuilding better schools and hospitals. But the donors wanted to improve both “hardware” and “software”: they not only built better schools and hospitals, but also upgraded the skills of the management and professional staff.

Shifang City is an exemplary case. The schools of Shifang were twinned with schools in Beijing. The online Distance Education Training Network, developed by the Beijing partners, is open for Shifang teachers. Shifang students can join online classes with their twin school students in Beijing.

Recommendation: When helping disaster-affected areas to rebuild public services, donors should not only focus on classrooms or hospital facilities, but also emphasize improvements to the management and technical skills of the staff. In this way, the recovered public services will be beautiful outside, and capable inside.

2.3. National program to upgrade school building safety.

To protect children, the most vulnerable group in disasters, China started a national program to upgrade the safety of primary and middle school buildings all over the country. The program aims to make schools the safest place for children. It begins with a risk assessment of school buildings. Repairs, strengthening or reconstruction efforts will be carried out based on risk assessment.

Recommendation: Children, due to their age and experience, are highly vulnerable in disasters. It is the government's responsibility to ensure that schools are resistant to disasters and that the buildings are safe.

2.4. Policies and practices to ensure education recovery.

The Education Department of Sichuan Province implemented the following policies and measures to reduce disaster risks in the education recovery:

- Place safety as the top priority in school reconstruction.
- Strictly observe the building codes set by national and local governments.
- Tighten the quality control of the reconstruction projects.
- Close monitoring and supervision, and re-visit the rebuilt schools to check quality.
- Rebuilt schools should serve as shelters for public use in emergencies.

Recommendation: Government agencies in charge of the education sector recovery shall develop policies and measures to make schools the safest public gathering places possible.

2.5. Rebuild better health services.

The Ministry of Health and World Health Organization worked to restore the surveillance system on communicable diseases, which is key to prevent outbreaks of epidemics after the earthquake. They also provided the urgently needed know-how and best practices on designs and planning for safe hospitals, particularly related to earthquakes.

Recommendation: Tailor-made knowledge products should be made available by specialized UN agencies and provided to disaster prone countries.

2.6. Pilot psychosocial intervention in post disaster recovery.

Global experiences in emergencies showed that psychosocial support is critical for long-term recovery. The Government of Finland-supported UNFPA project generated positive experiences in the provision of psychosocial support to the Wenchuan Earthquake survivors.

The project, which especially focuses on vulnerable groups, i.e. elderly groups, women, youths, community leaders and health staff, has 1) established a multi-sectoral psychosocial support intervention service network; 2) developed Core Information Cards to introduce a set of psychosocial support guidelines; and 3) provided a core training on psychological counseling and intervention skills.

Recommendation: Psychological recovery is part of post disaster recovery. Interventions and the widespread availability of counseling services are necessary to provide psychological health support to people in need.

2.7. Link the health sector recovery with the sector reform.

Health sector recovery after the Wenchuan Earthquake coincides with health sector reform in China. A World Bank study reported that the recovery process provides special opportunities for health sector reform in China. The reconstruction should address long-standing issues through the recovery process, such as health financing to reduce out-of-pocket expenditures, better health insurance coverage and benefits, and accessibility for the poor and other vulnerable groups.

Recommendation: Post disaster recovery for the health sector provides an opportunity for sectoral reform. Government officials in charge of health sector reconstruction should integrate the most advanced reforms while rebuilding the general health system.

2.8. New Sangzao Middle School.

The reconstruction of the school provided a typical example of how schools can be rebuilt in a better and safer place. It requires the construction companies as well as school authorities to make protecting the lives of students their principle objective.

Recommendation: Children are the most vulnerable groups to various disasters. Construction companies and school authorities must work together to ensure that reconstructed schools are in quality buildings that are safer and more resistant to future disasters.

3. Public Utility Recovery and Reconstruction

4.1 Restoration of power supply to power the recovery.

Under the Twin Assistance, the State Power Grid is to help restore and reconstruct the power supply systems in Sichuan. Thanks to the assistance, all the power supply restoration works have been completed, which delighted families in urban and rural communities and powered the local economic recovery and reconstruction.

Recommendation: Power supply is one of the basic supports to the local economic recovery, and governments at various levels must address it as one of the priorities of post disaster recovery.

4.2 3.2– Bring safe water to thirsty people.

Another priority of the recovery is water supplies, including drinking water supplies. Under support of the UNICEF project, 4 villages rebuilt their centralized water supply systems to benefit the local farmers and students.

Recommendation: Clean and safe water supplies for disaster-affected people must be recovered and improved by local governments in the first days after the disaster.

4.3 Integrated approach to reduce disaster risks for villages.

The program of the Leading Group Office of Poverty Alleviation and UNDP introduced community-based disaster risk reduction in pilot villages in an integrated approach. The approach covers community restoration, house reconstruction, livelihoods and employment recovery, environment improvements and the use of clean energy, etc. The approach is a collaboration model among various departments in the community recovery.

Recommendation: Government institutions in charge of disaster management are recommended to use the recovery process to reassure with all agencies that DRR is addressed by an integrated approach.

4.4 Disaster risk awareness raising starts with children.

The Ministry of Education and UNESCO started to integrate disaster risk reduction into teacher and school education by introducing the Guidebook for Planning Education in Emergencies and Reconstruction". The project established an expert team to develop two sets of teaching support materials and organized trainings for the trainers.

Recommendation: Efforts for raising disaster risk awareness must start with kids and their teachers. It is suggested that the UNESCO guidebook be adapted to national conditions for countries prone to disasters.

4.5 Beichuan County reconstructed at a safer site.

Relocation of large population is always a hard choice for the displaced people as well as for government after their original inhabited place was completely destroyed. Beichuan is a good example. Three sites were recommended. In the end, Anchang was selected, because it is away from

earthquake faults and is safer. Another consideration in relocation is to secure jobs for the people to ensure long-term settlement and improved livelihoods.

Recommendation: When relocating disaster victims to a new site, which is a difficult choice in the recovery process, the administration must first think of the safety of the place, whether it is suitable for a new town, and whether enough livelihoods can be secured.

4. Employment and income generation

4.1 Twin Assistance to support employment.

One of the major solutions for employment and income generation is to recruit people from disaster-affected areas for the reconstruction projects by the TA donors. The counties of Jiange, Lixian and Mianzhu used this straight-forward method to increase employment, in addition to job fairs, jobs from donor provinces for the affected people, and vocational training.

Recommendation: Increasing employment and income sources often does not require excessive funds. Government institutes must take the initiative to find solutions.

4.2 “Pioneer farmers” to lead income generation.

In *Qingchuan* County, the Twin Assistance Province Zhejiang initiated a practice of training potential “pioneer farmers” and linking them with a program of “one township, one elite agro-product” that covers all the townships of the county. The program helps in the recovery of the agricultural sector and assists local farmers in generating income.

Recommendation: Governments and donors will find opportunities with local development potential and train pioneer farmers who can lead income-generating activities in the local economic recovery.

4.3 Needs A + Needs B = Job Opportunities.

The project of the Ministry of Human Resources and Social Security and ILO assisted those who needed jobs to find employment opportunities or to setup small businesses. The project also assisted them to discover their potential needs for laborers. Once the two needs meet, job opportunities emerge. A series of training workshops were conducted by the project to help people understand the labor market and learn how to find employment.

Recommendation: Simply bringing job seekers and employers together does not always work. The government should further help people to know their strengths and be capable of discovering job opportunities.

4.4 Conserve minority culture and tradition to revitalize tourism.

Jina and Shiyi are two villages where the Qiang minority culture was well preserved and promoted in the recovery. The houses and communal spaces of the village were reconstructed in a safer and more convenient way for tourists. Shiyi village has gone even further. They formed a company to scale up the business and they installed a sewage treatment facility to maintain village hygiene as an environmental protection measure.

Recommendation: Governments should take measures to conserve minority culture and traditions in the recovery, and to help them to live better lives.

4.5 Create your own business.

This case is about how to assist people to learn about and start new businesses. Lui Jun with his two friends joined an ILO training workshop on Emergency Start and Improve Your Business. There he learned the concept of “challenge is opportunity”. He listed all challenges and discovered that there was a huge need of bricks for the reconstruction. So they established a small business to produce environment-friendly bricks using sands and pebbles, and the business prospered.

Recommendation: Creating your own business is a way to generate employment, in which the government role is to assist people to locate business opportunities suitable to their abilities and interests.

4.6 NGOs to assist income-generating activities.

The Red Cross Society of China established several projects in Mianzhu County to help local people to join in income-generating activities. These projects range from helping ethnic minority women create and market their embroidery work to a charity supporting local people breeding rabbits. Income-generating activities contribute to the recovery of people's livelihoods so they can gradually lessen dependence on the relief programs. NGOs are important social supporters that supplement the government and businesses in the recovery.

Recommendation: The government should encourage NGOs to be engaged in the recovery operations, as they have rich experiences in creating income generating activities for the disaster-affected people.

4.7 Re-settlements need employment and basic services.

Xiaoba was one of the rebuilt townships after the catastrophic earthquake. In constructing the new town the government reserved the ground floor of the residential buildings on each side of the streets for running small businesses to promote employment for people that have been resettled. They also built community services such as a nursery and a clinic to serve people.

Recommendation: The government in a post disaster recovery must help relocated people make a living and access basic services within their new communities.

5. Environment and ecosystem restoration

5.1 Environment-friendly reconstruction.

In the reconstruction, environment-friendly building materials and energy-saving technologies were extensively utilized by construction companies, as advocated by the government. The use of green building techniques was also encouraged by the TA provinces. The Shifang Social Welfare Centre assisted by Beijing Municipality is a good example. The centre used green building materials, solar heaters, energy-saving lights, facilities for processing garbage and waste, etc.

Recommendation: Governments at various levels are recommended to promote environmentally friendly reconstruction and to develop incentives for the wide application of such techniques. Post-disaster reconstruction provides a good chance for factories and companies to produce and sell their green products.

5.2 Restoration of ecosystems for the Giant Panda.

Wolong in Sichuan is an area where famous Giant Pandas live, and the recovery operation has benefitted both wild animal protection and human re-settlements. Local governments managed to limit further human intrusion of protected lands in rebuilding houses and saved land for Giant Pandas.

Recommendation: Governments and local households must restore ecosystems damaged by disasters to protect both wild animals and human beings.

5.3 Rapid assessment of chemical contamination.

The World Bank project implemented by a local environment bureau targeted hazards released from chemical facilities damaged in the earthquake. This was an important action as the spills endangered people's health and the recovery operations. Rapid assessments and follow-up treatments to the contamination will reduce risks that may lead to secondary disasters.

Recommendation: Environmental protection requires close attention by governments in a recovery. Rapid actions should be taken to check if chemical industries and radiation facilities are safe in disasters.

5.4 Sharing experiences to heal nature.

UNEP assisted the Ministry of Environment Protection to cope with the situation by sharing knowledge from experience in other countries and with some international organizations. The process of sharing information should start with sending experts, organizing seminars and field visits, and conducting workshops to jointly explore and design strategies and potential actions.

Recommendation: Governments and the people should jointly address the recovery challenges after disasters. However, they should not have to discover best practices on their own. A wealth of knowledge is available from past disaster experiences in other countries and can be accessed through sharing of information among governments and international organizations.

6. Additional good practices

6.1 Sichuan supports Yushu with recovery knowledge.

Sichuan set a good example for information sharing and post-disaster assistance when it provided materials, funds, and information on the best practices in a recovery to Yushu. After the earthquake in Yushu, Sichuan sent in some of the first responders and made its information on best practices available.

Recommendation: Sharing of information on disaster response and post-disaster recovery helps increase a culture of resilience to disaster risks. Countries and international organizations with experience should make their best practices and most essential warnings available to the international community.

6.2 Shanghai Twin Assistance.

Shanghai TA assistance to Dujiangyan had two strong points: A) It targeted the basic necessities of the region: public services and local development .B) It did not only “handover the key” after the project’s completion, but ensured that the project would continue to function on its own. To make sure the assisted projects continue to benefit the local people, Shanghai even reserved funds to subsidize the operating costs for the rebuilt public utilities.

Recommendation: Donor countries and institutions should work to ensure that their contributions to a post-disaster recovery extend beyond building construction and actually promote the long-term viability of new and rebuilt institutions.

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